IC2RSE2019

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The 3rd International Conference Community Research and Service Engagements (IC2RSE-2019)

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Preface

The 3rd International Conference on Community Research and Service Engagements (IC2RSE) 2019 has been held by the Institute for Research and Community Service (LPPM) Universitas Negeri Medan – Indonesia on 4 December 2019. Highlighting the theme on this conference, The Role of Higher Education in Building A Super Smart Society: Incorporating the Human-Cantered Innovations in Learning System Towards Society 5.0 Era. The conference has discussed, formulate and socialize various thoughts, ideas and concrete actions for optimizing the innovation in learning system moving forward from the implementation of advance technology in the industrial revolution 4.0 to society 5.0 era in regional and global settings. The discussion activities involving experts in respective fields will also be accompanied by the presentation of quantitative and qualitative results of applied-base studies and community service that have been carried out by academics, students, agencies, policy owners and the general public in the call for paper format relevant to given conference theme.

The fields of study discussed in this event are (1) Education Related Studies (Education of Science, Higher Education, E-Learning, Elementary Education, Education Research and Organization, Barriers to Learning, Language Education, Adult and Continuing Education, Education and Globalization, Early Childhood Education, Education Policy and Administration/Leadership, Teacher Training, Vocational Education); (2) Social Related Studies (Communication, Economics, Finance, Geography, Law, Management, Marketing, Urban Studies, Psychology, Politics and Political Science, Sociology, Women's Studies, Ethical Issues in Education); (3) Natural and Environmental-Related Studies (Biology, Physics, Mathematic, Chemical, Environmental, Medical, Sport Science, Engineering, Information Technology).

The conference invites delegates from across Indonesian and South East Asian region and beyond and is usually attended by more than 100 participants from university academics, researchers, practitioners, teachers, students of postgraduate program and professionals.

Thank you to all those who have supported the success of this conference, for the advancement of education.

Kustoro Budiarta
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Developing Interactive Teaching Material to Increase Students’ Understanding about the Concept of Audit Practice

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Abstract. One of the abilities that must be mastered by the students in learning the audit practice is to understand the concept of accounting checks in solving a case. To realize this goal, a lecturer must have skills in choosing the proper methods and making new innovations to create an effective and efficient learning environment for students. The Financial Professional Development Center (PPPK) of the Ministry of Finance and the Indonesian Institute of Certified Public Accountants (IAPI) developed ATLAS (Audit Tool and Linked Archive System) electronic application on 2018. It facilitates the process of preparing audit worksheet in the Public Accountant Office. The use of proper learning methods and teaching materials will influence the learning process in the classroom to be more attractive. To find out the effectiveness of the learning process with this method statistically, a regression analysis was carried out, in addition to qualitative analysis. The results of the pretest and posttest were respectively 73.36 and 90.57. Based on the above calculation, the gain score obtained from the comparison of the average value of pretest and posttest in learning using interactive teaching materials is 0.65 with the category "Medium" (0.7 N-Gain> 0.3). The increasing of post-test mean scores indicates that interactive teaching materials have been able to enhance the student’s understanding of audit practice in general after the students use ATLAS for learning.

Keywords: Audit Practice, ATLAS, Learning Effectiveness.

1 Introduction

Quality assessment of educational products is first seen in the development of basic attitudes, such as scientific academic stance and continuing willingness to seek truth. Therefore, the concept of education is not reduced on exams that only measure knowledge transfer, but it is wider, including the establishment of skills and basic attitude, such as critical thinking, creativity and openness to innovations and inventions. Audit practice is one of the subjects learned in college. The Students must be able to understand the concept of audit practice, explaining the relationship between concepts and implementing the concept accurately and efficiently in problem solving.

Therefore, this should be supported by the effectiveness of the interactive methods of learning and teaching materials. So far, the existing teaching materials are often not interactive and incomplete. It is required that a teaching material is capable of explaining the material in more detail, visualizing abstract material, and training students to think creatively in order to solve the cases.
The Financial Development Center (PPPK) of the Ministry of Finance and the Institute for Public Accountants (IAPI) developed the electronic application ATLAS (Audit Tool and Linked Archive System). Responding to this, ATLAS was chosen to be used in the study of accounting practice. The effectiveness of media use and modules will be seen from student enthusiasm in the learning and teaching process.

Theoretical Framework

Learning is the process of acquiring knowledge and science, forming attitudes, habits and beliefs with the help of teachers in a learning environment [1]. Teaching materials are one of the important supporting factors in learning. The use of teaching materials can improve student learning outcomes. In drafting the teaching materials at least the following four elements, namely (1) there is content or subject matter (2) using the media, (3) arranged with the intention of assisting students in learning and achieving learning objectives, and (4) the existence of instructions for use.

The type of teaching materials divided into two namely (1) printed teaching materials in the form of handouts, textbooks, modules, programed materials, (2) Electronic teaching materials in the form of interactive CDS, TV, and radio. Teaching materials can also be tapes, videos, CD-rooms, dictionaries, reading books, photographs, newspapers, etc. The module can be divided into two types or shapes, and Figure 1 shows the description in more detail.

An interactive learning method is a teaching strategy that emphasizes common attitudes or behaviors in working or assisting among others in the working structure. In a group, consisting of two or more people. Work success is heavily influenced by the involvement of each member of the group. Interactive learning is a type of learning that prioritizes the cooperation between students to reach the learning objectives. The learning step is as follows: (a) convey purpose and motivate students; (b) Provide information; (c) Organizing students in study groups; (d) Guiding study and work groups; (e) Evaluation; (f) Give awards.

2 Research Method

The used research method is R & D (Research & Development), which is oriented to researching, designing, producing, testing, and validating the produced product. The development model used in this study is a model developed by M. Alessi and Stanley R.
Trollip, which consists of stages of planning (planning), design (design), and development (development).

![Fig 2. The stages of development model](image)

### 2.1 Planning Stage

a. Define the Scope.
   At this stage, we determine the material raised and determine the achievement target. Identify Learner Characteristics. In identifying the characteristics of the product users used as a target of interactive teaching materials development using interview techniques with lecturers and students. The target (user) of the interactive teaching materials product in this study is student of VII semester in Accounting Department.

b. Produce a Planning Document.
   Before developing a product, it is recommended to create a planning document that contains material, images, animations, test scripts, product views, which are presented in a teaching material.

c. Determine and Collect Resources.
   At this stage, covers all materials used to support and assist in the process of product development. There are three sources of materials used in this development: (1) everything that is relevant to the material presented. (2) All that is relevant to the development and process of learning. (3) All relevant in accordance with the conveyance techniques presented in the interactive teaching materials are the software used. The source is used based on SK and KD which is contained in the syllabus and is equipped with other references that are suitable for the purpose of learning.

d. Conduct Initial Brainstorming.
   Brainstorming is done with the professor of Accounting Practice examination related to the interactive teaching materials of accounting check practices that will be developed to add insight.

### 2.2 Design Stage

a. Develop Initial Content Ideas.
   At this stage, the researcher designs the initial content contained in interactive teaching materials such as the theme of interactive teaching materials, the type of color and size of the text.

b. Conduct task and Concept Analysis.
   At this stage, the purpose of the task analysis is to determine the order of the material using concept maps so that they are easy to learn by students. Whereas concept analysis is focuses on how to organize the material so that it is easily seen.

c. Prepare Create Flowchart, and Storyboards.
The last stage in the design phase is making flowcharts and storyboards that are used as guidelines for the development of teaching materials from the aspects of appearance, navigation, layout, and material presented to achieve learning objectives.

2.3 Development Stage

a. Prepare the Text
   Prepare the text of the material presented in interactive teaching materials. The text of this material is adapted to the syllabus and Learning Implementation Plan (RPP).

b. Produce Video
   Interactive teaching materials developed will be equipped with videos that explain the material and discussion of the questions. The video presented is in the form of a brief explanation of the material.

c. Assemble the Pieces
   At this stage merge all content into one file in the form of text, images, animation, and video. Prepare Support Materials, in addition to media content in the form of text, images and videos will also be equipped with other supporting materials such as animations and user manuals, so the teaching material developed is interactive and easy to use.

d. Test and Revision
   At the test and revision stage has the following steps, consisting of: (1) Do an Alpha Test; (2) Make Revision; (3) Do a Beta Test; and (4) Make Final Revision. The alpha test will be validated by media experts and material experts and the beta test was conducted on 34 semester VII students.

2.3 Product trial design

Trial Design

Product trials conducted in this study aim to collect data about the quality of the product to be used. Interactive teaching material products in the form of interactive learning modules will be more quality if tested and revised. The module product trial phases conducted in this study are:

a. Alpha Test
   At this stage, the interactive teaching material products that are developed will be validated by two media experts and two material experts who master their fields using instruments that have been prepared previously. Furthermore, revisions were made according to the input of the two experts. If the content experts and media experts have agreed to the revised results, then proceed to the beta test.

b. Beta Test
   Beta test is done after alpha test is given. The beta test consists of two stages, namely beta 1 and beta 2. Beta 1 is given to a small group of students. In order not to be biased, this small group test will be tested on VII semester students who have taken accounting examination -1 and examination of accounting-2 courses, while beta test 2 is given to large groups of students meaning it is given to 34 students majoring in accounting FE-Unimed as research subjects. The purpose of this beta test is given to determine student responses about the interactive teaching material products used. After the student response instrument is obtained, the next step of the data is processed and analyzed. In the beta test 2 also tested the effectiveness of the product through pretest and posttest.
Trial subject

The experimental subjects in this study were material experts, media experts, and VII semester students of the Accounting Department FE-Unimed 2019/2020 school year. Material experts and media experts play a role in assessing the feasibility of the report. Many trial subjects in the first beta test were 7 semester VII students while the total numbers of trial subjects in the beta test were 28 students consisting of VII semester students.

Data collection technique

Data collection techniques used in this study were questionnaires, tests, interviews and observations. The instruments used to collect data are test questionnaires, interview guidelines and observation sheets.

a. Questionnaire

Questionnaire is a data collection technique by giving a set of questions to respondents to be answered.

b. Test

The test in this study is used to measure the effectiveness of the use of the product being developed. Tests are given twice, namely before the learning process using interactive teaching materials in the form of Pre-test questions and after the learning process using interactive teaching materials in the form of Post-test questions. The results of the two tests are then compared, so there is an improvement between the pre-test and post-test results. The improvement is used to determine the effectiveness of the use of interactive teaching materials in improving the understanding of auditing concepts.

c. Interview guidelines

Interview guidelines are used as a tool to gather information or data from lecturers and students about analyzing student needs. The needs analysis is used as a reference in developing interactive learning module products. Interview activities carried out at the time of pre-observation.

d. Observation

Observation is a tool used to pre-survey conducted in the VII semester students of the Department of Accounting FE-Unimed. Observations were made to collect information related to the analysis of learning needs and conditions both in terms of facilities and infrastructure to support the operation of the product being developed.

2.4 Data analysis technique

Data analysis techniques in this study were obtained from research instruments in the form of qualitative and quantitative data. Quantitative data were obtained from questionnaires and qualitative data were obtained from responses or suggestions from experts and students after using interactive teaching materials in the form of interactive learning modules and data analysis techniques for the feasibility of the media using descriptive data analysis. While the quantitative data analyzed as follows:

a. Data Analysis Techniques for Media Feasibility

1) Questionnaire assessment results obtained from experts (media and material) and student responses in the form of quantitative data are changed in the form of categories with the guidelines in the following table:

<table>
<thead>
<tr>
<th>Category</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very good</td>
<td>4</td>
</tr>
<tr>
<td>Good</td>
<td>3</td>
</tr>
<tr>
<td>Bad</td>
<td>2</td>
</tr>
<tr>
<td>Very bad</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 1. Scoring
2) Calculate the average score of instruments using the following formula:

\[
M = \frac{\sum X}{N}
\]

Note:
\( M \) = Average Score
\( \sum X \) = Total Score
\( N \) = Number of Assessors

3) Change the average score into a qualitative value with the following assessment criteria to be a quantitative value.

Table 2. The Criteria of Assessment

<table>
<thead>
<tr>
<th>Score Range</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>( X \geq M + SBi )</td>
<td>Very feasible</td>
</tr>
<tr>
<td>( M + SBi &gt; X \geq M )</td>
<td>Feasible</td>
</tr>
<tr>
<td>( M &gt; X \geq M - 1 SBi )</td>
<td>Enough Feasible</td>
</tr>
<tr>
<td>( X &lt; M - 1 SBi )</td>
<td>Very Less Feasible</td>
</tr>
</tbody>
</table>

Note:
\( X \) = Obtained Score
\( M \) = Average Ideal Score
\( SBi \) = Standard Deviation

Based on these data, an interactive learning material assessment criteria table can be drawn up in the following table:

Table 3. The Criteria of Determining Score

<table>
<thead>
<tr>
<th>Score</th>
<th>Range</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>( X \geq 3,0 )</td>
<td>VF (Very feasible)</td>
</tr>
<tr>
<td>3</td>
<td>( 3,0 &gt; X \geq 2,5 )</td>
<td>F (Feasible)</td>
</tr>
<tr>
<td>2</td>
<td>( 2,5 &gt; X \geq 2,0 )</td>
<td>EF (Enough feasible)</td>
</tr>
<tr>
<td>1</td>
<td>( X &lt; 2,0 )</td>
<td>NF (Not feasible)</td>
</tr>
</tbody>
</table>

In this study the feasibility value of interactive teaching materials is determined by a minimum value of "F" with the Eligible category. So if the results of the assessment by media experts, material experts and students' responses give the final score "F", then the product development of interactive teaching materials is feasible to use.

b. Data Analysis Techniques of Pre-test and Post-test

Analysis of the results of the pretest and posttest is done by providing a test problem understanding the concept and measured learning outcomes to see the level of effectiveness of the product. Improvement of student learning outcomes obtained before and after using interactive teaching materials, calculated using the formula N-gain is determined based on the average gain. The gain score (g) obtained is the result of a comparison between the average values pre-test and post-test. The average gain compared (N-gain) expressed in the following equation:
Furthermore, if the value is obtained then the next step of the value is converted into the interpretation of the value gain as in the table below:

**Table 4. N-gain Interpretation**

<table>
<thead>
<tr>
<th>No.</th>
<th>Value (g)</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(N-gain) ≥ 0.7</td>
<td>High</td>
</tr>
<tr>
<td>2</td>
<td>0.7 &gt; (N-gain) ≥ 0.3</td>
<td>Middle</td>
</tr>
<tr>
<td>3</td>
<td>(N-gain) &lt; 0.3</td>
<td>Low</td>
</tr>
</tbody>
</table>

**Analysis**

In this research and development produces products in the form of teaching materials in ATLAS-based Accounting Examination Practice courses. Teaching material product is a digital learning media application that can be used / read on a computer or laptop device. The product development of teaching materials produced through several stages of development based on the Alessi & Trollip model including the stage of planning, design and the stage of development. Each stage of the research and development can be explained as follows:

**Planning Stage**

a. Define the Scope

The selection of program objectives, materials and targets developed in interactive teaching material products is to consider some of the results of observations and interviews with lecturers on accounting examination practices at the FE-Unimed Accounting Department and Practitioners of Public Accountants. Based on the results of preliminary observations obtained some information that supports the selection of material to be developed in this interactive teaching material. According to lecturers of audit practices and Practitioners from the Public Accounting Firm stated that students have difficulty in understanding material that is simulated practice. This can be seen from the way and work attitude of fresh graduates in the Public Accounting Firm.

The practice of checking control tests is one of the materials that are considered difficult for students, because the material is abstract. This difficulty is also supported by the lack of teaching materials used. Teaching Materials used by students are only substantive tests. Where the presentation of material contained in the book used is very minimal explanation, illustrations are too complicated and not yet interactive which results in students lacking/difficulty understanding concepts.
b. Identify Learner Characteristic
At this stage, it is to identify the characteristics of students who aim to make the results of product development on target and in accordance with user needs. Identification of student characteristics was obtained from theory, interview results, and preliminary observations at the Department of Accounting FE-Unimed. Characteristics of high school students have an average age of 21-22 years, student motivation to learn increases when using digital form of media, each student has different speeds in understanding the material there are fast, medium, and slow, often answering the teacher's question with short answers, students remember what is seen rather than what is heard and like to imagine and try new things. Based on these characteristics, students need to be facilitated in the development of interactive teaching materials. One of them is using interactive teaching materials that support student speed in learning. For this reason interactive teaching materials are packaged in digital form in which they can present material visually so students are able to imagine and think critically.

c. Produce a Planning Document
The process in this stage is the making of planning documents, consisting of teaching needs, material scripts, test script documents, and assessment documents. The material requirements include the syllabus, Learning Implementation Plan (RPP shortly in Indonesian) and text material in the form of text, and pictures. The test document includes the question grid consisting of pretest and posttest, question exercises, answer keys and discussion of questions. While the assessment documents are in the form of grids and questionnaires for material experts, media experts and student responses.

d. Determine and Collect Resources
At this stage a gathering of supporting resources is carried out in developing interactive teaching material products in the form of software, learning resources, as well as facilities and infrastructure. The process starts from identifying the syllabus in the form of competency standards and basic competencies in accordance with the needs analysis at the time of initial observation and interviews with subject teachers and students. After determining the competency and competency standards, then proceed with the preparation of the lesson plan (RPP). The lesson plans are developed using the assignment method, where these interactive teaching materials will be used independently by students. Further identification relates to the supporting facilities and infrastructure needed to operate the interactive teaching material products that will be developed. This interactive teaching material product will be in the form of digital that is read on a computer / laptop screen that has a format while the process stages are still based on Microsoft Excel. Based on the observations obtained, there are 28 students having ready-to-use laptops that can be used later. The operating system running on the laptop is Windows. The next process is related to the content of the material that will be used in interactive teaching material products. In general, material is obtained from various sources such as textbooks and the internet. The material obtained is then designed to be presented in an interactive teaching material product.

e. Conduct Initial Brainstorming
At this stage, the developer conducts discussions with lecturers on audit practices for the breadth of the material aspects, regarding the determination of learning objectives, indicators of goal achievement, sample questions, practice questions, and evaluation questions and so forth. In addition, developers discuss with friends Learning Technology about aspects of developing interactive teaching materials to get advice and input. The process was also consulted with counselors, material experts and the media.
2.5 Develop Initial Content Ideas

The process in this stage is that all ideas are developed. The idea is about the appearance, programming and form of interactive teaching materials that can present text, image, animation, and video content in form of interactive teaching materials that can load content in digital form that can be used / read on computer or laptop.

Conduct Task and Concept Analysis

At this stage, what is done is to analyze the three dimensional space material obtained from various sources in accordance with the learning objectives that have been determined in the syllabus and lesson plans. The next step is to arrange the scope of the material control test and substantive test according to the learning objectives. In addition, writing the concept map as a flow of material to be studied, lattice questions to measure the achievement of learning objectives, and test scripts in the form of pretest and posttest questions that are used to measure students' understanding of concepts. All documents produced must first be assessed to be appropriate for use when collecting data, so it needs to be consulted with material experts.

Prepare Create Flowchart and Storyboard

At this stage the design of program planning are carried out in the form of flowcharts and storyboards. Flowchart is a workflow of interactive teaching material products that will be developed when used by student. Furthermore, the preparation of this flowchart is used as the basis for making storyboards that is made to compose a good product design display, color, buttons, text, video, animation and others. In general, the process contained in the storyboard includes a cover page, preface, description, instructions, objectives and concept maps, material description, summary, question exercises, answer keys / discussion of questions and a list of references.

2.6 Development Stage

The process in this development phase includes the development of content contained in interactive teaching materials consisting of text, images, animations, practice questions, and videos so that they are easy to read on a computer / laptop or in digital form. Interactive learning material components are the same as module components in general which consist of: cover page, module identity, preface, table of contents, glossary, target users, description, final destination of learning, instructions for learning interactive instructional materials, concept maps, interactive teaching material criteria , learning activities, competency tests, and answer keys. Learning activities that are presented in interactive teaching materials consist of two learning activities, namely learning activity 1 is about the control test. Learning activity 2 is about determining the substantive test. Each learning activity consists of components of learning objectives, material descriptions, summaries, exercises in the form of multiple choice questions, a list of references and key answers / discussion questions.

The product cover page for interactive teaching materials is the title and user identification page. The title page of interactive teaching materials is "ATLAS-based Accounting Examination Practicum. Components of the table of contents, glossary, target users, descriptions, instructions for interactive teaching materials and concept maps are important components in a product. While the table of contents in this interactive teaching material is presented to make it easier for students to access the page as they wish. The interactive teaching material product is equipped with question exercises and answer/discussion questions. The question exercises are presented in each learning activity. The next step support materials, is preparing namely providing user manuals. This manual contains an explanation of the menus contained in interactive teaching materials and learning instructions using interactive teaching materials.
5. Results and Discussion

Alpha Test Results

a. Material Expert Validation Results Material

The validators on interactive teaching material products were conducted by two material experts. Both material experts are lecturers from FE-Unimed accounting majors. The purpose of this material expert validation is to measure the level of accuracy and quality of the material presented in the interactive teaching material product, the substantive test material. In addition, the purpose of this material expert validation is to obtain feasible products from each aspect.

<table>
<thead>
<tr>
<th>No.</th>
<th>Aspects</th>
<th>Material Expert</th>
<th>Total</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>I</td>
<td>II</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Preliminary</td>
<td>3.7</td>
<td>3.5</td>
<td>7.2</td>
</tr>
<tr>
<td>2</td>
<td>Content</td>
<td>3.5</td>
<td>3.5</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>Learning</td>
<td>3.5</td>
<td>3.5</td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td>Summary</td>
<td>3.7</td>
<td>3.3</td>
<td>7</td>
</tr>
<tr>
<td>5</td>
<td>Task</td>
<td>3.3</td>
<td>3.6</td>
<td>6.9</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>35.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Average</td>
<td></td>
<td></td>
<td></td>
<td>3.526</td>
</tr>
<tr>
<td>Category</td>
<td>Very feasible</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The results of the assessment of two material experts on the five aspects obtained an average score of 3.52 which is qualitatively categorized as Very Eligible (X ≥ 3.0).

b. Media Expert Validation Results Media

The validator on interactive teaching material products was carried out by two material experts. Both material experts are lecturers from FE-Unimed accounting majors. The purpose of this media expert validation is to measure the level of clarity and utilization of the media used in interactive teaching material products, the accounting examination practice module. In addition, the purpose of this material expert validation is to obtain appropriate media from each aspect.

<table>
<thead>
<tr>
<th>No.</th>
<th>Aspects</th>
<th>Media Expert</th>
<th>Total</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>I</td>
<td>II</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Display</td>
<td>3.4</td>
<td>3.2</td>
<td>6.6</td>
</tr>
<tr>
<td>2</td>
<td>Preliminary</td>
<td>3.5</td>
<td>3.2</td>
<td>6.7</td>
</tr>
<tr>
<td>3</td>
<td>Utilization</td>
<td>3.4</td>
<td>3.1</td>
<td>6.5</td>
</tr>
<tr>
<td>4</td>
<td>Task/Evaluation</td>
<td>3.5</td>
<td>3.2</td>
<td>6.7</td>
</tr>
<tr>
<td>5</td>
<td>Summary</td>
<td>3.8</td>
<td>3.2</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td>31.5</td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td></td>
<td></td>
<td>3.34</td>
</tr>
<tr>
<td>Category</td>
<td>Very feasible</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The results of the assessment of two media experts on the five aspects obtained a mean score of 3.34 which was qualitatively categorized as Very Eligible (X ≥ 3.0).
Results Pretest and Post Test in Beta 2 Test

c. Application of Case-Based Learning

Implementing pretest and posttest aims to determine the level of effectiveness of teaching material products developed in improving understanding of ATLAS-based accounting examination practices, namely by looking at the difference in scores before and after using interactive teaching material products.

\[
g = \frac{S_{post} - S_{pre}}{S_{max} - S_{pre}} = \frac{17.21}{26.64} = 0.65
\]

Based on the above calculation, the score gain obtained from the comparison of the average value of pretest and posttest in learning using interactive teaching materials is 0.65 with the category "Medium" (0.7 N-Gain > 0.3). The increase in mean scores posttest indicates that in general interactive teaching materials have been able to improve the understanding of accounting examination practices after students use products in learning. The pretest and posttest questions used have the same problem language and number of items consisting of 20 items. The 20 items represented by 8 question indicators.

![Comparison Results of Average Pretest and Posttest Scores](image)

Fig 3. Comparison Results of Average Pretest and Posttest Scores

It can be concluded that the application of Case Base learning can improve students' understanding of ATLAS-based Accounting Examination Practice material with the category "medium" (0.7 ≥ N-Gain > 0.3).

3 Conclusions

Based on the above calculation, the score gain obtained from the comparison of the average value of pretest and posttest in learning using interactive teaching materials is 0.65 with the category of "Medium" (0.7 N-Gain > 0.3). Improvements to the average scores posttest indicate that in general interactive teaching materials have been able to improve the understanding of accounting examination practices after students use products in learning.
4 References


Do Tourism Vocational High School Students in Medan Know About MICE?

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*sarahroulitambunan@polmed.ac.id

Abstract. Increasing tourism revenue from MICE sector is currently being driven by the government, therefore human resources in tourism based MICE sector are needed. MICE Study Program of Politeknik Negeri Medan was established in 2007. One of the potential student targets for this department is tourism vocational high school students, because MICE industry is related to tourism. Based on the number active students in MICE study program, there are only 3 students who graduated from tourism vocational high school, while in Medan, there are 15 tourism vocational high school. This article wants to discuss: do tourism vocational high school students in Medan know about MICE industry and the role of university in socializing MICE in Medan.

Keywords: mice, tourism vocational high school

1 Introduction

The Indonesian government is currently starting to focus on developing the tourism based on MICE sector. This is evidenced by the determination of the target number of MICE tourists by 2 million MICE tourists in 2019. MICE tourists are considered attractive because of the different characteristics of ordinary tourists. MICE tourists combine business and leisure activities, so the duration of the visit can be longer and their expenses can reach 7 times greater than ordinary tourists.

The manifestation of the government's attention in developing MICE industry is shown by setting 16 MICE destinations as Jakarta, Bali, Surabaya, Medan, Batam, Padang, Bandung, Yogyakarta, Semarang, Makassar, Manado, Lombok, Solo, Bintan, Palembang and Balikpapan. From a number of cities above only Jakarta and Bali are included in the category of existing destinations and always top the list of ICCA as the destinations that hold many MICE events. The success of Jakarta and Bali is supported by the presence of infrastructure as facilities for large-scale and international events.

Medan as a MICE destination is still unable to compete with Jakarta and Bali in the infrastructure, but Medan is one of the cities that produce skilled human resources in the field of MICE in Indonesia, which is marked by the establishment of the Meeting, Incentive Travel, Convention Exhibition (MICE) study program at Politeknik Negeri Medan (Polmed). This study program was established in accordance with decree No. 2155 / D / T / 2007.
The term MICE may not be too familiar to prospective new students. In fact, many MICE Polmed students only know the term MICE when filling in the registration form for Polytechnic entrance exams. The public is more familiar with the term tourism which is the root of MICE itself.

One of the targets that can be influenced to increase the number MICE study program students is tourism vocational high school students, because their learning connect to the MICE industry. However, the data shows that from the three batches of students in MICE study program (2016-2018) with a total of 175 students, only 3 students have graduated from tourism vocational schools in Tourism.

Awareness of various parties about MICE needs to get serious attention especially for those who connect with the world of tourism such as tours vocational high school graduates because they play a role as human resources who contribute in supporting MICE tourism in the city of Medan. Tourism vocational high school students are usually faced with 3 choices: continuing education to college, working, or doing business. For graduates who want to go to college, knowledge of MICE can add references to educational choices that answer the needs of human resources in the MICE field. Meanwhile, for them who want to work or be entrepreneurs, knowledge of MICE is very necessary to synchronize between graduates and the needs of the tourism based MICE industry that is currently being developed by the government in Medan intensively.

Based on the phenomena described earlier, this article will discuss the knowledge of tourism vocational school students in Medan and the role of universities in socializing MICE in Medan.

2. Analysis and Discussion

2.1 Do Vocational High School Students in Medan Know About MICE?

Vocational education is education that provides students with various kinds of knowledge, skills and experience so that they are able to do certain jobs needed, both for themselves, for the world of work, and for the development of their nation [1]. Vocational School graduates are mid-level workers who have sufficient skills or competencies in accordance with the guidance of the times, and are ready to work in the business world and the industry.

Arikunto in Muniarti [1], describes the characteristics of vocational education are as follows: Specialized education designed to prepare the learner for entrance into a particular vocation, or to upgrade employed worker

a. Content drawn from the world of work through analysis of the skills understanding, values and attitudes of successful workers in a particular field
b. Instruction organized into sequences of courses and at preparation for a particular occupation or family occupations
c. Emphasis on job preparation or advancement in employment

The tourism is the second most popular field in the vocational school in Indonesia. According to data from the Central Statistics Agency (BPS) approximately 83,000 vocational graduates were born from tourism. One of the factors that caused students want to choose this field is because of the perception of having fun and traveling. There are nine majors in the field of tourism that can be selected by prospective vocational students [2]:

---

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---
Table 1. Majors in The Field of Tourism

<table>
<thead>
<tr>
<th>No.</th>
<th>Field of Tourism</th>
<th>Majors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Business Travel Services</td>
<td>a) Business Travel Services</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b) Hospitality</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c) Maritime Tourism</td>
</tr>
<tr>
<td></td>
<td></td>
<td>d) Ecotourism</td>
</tr>
<tr>
<td>2.</td>
<td>Culinary</td>
<td>a) Catering</td>
</tr>
<tr>
<td>3.</td>
<td>Beauty</td>
<td>a) Skin and Hair Beauty</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b) Spa and Beauty Therapy</td>
</tr>
<tr>
<td>4</td>
<td>Clothing</td>
<td>a) Fashion</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b) Fashion Design</td>
</tr>
</tbody>
</table>

In the city of Medan, there are 15 registered vocational schools registered at the Directorate of Vocational Development [3], as:

Table 2. List of Tourism Vocational School in Medan

<table>
<thead>
<tr>
<th>NO</th>
<th>NPSN</th>
<th>Voc.Schools</th>
<th>Status</th>
<th>Province</th>
<th>City</th>
<th>Field of Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10211265</td>
<td>SMKS PENCAWAN 1</td>
<td>Private</td>
<td>North</td>
<td>Medan</td>
<td>Tourism</td>
</tr>
<tr>
<td></td>
<td>69954155</td>
<td>SMK SWASTA TRITECH INDONESIA</td>
<td>Private</td>
<td>North</td>
<td>Medan</td>
<td>Tourism</td>
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<tr>
<td></td>
<td>10211269</td>
<td>SMKS RAKSANA 2</td>
<td>Private</td>
<td>North</td>
<td>Medan</td>
<td>Tourism</td>
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<tr>
<td></td>
<td>10259159</td>
<td>SMKS INDONESIA MEMBANGUN 3</td>
<td>Private</td>
<td>North</td>
<td>Medan</td>
<td>Tourism</td>
</tr>
<tr>
<td>5</td>
<td>10259305</td>
<td>SMKS SHANDHY PUTRA 2</td>
<td>Private</td>
<td>North</td>
<td>Medan</td>
<td>Tourism</td>
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<tr>
<td></td>
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<td>SMKN 7 MEDAN</td>
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<td>North</td>
<td>Medan</td>
<td>Tourism</td>
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<tr>
<td>7</td>
<td>69886449</td>
<td>SMKS IT MARINAH AL-HIDAYAH</td>
<td>Private</td>
<td>North</td>
<td>Medan</td>
<td>Tourism</td>
</tr>
<tr>
<td>8</td>
<td>69949521</td>
<td>SMKS SETYA NUSANTARA MEDAN</td>
<td>Private</td>
<td>North</td>
<td>Medan</td>
<td>Tourism</td>
</tr>
</tbody>
</table>
Based on a survey that the author conducted on tourism vocational school students in Medan with 150 respondents, there are 78 peoples (58%) who had heard of the MICE industry, but only 23 peoples (29.48%) could correctly mention MICE’s length, 53 peoples (67.94%) were wrong and 2 peoples were unable to mention it.

Furthermore, respondents who had heard about the MICE industry knew MICE from their learning in schools as many as 70 peoples (92.5), 2 peoples (2.63%) got information from the mass media, while 4 peoples (5.25%) knew MICE from other sources as family, friends, etc.

Based on the data above, it can be seen that although the MICE industry is learnt at school, not all students are able to explain what MICE is. In fact, there are still students who have never heard about MICE, even though the tourism sector is connected with MICE and is the focus of the current government.

The low awareness of vocational students in the field of tourism based on MICE could have an impact on the absorption of vocational graduates in the MICE industry. MICE industry related to tourism in several field such as transportation, accommodation, food and beverage. The need for educational programs that are relevant to the demands and development of the times is increasingly important. Promoting collaboration between vocational schools and industry is an effective way to improve the quality of vocational school graduates.

Based on the research the author conducted, only 9 peoples (6.42%) of vocational students are interested in continuing their education in the MICE study program in Medan, they are more interested in entering the Medan Tourism Polytechnic because they feel linear with their majors. This is due to their ignorance of the existence of the MICE study program at Medan State Polytechnic. From 150 respondents only 48 peoples (32%) of respondents who knew that there is a MICE study program in Medan. This has an impact on the study program is more dominant filled by high school students, rather than tourism vocational high school and also has an impact on their sentiments on learning material in college.
2.2 The Role of Universities in Socializing MICE

Kesrul [4], stated that MICE as a tourism activity, combination of leisure and business, usually involves a group of people together, a series of activities in the form of meetings, incentive travel, conventions, congresses, conferences, and exhibitions. The development of the MICE industry as a new industry that can benefit many parties, because the MICE industry is a complex industry and involves many parties. Therefore MICE industry in Indonesia can support the development of Indonesian tourism widely [5].

The existence of universities is expected to be able to play an active role in realizing Medan as a MICE city. Arief Yahya (tourism minister for the period 2014-2019) explained that to create a positive development of the tourism sector, synergy is needed from the five main tourism stakeholders called penthalix, namely academics, business people, government, communities, and the media.

The stretching of MICE industry development has encouraged universities to open MICE study programs such as Politeknik Negeri Medan. Besides it, MICE as a subject is also taught in tourism study programs in Indonesia. This shows that universities see opportunities for reliable human resources to support government programs in developing MICE industry in Indonesia in the future.

As a study program that has been established since 2007, MICE Polmed study program needs to be active in introducing MICE to tourism vocational school students. The trick is to actively socialize about the MICE industry and future employment prospects.

Polmed also needs to be a government partner to socialize Medan as a MICE city to all levels of society in Medan, so that the community also participates in building the MICE industry in Medan.

In order to produce reliable human resources in the MICE field, MICE Polmed's study program can also provide training to encourage workers in the MICE field that are certified. All of this can be realized in community service programs as a form of higher education.

3 Conclusion

Awareness of the MICE industry in Medan needs to be increased especially for those who are involved in the tourism world such as tourism vocational students. Although they have learnt about MICE, not all students can explain what MICE is. The survey also showed that very few of tourism vocational school students knew about MICE study program in Medan, which had an impact on the lack of interest in students who wanted to continue their studies at MICE study program of Politeknik Negeri Medan.

Politeknik Negeri Medan needs to be active in socializing the MICE industry and future employment prospects as well as training for tourism vocational students in Medan to encourage the presence of certified human resources in the MICE-based tourism sector.
4 References


Identification Genetic of Soybean Mutant (*Glycine max* L. Merril) Based on Fatty Acid Characters Using Simple Sequence Repeat (SSR) Markers

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Abstract. Soybean is one of the leading strategic food crop in Indonesia. Nowadays, people's need for soybeans is not only seen from the production aspects but also soybean nutrient contents, especially fatty acids. One of the ways to develop superior varieties of soybean with high fatty acids is through mutations. Seven soybean mutants selected M5 and M7 generation with high production character and resistance *Athelia rolfsii* Curz were genetically related to high fatty acids using SSR markers. DNA quality and quantity test results showed DNA purity between 1.12-2.13 with concentration between 15.4-97.9 μg/mL. The FAD2-2D locus is the gene candidate of the result by the QTL mapping used in this study to identify soybean genes related to linoleic acid characters. The results showed that the primer used was specific and polymorphic. Mutant soybeans tested have a high genetic diversity.

Keywords: mutant soybean, fatty acid, SSR markers

1 Introduction

Awareness of the importance of health encourages people to tend to choose vegetable food products as their nutritional needs. Soybean is a source of vegetable food, where every 100 grams of dry matter consists of 35 grams of protein, 35 grams of carbohydrates, 18-20 grams of fat, and other nutritional content [1]. Of the existing fat content, 85% of this amount consists of unsaturated fatty acids that are free of cholesterol [2]. Fat or oil is the source of energy compared to carbohydrates and protein. Where 1 gram of fat can provide 9 kcal this means two times greater than carbohydrates and proteins that only produce 4 kcal per gram [1]. In 2017, national soybean production only reached 538.728 tons but increased to 982.598 tons in 2018 [3]. The increased availability of soybean will support the need for soybean oil as an alternative to vegetable oils and a source of omega fatty acids [4].

One effort to develop superior soybean varieties high in fatty acids is through mutations. Mutations are genetic changes that occur in several numbers of genes or chromosome composition. The results of these mutations obtained mutant line, which is then selected based on the desired characteristics and are expected to be better than parents with the final goal to release superior varieties of soybeans [5]. Selection based on phenotypic observations, phenotypes are strongly influenced by the environment and require a long time because they
have to wait for plants to grow and develop. Therefore the molecular markers approach needs to be considered to help an effective and efficient selection program [6].

The selection of markers that will be used in genetic analysis needs to find the desired objectives, sources of funds owned, facilities available, as well as the strengths and weaknesses of each type of markers [7]. One of the DNA markers based on polymerase chain reaction (PCR) is simple sequence repeat (SSR) markers that can identify the composition of the fatty acid-regulating allele in soybean mutant lines. SSR is specific loci, codominant and molecular markers based on repetitive DNA sequences that are spread in the genomes of eukaryotic living things [8]. The advantages of these markers are that they are abundant, highly polymorphic, codominant [9] based on PCR, able to detect polymorphic loci accurately [10] used for plant selection, analysis DNA fingerprinting, genetic mapping related to certain quantitative characters [11].

Research using microsatellite markers on soybean has been carried out to determine the location of the Quantitative Trait Loci (QTL) content of fatty acids including Bachlava et al. [12], Arjunrao [14]. FAD2-2D primers can be used as specific primers for the character of linolenic and linoleic acids in soybeans [12]. This study aims to determine the genetic diversity of mutant soybeans based on the character of fatty acids using SSR markers.

2 Research Method

This research was carried out at the Greenhouse and Molecular Genetics Laboratory of the Faculty of Agriculture, Universitas Sumatera Utara, September to Oktober 2019.

Plant materials

Soybean seeds obtained from M5 and M7 soybean mutant line selection based on high production characteristics and resistant *Athelia rolfsii* Curzi. They were M100-A17 (18/5), M200-A12 (6/5), M100-A25 (2/7), M100-A25 (3/4), M100-A25 (3/7), M100-A5 (31/1), M200-A11 (32/3), Anjasmoro as parents and Devon 1 as comparative variety. Seeds germinated, and the seedlings cultivated for DNA extraction in greenhouse. Twenty days after germination, young leaves from each plant were taken as much as 0.3 grams for DNA isolation.

DNA Extraction

The DNA isolation procedure was carried out based on the Cetyl Trimethyl Ammonium Bromide (CTAB) method of Orozco-Castillo *et al.* that was modified by the addition of PVPP and **mercaptoethanol**. After the DNA of each line is isolated, the DNA stock of each line is tested in quantity using a Nanodrop Spectrophotometer (Thermo Scientific, USA) and quality testing by electrophoresis method using Electrophoresis Power PAC 3000, Biorad.

Quantity test of DNA soybean mutant

DNA quantity testing was carried out using the spectrophotometer method using a Nanodrop Spectrophotometer (Thermo Scientific, USA) at wavelength (λ) 260 and 280 nm using 1 µl of isolated and purified DNA stock. DNA has high purity if the ratio of absorbance values at wavelengths of 260 nm and 280 nm ranges from 1.8 - 2.0 [13].
Quality test of DNA soybean mutant

DNA quality testing was carried out by standard method electrophoresis (Elektroforesis Power PAC 3000, Biorad) to see the presence of DNA on 1.5 % agarose gel stained with ethidium bromide. Agarose weighed 1.2 grams and then dissolved in 80 ml TAE buffer 1x. The solution was put into an erlenmeyer then heated using a hotplate and stirred with a magnetic stirrer so that the solution became clear and then cooled, added 0.5 μl ethidium bromide, stirring while reheating for 2 minutes. The solution is put into a gel well installed and allowed to condense for 60 minutes. The solidified gel was given 670 ml TAE 1x solution (until submerged). Stock DNA that has been prepared is inserted into the gel well. After all, the gel well filled with gel wells next electrophoresis. Running electrophoresis was performed under 60 volts for 70 minutes. The Visualization of DNA that has been electrophoresed done by UV Transluminator and photographed using a gel documentation system (UV cambridge).

PCR amplification
Before running the PCR, each DNA sample was diluted by taking 3 μl of DNA stock and adding 5 μl ddH2O to obtain 8 μl of DNA aliquots. The PCR reaction mixture consisted of 12.5 μl Go Taq Green Master mix (promega M7122), 8.5 μl ddH2O, 1 μl of each primer (forward and reverse) and 2 μl DNA aliquots with a total volume of 25 μl for one reaction. The PCR reaction was amplified in a thermal cycler applied bio system. Each sample was amplified with forward primers 5-GCCAAGGTGCATACATACGACA-3 and reverse 5-GCCAACAATTCTTTTCCCTCT-3 [14]. The optimization of the PCR condition was done by changing the annealing temperature of primers. Different annealing temperatures were tried to optimize the melting temperature of primers with help gradient PCR (BioRad and Eppendorf) and research Arjunrao [14] with some modification. PCR thermal cycling conditions were initial pre denaturation at 94°C for 5 minutes, followed by 35 cycles of denaturing at 94°C for 40 seconds, primer annealing at 55°C for 45 seconds, extension at 72°C for 1 minutes, with a final extension at 72°C for 7 minutes [14].

Agarose gel electrophoresis
DNA was analyzed by agarose gel electrophoresis using 1.5% agarose gel (promega V3121). Electrophoresis was performed using 1× Tris–Borate EDTA (TBE) buffer and added 0.5 μl of ethidium bromide (EtBr) at a volage of 60V for 60 min. The DNA bands were visualized and documented under UV light using gel documentation system (UV cambridge).

Data analysis
Determination of Tape Size for PCR Results
The size of the base fragment (base pair = bp) of the PCR product is determined using UVITEC Cambridge FireReader, the DNA fragment used as a standard measure of 100 bp ladder DNA, the image data from the electrophoresis required by the program will be detected whether or not the band appears and try to use the markers that have been marked entered.

3 Results and Discussion
Quantity test of DNA soybean mutant
Testing the quantity of DNA of soybean mutant lines was performed using the spectrophotometer method. DNA purity is measured by looking at the absorbance ratio at 260 nm and 280 nm. The following results of the DNA quantity testing of soybean mutant lines are presented in Table 1.
Table 1. Purity and Concentration of DNA of soybean mutant strains

<table>
<thead>
<tr>
<th>No.</th>
<th>Sample</th>
<th>Purity (Å260/280)</th>
<th>Concentration (µg/mL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>M200-A17 (18/5)</td>
<td>2.13</td>
<td>15.4</td>
</tr>
<tr>
<td>2.</td>
<td>M200-A12 (6/5)</td>
<td>2.00</td>
<td>97.9</td>
</tr>
<tr>
<td>3.</td>
<td>Devon 1</td>
<td>1.31</td>
<td>47.1</td>
</tr>
<tr>
<td>4.</td>
<td>Anjasmoro</td>
<td>1.81</td>
<td>25.0</td>
</tr>
<tr>
<td>5.</td>
<td>M100-A25 (2/7)</td>
<td>1.80</td>
<td>25.1</td>
</tr>
<tr>
<td>6.</td>
<td>M100-A25 (3/4)</td>
<td>1.94</td>
<td>18.6</td>
</tr>
<tr>
<td>7.</td>
<td>M100-A25 (3/7)</td>
<td>1.21</td>
<td>55.0</td>
</tr>
<tr>
<td>8.</td>
<td>M100-A6 (31/1)</td>
<td>1.24</td>
<td>44.8</td>
</tr>
<tr>
<td>9.</td>
<td>M200-A1 (32/3)</td>
<td>1.12</td>
<td>55.0</td>
</tr>
</tbody>
</table>

Based on Table 1, it appears that the purity level of isolated DNA ranges between 1.12 - 2.13 and obtained DNA concentrations ranging from 15.4-97.9 µg/mL. The highest value was obtained from M200-A17 (6/5) with a concentration of 97.9 µg/mL, and the lowest was M200-A17 (18/5), with a concentration of 15.4 µg/mL. Good quantity test results are shown by absorbance values between 1.80-2.00 [13], such as Anjasmoro, M100-A25 (2/7), M100-A25 (3/4) and M200-A12 (6/5). If the ratio is higher, it can be indicated the presence of impurities in the form of proteins, phenols or other strong contaminants its absorption at 280 nm as in M200-A17 (18/5), if the ratio is lower than the range of 1.8 - 2.0, it can be indicated the presence of contaminants in the form of RNA in the samples tested as in Devon 1, M100-A25 (2/7), M100-A25 (3/4), M100-A25 (3/7) [15]. DNA concentrations that are too little will affect the results of the documentation gel where the band will look thin or dim (Figure 1), if the absorbance value is not in the range 1.80 to 2.00 can cause smears due to the high content of polysaccharides and phenolic compounds [16]. Sufficient purity does not guarantee successful amplification of a gene, there are also other factors such as concentration that also need consideration [17].

**Quality test of DNA soybean mutant**

DNA quality testing aims to determine the level of purity of DNA isolation based on visualization of agarose gel electrophoresis. DNA quality testing was carried out on 7 DNA stock samples and 2 DNA stock comparative varieties. DNA quality testing was carried out by electrophoresis using agarose gel of 1.5% concentration on chamberwell containing 1x TAE buffer, with a voltage of 60 Volts for 70 minutes. The electrophoresis results are visualized under the UV Transilluminator. The following results of DNA quality testing of soybean mutant lines presented in Figure 1.
Based on Figure 1, all DNA samples tested show the presence of DNA bands (arrows) bright and thin. However, in samples M200-A12 (6/5), Anjasmoro, M100-A25 (2/7) and M100-A25 (3/4) showed smears marked by circles 1 and 2. The appearance of Smear was thought to be an impurity or contaminant [15] that was carried during the isolation process or could also be degraded DNA in the DNA isolation process [18]. Based on DNA quantity test results, samples of M200-A12 (6/5), Anjasmoro, M100-A25 (2/7) and M100-A25 (3/4) have good purity (table 1), but the DNA quality test found smears. This is caused by technical errors when injecting into a chamberwell. Solihah reported smears on DNA bands can also be caused by repetitive DNA piping so that DNA will be cut off. DNA quality test results showed satisfactory results. This research used CTAB method of Orozco-Castillo et al. that was modified by the addition of PVPP and \( \beta \)-mercaptoethanol so produced good quality DNA. The use of polyvinylpoliprolidone (PVPP) antioxidants and mercaptoethanol in extraction buffers can produce good quality DNA. PVP and mercaptoethanol will reduce phenolic compounds that can damage the quality of DNA [19].

**Visualization of DNA Amplification Results by the Electrophoresis Method**

DNA amplification of 7 soybean mutant lines and 2 comparative varieties for fatty acid characters was carried out using 1 specific fatty acid primers namely FAD2-2D and then electrophoresed using 1.5% agarose gel, voltage of 60V for 60 minutes. The electrophoresis results were then visualized under the UV Transilluminator. Visualization of agarose electrophoresis results of 1.5% of each primer on 7 samples and 2 comparative varieties can be seen in Figure 2.
The primer FAD2-2D showed amplification in 8 samples tested. For several samples that were not successfully amplified, the PCR procedure was repeated by optimizing the annealing temperature, the final result was that there was 1 DNA sample that did not successfully amplify, M100 A25 (2/7) sample. Band pattern is heterozygous, which is the number of bands that appear as much as two in several samples tested with a band size range between 158 bp to 247 bp. The largest band size in the M100 A17 (18/5) sample is 247 bp, while the smallest band size in the M200 A11 (32/3) sample is 158 bp. Primer FAD2-2D was used in the previous studies by Arjunrao [14] and Bachlava et al., [12] and showed the size of the amplicon of 220 bp. Bachlave et al., [12] reported this isoform (FAD2-2D) of FAD6 gene was associated with linoleic content [14].

The success of doubling specific sequences to the target DNA can influence by several factors, including the primary suitability of the target DNA, the annealing temperature used, and the purity of extracted DNA [15]. The results showed that there was a mismatch of base pairs of M100 A25 (2/7) DNA samples with nucleotide bases in primer FAD2-2D so that during the amplification process, the nucleotide bases could not stick to the target sequence. Unamplified DNA samples indicate no banding patterns when visualizing agarose gel electrophoresis under UV Transilluminator.

Amplification of soybean mutant DNA using one specific fatty acid primer shows that the marker can amplify DNA by producing two banding patterns with a percentage of polymorphism of 100%. Polymorphism indicated by the presence of two or more alleles in a population [20]. The locus can be said to be polymorphic if it has more than one allele [21], and if the frequency of occurrence is less than 0.99, it means that one allele can appear on one accession but no other accessions appear [22]. Conversely, genes are said to be monomorphic if they do not meet predetermined polymorphic criteria [20]. The high level of polymorphism produced from the primer FAD2-2D indicates that the genetic diversity of the mutant soybeans tested was relatively high.
4 Conclusion

DNA quality and quantity test results showed DNA purity between 1.12-2.13 with concentration between 15.4-97.9 μg/mL. Primer FAD2-2D was specific primer and capable by producing polymorphic bands so mutant soybeans tested have a high genetic diversity.

5 Reference


The Response of Growth and Production of Red Rice of the Bahbutong and Aek Sibundong Varieties to Gamma-Ray Irradiations

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Abstract. The purpose of this study was to identify the effect of gamma-ray irradiation on the growth and production of red rice Aek sibundong and Bahbutong varieties. This research was carried out on the farmer's land Jl Sedar, Batang Kuis, Deli Serdang Regency, North Sumatra, Medan. This study used a randomized block design (RBD) with two treatment factors. The first factor is the variety consisting of V1 = Bahbutong, V2 = Aek Sibundong. The second factor is the irradiation dose which consists of 4 levels namely, R0 = 0 Gy, R1 = 100 Gy, R2 = 200 Gy, R4 = 300 Gy. The results showed that the best dose of gamma-ray irradiation in reducing plant height, accelerating the age of flowering and increasing production was 200 Gy. Aek Sibundong variety red rice showed better growth and production response than Bahbutong variety.

Keywords: Oryza sativa L, variety, gamma rays, growth, production

1 Introduction

Rice (Oryza sativa L) is a major carbohydrate food crop in the world. Brown rice in particular is a potential food ingredient for food diversification programs. This is because the nutritional content of brown rice is higher than white rice. In addition to the main source of carbohydrates, brown rice also contains protein, beta-carotene, antioxidants and iron [1].

Along with increasing the standard of living of the people and awareness of the importance of health, some people need quality rice that is beneficial for health. However, so far, red rice is still rarely cultivated by farmers in Indonesia because of its long life (an average of 134 days) and its plant morphology is high (an average of 164 cm) making it easy to fall over [2]. Whereas economically, superior rice with short maturity and short posture are more profitable so that farmers are cultivated more than rice with a deep age. Classification of rice harvesting age according to IBPGR (1980) standards is early 110-125 days, moderate 126-145 days, and within > 145 days.
One way that can be done to improve the genetics of brown rice is by breeding mutations using gamma-ray irradiation. Mutation breeding can create genetic diversity that is very useful for improving just a few traits by not changing most of the traits of the original plants that have been favored. Because not much has changed the breeding of mutations requires a relatively shorter time in the purification process of the strain [3].

Mutation induction using irradiation produces the most mutants (around 75%) when compared to other treatments such as chemical mutagens. Gamma rays are short, high-energy electromagnetic waves that interact with atoms or molecules to produce free radicals in cells. Free radicals will induce mutations in plants because these radicals will produce cell damage or important influences in plant cell components [4].

Research results of Farisa [5] on local varieties of rice, that the radiation dose affects the plants, seen from the data specifications of mutant plants is very different from the control plants, especially in the data on the number of productive tillers, the number of rice grains, the weight of 100 grains and the age of harvest. Data on mutant plants showed higher yields than control plants, at the age of harvest the harvest age showed 26 days faster than the control plants. Furthermore Mugiono et al [6] in the improvement of rice varieties of Cisantana with induction mutations, an increase in productivity of rice varieties of Cisanta which experienced irradiation doses of 100 Gy, 200 Gy and 300 Gy compared with controls, and after conducting research up to M3 and M4 and also in the rainy season and dry season, the productivity of mutant rice is higher compared to control rice.

Until 2005, rice varieties produced in Indonesia reached 180 varieties. Of all these varieties, there is only one red rice variety, namely Bahbutong. However, this variety is less developed and not widely cultivated by farmers [7]. After that, in 2006 the Agricultural Research and Development Agency produced Aek Sibundong red rice varieties that are lowland rice. Just like Bahbutong, this variety is less developed.

In its natural habitat, accessions of local brown rice are now increasingly rare. Almost all farmers grow new varieties of rice including hybrid rice, only a small proportion of them cultivate local red rice. As a result, the existence of local brown rice is increasingly rare, even endangered [8]. Therefore, research is needed on local varieties of red rice Bahbutong and Aek Sibundong using gamma-ray radiation that aims to obtain mutant plants with the desired characteristics.

2 Research Method

The materials used in this study were local varieties of red rice seeds Bahbutong and Aek Sibundong. This research was carried out on the farmer's land Jl Sedar, Batang Kuis Deli Serdang Regency, North Sumatra, Medan in May-September 2019. The study used a Randomized Block Design (RBD) with two treatment factors. The first factor is the variety consisting of V1 = Bahbutong, V2 = Aek Sibundong. The second factor is the irradiation dose which consists of 4 levels namely, R0 = 0 Gy, R1 = 100 Gy, R2 = 200 Gy, R4 = 300 Gy.

Rice seeds are packaged in plastic and labeled according to the treatment of 200 grams. The packed seed is put into a Chamber 4000A CO60 gamma-ray irradiator for some time to obtain the required dose.
Fertilization and maintenance of plants are carried out by recommendations for rice cultivation. The parameters observed were plant height (cm), age of flowering (days) and weight of 1000 grains (g).

3 Results and Discussion

3.1 Plant Height (cm)

Table 1 below presents the average plant height of the two red rice varieties to several doses of gamma-ray irradiation at each observation.

<table>
<thead>
<tr>
<th>DAP</th>
<th>Varieties (V)</th>
<th>Doses of Irradiation</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>0 Gy (R₀)</td>
<td>100 Gy (R₁)</td>
</tr>
<tr>
<td>20</td>
<td>Bahbutong (V₁)</td>
<td>53.33 a</td>
<td>52.00 a</td>
</tr>
<tr>
<td></td>
<td>Aek Sibundong (V₂)</td>
<td>46.60 ab</td>
<td>47.78 ab</td>
</tr>
<tr>
<td></td>
<td>Mean</td>
<td>49.97 a</td>
<td>49.89 a</td>
</tr>
<tr>
<td>40</td>
<td>Bahbutong (V₁)</td>
<td>76.80 a</td>
<td>75.20 a</td>
</tr>
<tr>
<td></td>
<td>Aek Sibundong (V₂)</td>
<td>69.67 b</td>
<td>69.77 b</td>
</tr>
<tr>
<td></td>
<td>Mean</td>
<td>73.23 a</td>
<td>72.48 a</td>
</tr>
<tr>
<td>60</td>
<td>Bahbutong (V₁)</td>
<td>78.60 a</td>
<td>78.25 a</td>
</tr>
<tr>
<td></td>
<td>Aek Sibundong (V₂)</td>
<td>70.93 b</td>
<td>71.63 b</td>
</tr>
<tr>
<td></td>
<td>Mean</td>
<td>74.77 a</td>
<td>74.94 a</td>
</tr>
</tbody>
</table>

Note: Those numbers followed by the same alphabet on the same application unreally different by Duncan test Average Difference α=5%

Based on the average plant height in Table 1, it can be seen that the lowest plant height was found in the treatment R2 (200 Gy) which is 74.53 cm while the highest plant height was found in treatment R3 (300 Gy). This shows that plant height increases with an increasing dose of gamma-ray irradiation, but the increase is not much different from control plants. This is by Warman et al [9], which states that when M1 is planted in the field there is a visible pattern of normal plant growth and no significant differences are found between the irradiation dose with each other, even with the control plants (without irradiation).

3.2 Flowering Age

Table 2 below presents the average flowering age of two varieties of red rice to several doses of gamma-ray irradiation.
Table 2. The average flowering age of two red rice varieties to several doses of gamma-ray irradiation

<table>
<thead>
<tr>
<th>Varieties (V)</th>
<th>Doses of Irradiation</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0 Gy (R₀)</td>
<td></td>
</tr>
<tr>
<td>Bahbutong</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aek Sibundong</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(V₁)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(V₂)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>100 Gy (R₁)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>200 Gy (R₂)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>300 Gy (R₃)</td>
<td></td>
</tr>
</tbody>
</table>

Note: Those numbers followed by the same alphabet on the same application unreally different by Duncan test Average Difference α=5%

Based on the average flowering age in Table 2, it can be seen that the fastest flowering age is in the treatment of 200 Gy (R₂) gamma-ray irradiation doses. This shows that mutations in plants can cause changes in plant parts both in shape and color as well as changes in other properties including flowering age. According to Yunita [10], genetic changes resulting from gamma-ray radiation occur because of the increase or loss of one or more bases contained in a DNA molecule. The variety factor also affects the flowering age of rice plants, where the flowering age of Aek Sibundong varieties is faster than Bahbutong varieties. This is due to the genetic differences of each variety. According to Sitompul and Guritno [11], very large differences in varieties affect plant properties, because different genetic factors can be expressed in a variety of plant traits that include the shape and function of plants that will ultimately produce a variety of plant growth.

3.3 Weight of 1000 grains (gr)

Table 3 below percentage average weighted of 1000 grains of two red rice varieties to several doses of gamma-ray irradiation.

Table 3. The average weight of 1000 grains of two red rice varieties to several doses of gamma-ray irradiation

<table>
<thead>
<tr>
<th>Varieties (V)</th>
<th>Doses of Irradiation</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0 Gy (R₀)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>100 Gy (R₁)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>200 Gy (R₂)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>300 Gy (R₃)</td>
<td></td>
</tr>
<tr>
<td>Bahbutong</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aek Sibundong</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(V₁)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(V₂)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Those numbers followed by the same alphabet on the same application unreally different by Duncan test Average Difference α=5%

Based on the average weight of 1000 grains in Table 3, it can be seen that the highest weight of 1000 items is not found at the highest dose, but at a dose of 200 Gy gamma-ray irradiation,
which is 27.14 grams. This shows that lower doses can produce better character than the control plants. Nurjanah [12] states that the use of lower doses of radiation exposure has been able to cause a large genetic effect. Often, lower doses can give mutants better results than higher radiation doses. Giving higher doses often cause physical damage that affects the weight of the seeds.

In addition to the irradiation dose factor given, other factors that affect plant growth and yield are the environments, such as humidity, rainfall, temperature, sunlight and temperature. These factors can affect rice production, especially when filling seeds. Lu [13], temperature greatly affects the filling of seeds, which with optimal temperature and humidity at the time of flowering, is very good for the fertilization process.

4 Conclusion

Gamma-ray irradiation affects plant height, flowering age and plant seed weight. Gamma-ray irradiation at a dose of 200 Gy can reduce plant height, accelerate flowering age and increase the weight of 1000 grains on Aek Sibundong variety rice.

5 References


The Development of Online Learning Media Based Android on Students Development Subject

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Abstract. The purpose of this study is to determine the form of an online learning media based android on Students Development subject and to determine how the students assessment against android application developed. This study is a research and development. Researchers use ADDIE research groove namely Analysis, Design, Development, Implementation and Evaluation. In the analysis phase, researchers conducted interview with students in Primary Teacher Education to find out the application form required in the subject of Students Development with blended learning model. Furthermore, researchers designed the initial shape and structure of the application work. After the initial shape and structure have been defined, the researchers develop android application using android software studio accordance with the application form needed by the students. The material used by researchers on android application is the material according to the syllabus of Student Development Subject and the researchers also developed a Semester Lecture Plan in accordance with the design of blended learning model. In the implementation phase, the researchers asked two experts are subject matter expert and media expert to assess the application developed. In implementing phase, the researchers also asked students from the Department of Primary Teacher Education as many as 30 people to give their assessment of the application developed including providing assessment of the implementation of online learning using android application. Media expert gives a value of 75.50 with an average of 3.41 and categorized as very feasible. For the material, the researchers asked the expert that truly understand even master the Students Development subject. Material expert provides an assessment of 59.50 with an average value of 3.71 and considered good and decent. Students give value to this application at 72.85 with an average of 3.60 and the category is decent.

Keywords: Blended Learning, Android, Students Development Subject.

1 Introduction

The world of education is inseparable from the learning process that includes faculty, students, and the learning environment influence each other in order to achieve the learning goals. The media is one factor supporting the achievement of learning goals. This relates to the use of appropriate media and varied in the learning process can increase the motivation to learn and can reduce the passivity of students [1].

The development of mobile technology is now so fast; one of the mobile devices that are now commonly used is a cellular phone. Almost 90% of students have a mobile phone with android platform. With the increasing number of students who have and use mobile devices, the greater the chances of the use of technology tools in education. Media that utilizes mobile
phone technology is called mobile learning (M-Learning). M-Learning is one of the alternative development of instructional media. The presence of m-learning is intended as a complement to the learning and provide opportunities for students to learn the material that is less controlled anywhere and anytime [2,3]. Android Studio is a software to create an learning media based android that is easy to use and apply. Android Studio is a software that provides templates in making android application. Android Studio can support the process of making learning applications based on Android, Mac OS, Windows Phone, Blackberry and HTML 5.

Students Development are subject that provide supplies to the students about the students understanding in depth, as one of the basic competencies that must be mastered well by the teacher to the learner as its main focus in the provision of education and learning, relating to the characteristics learners, growth and development, the laws of development, developmental aspects, needs, developmental tasks, and the adjustment (early age, children and adolescents), means of non-test in identifying development of learners and their implications in education. Students Development subject is taught by researchers.

The purpose of this study was to determine the form of an online learning media based android on Students Development course and to determine how the student assessment against android application developed.

Learning Media.

According to Flemming in Arsyad [2,4] argues that the media often referred to the mediator that is the cause or the tools to intervene and reconcile the two parties. The term mediator media indicate the function or role of organizing an effective relationship between the two main parties in the learning process. Meanwhile, Gagne and Briggs in Arsyad [5] implicitly saying that learning media is a tool that is physically used to convey the content of learning materials, consisting of books, tape recorders, cameras, cassettes, video recorder, film, television, slide (picture frame), photographs, graphics, and computer.

Mobile Learning

The term mobile learning (m-learning) refers to the use of the device / device information technology (IT) handheld and moving, just as PDAs, mobile phones, laptops and tablet PCs, in teaching and learning. M-learning is part of the electronic learning (e-learning) so that by itself is also part of the distance learning (d-learning). Mobile learning is a unique learning because learners can access learning materials, referrals and applications relating to learning anytime and anywhere [6,9]. This will increase attention on the material being taught, makes learning more interesting, and can motivate learners towards lifelong learning.

Android applications

Android is an operating system developed for Linux-based mobile devices such as smartphones and tablet PCs. Android is the operating system (OS) mobile grow amid developing other OS. Other OS such as Windows Mobile, i-Phone OS, Symbian, and much more [7]. This OS also offers content and the optimal wealth of existing hardware devices. However, the existing OS is running prioritize core applications are built on their own without seeing considerable potential of the application of the various parties.

Students Development Subject

In every stage of human development have distinct characteristics and its own developmental tasks that are useful as a guide towards a normal development. The developmental tasks are also highly correlated with the education received by the individual.
Education determines whether the task can be executed someone at certain times. The self-concept and self-esteem will go down if someone does not carry out the development tasks well, because the individual would receive censure from the surrounding community, causing unhappiness for the individuals concerned. Instead of success in carrying out development tasks gives a feeling of success and happiness.

In general, the benefits of studying Students Development can be perceived by educators and learners. For Educator: a. Provides an overview of human development throughout the life span as well as the factors that influence it, which cover physical, intellectual, emotional, social and moral. b. Provides an overview of how the process of learning appropriate to the stage of development of learners. For Students: Have knowledge of the concepts of development of Students that includes individuals in carrying out developmental stages of prenatal and elderly.

3 Research Method

This study is research and development that is a type of research that aims to produce a specific product and test the quality of the product. Product that produced in this study is learning media based android. The research method used is ADDIE model (Analysis, Design, Development, Implementation, and Evaluation).

Data collection techniques used in this research is observation, interviews, and questionnaires. This research using descriptive analysis techniques to analyze data in ways that describe or depict the data that has been collected from the development, validators’ responses for validity and students’ responses in trial design for practicality [8].

4 Results and Discussion

This media development begins by analyzing some of the necessary requirements. These needs include: the election materials, the determination of the user (user), eligibility criteria, and software to develop android application blended learning model.

From the observation that have been made data showed that the average student has an android smartphone. It became a great potential and opportunities for the development of learning media based android.

Content that is intended in this case is learning materials of Students Development Subject based on Semester Lecture Plan (RPS) issued by the coordinator of Basic Courses Education (MKDK) Unimed. The material presented in mobile learning applications being developed are:

1) The essence of development,
2) Theory of development: Physical, Intellectual, Emotional, Language, Special Talent, Social, Moral,
3) Developmental tasks,
4) Self concept,
5) Adjustment, and
6) Individual personality
Mobile learning application developed using Android Studio. Android Studio is an Integrated Development Environment (IDE) for developing Android applications, based on IntelliJ IDEA. This technology can be used to construct powerful hybrid mobile applications, fast, easy and also has an attractive appearance.

1) Design
This application has a main menu that consists of Classrooms, Group, Material, Video, Exercise (quiz) and a chat room. Application Log begins with a display that requests the username and password of the user. The main menu layout application (home) has five menu icons along with the name of the application's main menu. The initial view, log in, and the application's main menu.

2) Development
Virtual learning space on the application is made to resemble the app so between learners and teachers can perform two-way communication time willingly. This application is also featured instructional videos (youtube assisted) to assist learners in understanding the material. The beginning and the display form on the application login screen are not much different as contained in the application design. The logo contained in the initial appearance of the application is English language learning logo for the Faculty of Science as in Figure 1 below.

![Fig 1 The Front Display (Login)](image)

Before students attend learning online based on android, students must be registered by the lecturer by filling out the form that is already available in the application (Figure 2). Once students’ account has been activated then the student can sign in to the application.
Once entered into the system, students choose a study room in accordance with the classes and subjects enrolled in Study Plan Card (KRS), virtual classroom is shaped like a chat room on Whatsapp. The overall view class can be seen in Figure 3, below.

Menu quiz or exam quiz presented on the menu contents for the topics of material and accompanied by solutions answer. When the user opens the first page of the menu it will show a selection of exercises about. About the selection is divided into two sections, each section consists of 10 questions. Quizzes are given a set of exercises from various sources. Exercises that are presented in a mobile learning application are expected to help users to measure their knowledge on matters related to Students Development subject. Exercise menu page shown in
In a virtual classroom, students can view instructional videos or in the form of demonstrations connected via Youtube. Users simply select a video to be seen and confirmed to be connected with an internet connection. Video display and sound is shown in Figure 5 below.

Further to the collection activities 6 tasks, ranging from routine tasks, tasks critical book reviews (CBR), Critical Journal Review (CJR), Mini Research, Idea Engineering, and Project, in this application there is menu to upload the data tasks. Each student data upload task, lecturers will receive a notification. Upload task menu display shown in Figure 6 below.
3) Implementation

At implementation phase, the product have been developed rated buy respondents. In implementation, researchers created a model of Blended Learning scenarios. Implementation of blended learning consists of 4 meetings, two are face to face meetings and two meetings online using android application.

a) Media Expert Assessment Results

A media expert respondent is the one who considered have good judgment and cons of a medium of learning. This app was tested by one person who considered by the media played a role in assessing the software engineering and visual communication. The results of media assessment are shown in Table 1 below:

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Description clear application</td>
<td>3.50</td>
</tr>
<tr>
<td>2</td>
<td>The application installation process goes well</td>
<td>3.50</td>
</tr>
<tr>
<td>3</td>
<td>Free use of the application is easy to understand</td>
<td>3.50</td>
</tr>
<tr>
<td>4</td>
<td>Application does not take up much memory</td>
<td>3.50</td>
</tr>
<tr>
<td>5</td>
<td>The process of loading media goes well</td>
<td>4.00</td>
</tr>
<tr>
<td>6</td>
<td>Display layout interesting applications</td>
<td>3.00</td>
</tr>
<tr>
<td>7</td>
<td>The composition and interesting colors used design</td>
<td>3.00</td>
</tr>
<tr>
<td>8</td>
<td>Display design, size and layout of the proper icon</td>
<td>3.50</td>
</tr>
<tr>
<td>9</td>
<td>Icon / button that allows users to use the media</td>
<td>3.50</td>
</tr>
<tr>
<td>10</td>
<td>Audio files in the app runs fine</td>
<td>3.00</td>
</tr>
<tr>
<td>11</td>
<td>The video link learning goes well</td>
<td>3.50</td>
</tr>
<tr>
<td>12</td>
<td>Applications can be run in all versions of android</td>
<td>4.00</td>
</tr>
<tr>
<td>13</td>
<td>Use of the font type and size are correct</td>
<td>3.50</td>
</tr>
<tr>
<td>14</td>
<td>The use and effect of the application interface is simple and</td>
<td>3.00</td>
</tr>
</tbody>
</table>
b) The Results of Material Expert Assessment

A learning material expert who assess the feasibility of respondents in terms of instructional design and content learning materials. In this study the authors define material experts are experts who truly understand how to design an interesting learning based on the material and sub-material in Students Development subject and has a science background who very related to the subject. The results of the assessment of the material shown in Table 2 below.

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The material contained in the application in accordance with the curriculum</td>
<td>4.00</td>
</tr>
<tr>
<td>2</td>
<td>This application can support the achievement of learning goals</td>
<td>4.00</td>
</tr>
<tr>
<td>3</td>
<td>This application can support the implementation of blended learning models</td>
<td>4.00</td>
</tr>
<tr>
<td>4</td>
<td>This application can make learners interested to learn more about the teaching materials</td>
<td>3.50</td>
</tr>
<tr>
<td>5</td>
<td>The material contained in the application in accordance with the RPS Students Development subject</td>
<td>4.00</td>
</tr>
<tr>
<td>6</td>
<td>Applications can broaden learners</td>
<td>3.50</td>
</tr>
<tr>
<td>7</td>
<td>This application allows students to learn independently</td>
<td>4.00</td>
</tr>
<tr>
<td>8</td>
<td>Readability clear sentences and paragraphs</td>
<td>3.50</td>
</tr>
<tr>
<td>9</td>
<td>The material contained in the application are arranged in a systematic and coherent</td>
<td>3.00</td>
</tr>
<tr>
<td>10</td>
<td>Fucking displayed in the application can help learners to understand the material</td>
<td>4.00</td>
</tr>
<tr>
<td>11</td>
<td>The video link is presented in accordance with the material</td>
<td>3.50</td>
</tr>
<tr>
<td>12</td>
<td>Encouraging learners actively involved</td>
<td>4.00</td>
</tr>
<tr>
<td>13</td>
<td>Exercises given in the application is in conformity with the material presented</td>
<td>3.50</td>
</tr>
<tr>
<td>14</td>
<td>Suitability exercises with less learning objectives</td>
<td>4.00</td>
</tr>
<tr>
<td>15</td>
<td>Uses terms that are easily understood</td>
<td>3.50</td>
</tr>
<tr>
<td>16</td>
<td>Provide motivation / interest and curiosity of learners</td>
<td>3.50</td>
</tr>
</tbody>
</table>

Total number 59.50
Average 3.71
Criteria very Decent
c) The Assessment of Student

Students are respondents who are users of these applications in the future, the authors felt it was important to ask the student assessment on mobile learning based android application. This application is tested to 30 students majoring in the 1st half of Primary School Teaching (PGSD), Faculty of Education, Unimed. Students are given a questionnaire assessment of mobile learning applications. Accumulated average learner assessment questionnaire results are shown in Table 3 below.

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Description of the application is easy to understand</td>
<td>3.50</td>
</tr>
<tr>
<td>2</td>
<td>The application installation process runs smoothly on my mobile phone</td>
<td>3.20</td>
</tr>
<tr>
<td>3</td>
<td>Free use of applications easier I understand</td>
<td>3.50</td>
</tr>
<tr>
<td>4</td>
<td>The process of loading an application running (application no hang or jam)</td>
<td>3.45</td>
</tr>
<tr>
<td>5</td>
<td>All navigation button goes well</td>
<td>3.20</td>
</tr>
<tr>
<td>6</td>
<td>Size does not take up much memory applications</td>
<td>3.80</td>
</tr>
<tr>
<td>7</td>
<td>Application easy to run</td>
<td>3.80</td>
</tr>
<tr>
<td>8</td>
<td>Application loading process is not long</td>
<td>3.50</td>
</tr>
<tr>
<td>9</td>
<td>Mobile learning applications to motivate me to learn</td>
<td>3.30</td>
</tr>
<tr>
<td>10</td>
<td>I was able to learn actively and independently use mobile learning application</td>
<td>3.80</td>
</tr>
<tr>
<td>11</td>
<td>I enjoy learning using mobile learning applications rather than just listening to the explanation from the teacher</td>
<td>3.67</td>
</tr>
<tr>
<td>12</td>
<td>I can understand the material in the presence of an interesting learning videos</td>
<td>3.60</td>
</tr>
<tr>
<td>13</td>
<td>I can understand the material with the help of attractive animations</td>
<td>3.80</td>
</tr>
<tr>
<td>14</td>
<td>I can read the text easily because of the type and size of the font used was appropriate</td>
<td>3.58</td>
</tr>
<tr>
<td>15</td>
<td>I can learn easily because the material is presented clearly</td>
<td>3.80</td>
</tr>
<tr>
<td>16</td>
<td>I can use the buttons with ease</td>
<td>3.84</td>
</tr>
<tr>
<td>17</td>
<td>The material presented in easy application I understand</td>
<td>3.80</td>
</tr>
<tr>
<td>18</td>
<td>Exercises helped me measure my understanding on the kinetic theory of gases</td>
<td>3.80</td>
</tr>
<tr>
<td>19</td>
<td>With mobile learning application I get a deeper knowledge about the material the kinetic theory of gases</td>
<td>3.50</td>
</tr>
<tr>
<td>20</td>
<td>I like the look of this mobile learning applications because it has a matching color composition</td>
<td>3.60</td>
</tr>
<tr>
<td>21</td>
<td>I was able to master the use of mobile learning application media with ease</td>
<td>3.48</td>
</tr>
<tr>
<td>22</td>
<td>I could use mobile learning application anywhere and anytime</td>
<td>3.80</td>
</tr>
</tbody>
</table>

Total number 72.85  
Average 3.60  
Criteria Very Decent

4) Evaluation

The evaluation was done in order to improve mobile learning applications. In this study, improvements were summarized based on the suggestions and criticisms of the respondents were divided into three aspects, namely, software engineering, instructional design and visual communication.
**Aspect** | **Criticism and suggestions**
---|---
Software Engineering | 1. This application should have color settings menu so that students can change the background color as they wish.
2. The good form of display is designed more attractive again.

Instructional Design | 1. Content material needs to be added, especially the explanation in the form of images.
2. Enrich reference teaching materials
3. The use of communicative language
4. Make learning videos related to the moral and emotional development through socio-dramas approach.

Visual | 1. Design re-shape the look on the veranda with a more interesting theme.
2. The good video contained in the application can be downloaded by the students.

**Discussion**

The development of mobile technology is now so fast, one of the mobile devices that are now commonly used is a cellular phone. Almost 90% of students have a mobile phone with android platform. With the increasing number of students who have and use mobile devices, the greater the chances of the use of technology tools in education.

Media that utilizes mobile phone technology is called mobile learning (M-Learning). M-Learning is one of the alternative development of instructional media. The presence of m-learning is intended as a complement to the learning and provide opportunities for students to learn the material that is less controlled anywhere and anytime [3,4].

This media development begins by analyzing some of the necessary requirements. These needs include: the election materials, the determination of the user (user), eligibility criteria, and software to develop android application learning blended learning models. After that the next stage is draft structured in a flow diagram that contains forms and display features contained in the application. The development stage is the stage of manufacture of mobile learning applications. In making the application is tailored to the design plan.

Study materials and the material presented in the course is based on the development of learners in the learning activity undertaken. In general, the study material of this course include: The nature of development, development theory, development: Physical, Intellectual, Emotional, Language, Special Talent, Social, Moral, tasks development, self-concept, self-adjustment, and individual personality [6].

Once the finished product is developed then a subsequent implementation phase. Pilot implementation phase containing products have been developed to a number of respondents. In implementation, researchers created a model of learning scenarios Blended Learning. Implementation of blended learning consists of 4 meetings; two are face to face meetings and two meetings online using android application.

All respondents were identified in this study have their respective roles in providing an assessment of the feasibility of applications., Ranging from media experts, materials and respondents who were students taking Students Development subject. This app was tested by one of the experts who assess media that play a role in assessing the software engineering and
communications media visual. The expert give a value of 75.50 with an average of 3.41 were categorized as very feasible. For the material, the researchers asked the expert appraisal that truly understand even mastered the course Students Development subject. Media experts provide an assessment of 59.50 with an average value of 3.71 and considered good and decent.

Students are respondents who are users of these applications in the future, the authors felt it was important to ask the student assessment on mobile learning applications. This application is tested to 30 students majoring in the 1st half of Primary School Teaching (PGSD), Faculty of Education, Unimed. Students give value to this app at 72.85 with an average of 3.60 is the decent category.

In addition to providing an assessment, experts and students are required to provide feedback and ideas to the researchers. Both experts and students give us some feedback that serves as a reference for evaluation researchers against the application. The average response from the respondents is software engineering, instructional design and visual communication. After the researchers pooled the results of respondents and receive responses, perform the repair on the android app.

5 Conclusion.

Based on the purpose of research, the results of the analysis and development of data contained in this study the conclusions of this study are translated as follows:

1) This media development begins by analyzing some of the necessary requirements. These needs include: the election materials, the determination of the user (user), eligibility criteria, and software to develop android applications online learning. After that the next stage is draft structured in a flow diagram that contains forms and display features contained in the application. The development stage is the stage of manufacture of mobile learning applications in accordance with the design plan.

2) This app was tested by one of the experts who assess media that play a role in assessing the software engineering and visual communication. Media experts give a value of 75.50 with an average of 3.41 were categorized as very feasible. For the material, the researchers asked the expert appraisal that truly understand even mastered the Students Development subject. Media experts provide an assessment of 59.50 with an average value of 3.71 and considered good and decent.

3) This application is tested to 30 students majoring in the 1st half of Primary School Teaching (PGSD), Faculty of Education, Unimed. Students give value to this app at 72.85 with an average of 3.60 is the decent category. During the implementation of blended learning is learning two face to face meetings and two meetings online students to look more interested in participating in student learning and much freer to express questions or opinions.

As a follow up of the results of research and development that have been implemented the suggestions of researchers are

1) The lecturers should develop online learning media guided by the technical and teaching approaches in the course of teaching.

2) The lecturers should undertake a learning model for blended learning based on observation of researchers, the learning model of blended learning and online
Learning media use is very effective and well used to increase motivation and student learning outcomes.

5 References

Analysis of SME's Industry Influence on Economic Growth in Indonesia

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Abstract. The research was titled “The Role of SME industry to economic growth in Indonesia. The purpose of this research is to determine the extent to which the role of the SME industry affects Indonesia's economic growth. This study saw the influence of independent variables i.e. the number of SME units, manpower, investments, and export of SMEs (intervening variables) on dependent variables of the GDP value in Indonesia. This research hypothesis shows that business units, labor, investments, and exports of SMEs have a positive and significant influence on the economic growth in Indonesia. This type of research is quantitative descriptive research using secondary data. The secondary data used comes from the statistics central Agency data. The method of data analysis used is Path Analysis in estimating the results of his research. In testing the suitability of the model, a classic assumption test is used that is the test of normality and multicollinearity test. The purpose of this research is to analyze the influence of the number of SME units, the influence of the number of SME workers, investment influence and the influence of export from the SME sector to the Indonesian economy. From the results of the research known that the variable SME units, the number of SME workers, investment and export of SMEs as intervening variables affect the variable GDP. Overall the SME sector can affect Indonesia's economic development.

Keywords: Economic growth, SME unit, Labour, investment, SME exports Indonesia.

1 Introduction

Slow economic growth is not only due to weakness in the monetary and financial sector alone but also in the strong economic sector structure in the face of the turmoil from the outside of the turmoil from the inside. Before the crisis priorities, the government-industry prioritized to put the upstream industry first but ignored the downstream industry. There is a kind of statement that if the upstream industry awakens then downstream industry will follow. But in reality, the government ignored the concept of building downstream industries that can be implemented. Meanwhile, the large industries that woke up remained prone to the outside turmoil have no strong linkage in the provision of inputs. The delay of being promoted by SMEs in the program to build downstream industry and government administration towards large business development resulted in a prominent role in big business. With the slow to be promoted downstream industries occur quite badly when the Asian crisis struck the economy. In the event of a crisis, large industries have a serious problem, whereas SMEs work according to the rhythm of their respective advantages. Two patterns of industrial growth differ because of the use of raw material sourced from domestic, low wage labor and relatively fast-moving
towards adjustment of raw materials and market-oriented. All three factors above put SMEs are able to show themselves into a business that has advantages of competitiveness and economic growth. Experts see reality and argue that the process of economic recovery is supported by significantly increasing the role of SMEs. This shows that in addition to being a crisis antidote also has a very strategic role in the economy of a country.

Table 1. Indonesia's SME Data in 2013-2016

<table>
<thead>
<tr>
<th>Tahun</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>PDB (Billion IDR)</td>
<td>5,440,007.90</td>
<td>10,569,705.30</td>
<td>11,531,716.90</td>
<td>12,406,809.80</td>
</tr>
<tr>
<td>Total UKM (Unit)</td>
<td>57.895.721</td>
<td>58.444.657</td>
<td>59.262.772</td>
<td>59.890.487</td>
</tr>
<tr>
<td>Total HR UKM (persons)</td>
<td>114.144.082</td>
<td>119.050.288</td>
<td>132.379.684</td>
<td>134.632.315</td>
</tr>
<tr>
<td>Invest (Billion IDR)</td>
<td>1.655.233.5</td>
<td>1.688.338.2</td>
<td>1.722.105</td>
<td>1.761.816.7</td>
</tr>
<tr>
<td>Export (Billion US$)</td>
<td>182.112.70</td>
<td>185.833.49</td>
<td>192.573.60</td>
<td>199.313.57</td>
</tr>
</tbody>
</table>

From the above data can be found that SMEs are one of the sectors capable of contributing to GDP so as to increase the country's economy. With the research data, the Government should be able to provide support for SMEs to continue to improve its products so that the country's economy continues to improve. Below is a diagram that shows the change of data on the number of SME units and the number of SME workers as follows:

Fig 1. Total Data of Indonesian SMEs in 2013-2016

Fig 2. Data on number of Indonesian SME workers year 2013-2016
SMEs also contribute to export receipts, although SME contributions are much smaller if it is compared with large business contributions. In 2005 the export value of small businesses reached 27,700 billion and created a role of 4.86 percent on total exports. Whereas in 2002 the same business scale export value of 20,496 billion and created a role of 5.13% on total exports. It means an increase in the value even though the export role in small businesses has decreased slightly. For medium enterprises, the export value also increased from 66.821 billion in 2002 (16.74%) Increased to 81,429 billion with a reduced role of 14.30% in 2005.

Based on the distribution of export revenues by business scale, the 2003-2005 period of the largest export drive sector in total is the processing industry, and the smallest export contributors are agriculture, livestock, forestry and fisheries sectors. Especially in small businesses, the largest contributor to non-oil exports is the processing industry sector followed by agriculture, livestock, forestry and fisheries sectors and lastly is the mining and excavation sector. As for medium enterprises, the largest contribution to exports is the processing industry sector [1].

The role of small Medium enterprises (SMEs) in Indonesia is very large and has been proven to save the nation's economy during the economic crisis in 1997. In the countries of the country, in the United States, Japan, Germany, Italy, SMEs are the main pillars of the country's economy. Besides, the SME development efforts by synergizing it with the big industry through partnership pattern will also strengthen the economic structure both national and regional. The participation of related parties or stakeholders should continue to be grown to develop so that SMEs are really able to do even greater in the national economy. Because of this basis in writing this researcher interested to take the title "Analysis of the influence of the SME industry to economic growth in Indonesia".

1.1 Economic Growth

Economic growth is a process of changing the economic condition of a sustainable country to better conditions during a certain period. According to Sukirno [2], Economic growth means the development of activities in the economy that causes goods and services produced in society increased and community prosperity increased. So that economic growth can also be interpreted as a process of increasing the production capacity of an economy that is realized in the form of national income increase. Economic growth is an indication of the success of economic development. The theory builds on the empirical experience, so the theory can serve as the basis for predicting and making policy. In general, theories of economic growth according to experts can be divided into two, namely the theory of historical economic growth and classical and neoclassical economic growth theory.

1.2 Small Medium Enterprises

Small and Medium Enterprises abbreviated UKM is a term that refers to the small business type that has the most net worth Rp 200 million excluding land and building business. And a stand-alone endeavor. According to Presidential Decree No. 99 the year 1998, the sense of Small business is: "Small-scale economic activities with the business field which is mostly small business activities and need to be protected to prevent the business competition that Unhealthy.

Small business criteria according to LAW No. 9 year 1995 are as follows:

1. Having the most net worth Rp 200.000.000,-((two hundred million Rupiah) does not include land and business premises.

2. Have the most annual sales results Rp. 1 billion-(one billion Rupiah)
3. Belongs to an Indonesian citizen  
4. Stand-alone, not a subsidiary or branch company that is not owned, mastered, or affiliated either directly or indirectly with the medium enterprises or large enterprises  
5. In the form of an individual business, a business entity that is not a legal entity, or a legal entity, including cooperatives.  

According to the Ministry of Finance based on the decree of the Minister of Finance No. 316/KMK 016/1994 dated 27 June 1994 that small business as an individual/business entity that has been conducting activities/businesses that have sales/turover per year highest Rp. 600 million or asset (assets) highest Rp. 600,000,000 (outside land and occupied buildings). For example, firm, CV, PT, and cooperatives are in the form of a business entity. Meanwhile, examples in the form of individuals, such as household industry craftsmen, farmers, fishermen, goods, and services merchants.

1.3 SME Exports

Exports are the process of transporting goods or commodities from a country to another country. This process is often used by small to medium business enterprises as the main strategy to compete internationally. The export strategy is used due to lower risk. Capital is smaller and easier when compared to other strategies.

SME in Indonesia is very expected because it has great potential as one of the important sources of development (diversification) and growth of X, specifically X manufacturing. The ability of Indonesian SMEs to realize its potential X is determined by a combination of a number of factors of relative excellence owned by Indonesian SMEs over its competitors, both in large enterprises (UB) and abroad.

Types of exports:

a. Direct export

Direct exports are a way of selling goods or services through intermediaries located in other countries or export destination countries. Sales are conducted through distributors and sales representatives of the company. The advantages are centralized production in the country of origin and control of better distribution. Its weakness, higher transportation costs for large-scale products and the presence of trade barriers and protectionism.

b. Indirect export

Indirect exports are techniques in which goods are sold through the intermediary of the country of origin then sold by the intermediary. Using this way, the of has a chance to... Through, export management company and exporting company (export trading companies). The excess, production resources are concentrated and do not need to handle exports directly. Its weakness, control of less distribution and knowledge of operations in other countries is lacking.

2 Method Research

2.1 Research Approaches

The research approach conducted in this study is associative/quantitative research as associative/quantitative research is a study aimed at knowing the degree of relationship and pattern/form of influence between two or more variables, wherewith this research it will be
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built a theory that serves to explain, predict and control a symptom [3]. This quantitative study presents the analysis of inferential statistical data with the path analysis model.

2.2 Data analysis methods

In this study the analysis method used is a descriptive and quantitative analysis as follows[6]:

1.) Descriptive analysis

In this case the author uses a descriptive statistical analysis technique. According to Sugiyono [4] that descriptive statistics are statistics used to analyze data by describing or depicting data that has been collected as it is without intent to make any conclusions that apply to Generalization. In this case, descriptive statistics know the development of SME units, labor and investment, and export SMEs and economic growth. Descriptive analysis is statistics used to analyze data by describing or describing data that has been collected as it is without intent to make conclusions that apply to public or generalization [3].

2.) Quantitative Analysis

According to Rusiadi [3], Associative/quantitative research is a study aimed at knowing the degree of relationship and pattern/form of influence between two or more variables, wherewith this research it will be built a theory that serves to explain, predict and control a symptom. According to Ghozali, track analysis is the development of a regression model that is used to test the suitability of a matrix correlation of two or more models compared. Path analysis was developed by Sewall Wright. Models are usually depicted with circles and arrows. The arrows show the relationship of causality. Regression analysis is done in every variable contained in the model. The regression value predicted by the model compared to the correlation matrix of variable observation results and the value of its goodness of Fitnya can be calculated. Based on the goodness of Fitnya, the best model can be determined. In constructing the pathway diagram, the relationship between the constructs is aimed at the line through one arrow indicating the relationship of causality or regression from the construct one with the other construct. A correlation or covariant relationship is indicated by a line through two arrows. There are two assumptions that lubricated from the line diagram, namely:

a. All causality relationships are based on theory. The theory is used as a basis or foundation in inserting and eliminating causality relationships
b. Causality relationship in linear diagram model.

The author uses the SPSS 16 computer program to process data. The models used in this analysis are econometrics models. The data analysis method used is the analysis path. The Model is as follows:

\[ Y_1 = f(X_1, X_2, X_3) \] \hspace{1cm} (1)

\[ Y_2 = f(X_1, X_2, X_3, Y_1) \] \hspace{1cm} (2)

With the following model specifications:

\[ Y_1 = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \mu \] \hspace{1cm} (3)

\[ Y_2 = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 Y_1 + \beta_3 X_3 + \beta_4 Y_1 + \mu \] \hspace{1cm} (4)
Where:
\[ Y_2 \quad = \quad \text{Economic growth (billion rupiahs)} \]
\[ Y_1 \quad = \quad \text{SME exports (Billion rupiah)} \]
\[ \alpha \quad = \quad \text{Intercept} \]
\[ \beta_1, \beta_2, \beta_3 \quad = \quad \text{Regression coefficient} \]
\[ X_1 \quad = \quad \text{SME unit (million units)} \]
\[ X_2 \quad = \quad \text{Labour (million people)} \]
\[ X_3 \quad = \quad \text{Investment (Billion rupiah)} \]
\[ \mu \quad = \quad \text{Term of error} \]

3 Results and Discussion

3.1 Test Data Normality

Test data normality aims to test whether, in the regression model, the bully or residual variables have a normal distribution. To find out if any data has a normal distribution or not, the author uses graph analysis consisting of a histogram and a normal probability plot. The following is shown test normality by using the histogram chart and the normal probability plot.

The histogram line above indicates that the data has been distributed normally. It can be seen from the histogram chart indicating the distribution of data following the diagonal line indicating that the regression model meets the normality assumption. It is also supported with the normality test results using the Plot graph displayed in the following figure:
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Based on the Normal P-Plot graph above, it can be seen that the dots spread diagonally (not scattered away from the diagonal line) then the Normal graph of P-Plot is declared normal so as to fulfill the assumption of normality.

3.2 Multi co-linearity Tests

Multi co-linearity tests are used to test whether or not a variable is free to have a perfect relationship. Multi co-linearity testing can be seen from the value of variance inflation factor (VIF) based on the output result SPSS, when the value of the VIF < 10 and the value of Tolerance close to 1 can be concluded that the absence of multi co-linearity.

<table>
<thead>
<tr>
<th>Model</th>
<th>Correlations</th>
<th>Co-linearity Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>SME Units</td>
<td>.608</td>
<td>.599</td>
</tr>
<tr>
<td>Labour</td>
<td>.885</td>
<td>.543</td>
</tr>
<tr>
<td>Investment</td>
<td>.474</td>
<td>.453</td>
</tr>
<tr>
<td>SME Exports</td>
<td>.004</td>
<td>.164</td>
</tr>
</tbody>
</table>

Table 2. Multi co-linearity test Results

Based on the table above can be concluded that the research is trouble-free multi co-linearity. It can be seen by comparing the Tolerance and VIF values. From the results of this test, the Tolerance figures for all free variables are approaching number 1 indicating the absence of correlation between the free variables. And the value of VIF that shows the same
thing is that it has a value smaller than 10, so it can be concluded there is no multi co-linearity between variables free (independent).

3.3 Interpretation of SME Unit on economic growth through SME export factors

In order to prove that the export variable of SMEs can be an intervening variable between the SME units to economic growth, it will be calculated direct and indirect influence between the SME unit against economic growth. When the indirect influence of SME units to economic growth through SME exports is greater than the direct influence of SME units on the growth of fishermen's economy, the SME export factor can be an intervening variable between SME units To economic growth[7]. To perform the calculations directly and indirectly performed from the regression coefficients standardized each of the variables independent of the dependent variables. To know the influence of SME units through the export factor of SMEs to the economic growth used path analysis. The magnitude of the error value on each effect of the variable independent of the dependent in the can go through as follows:

\[ \text{Pe}_1 = \sqrt{1 - 0.971^2} = 0.239 \]
\[ \text{Pe}_2 = \sqrt{1 - 0.838^2} = 0.546 \]

In the trimming theory testing the validity of the research model was observed through the calculation of the total coefficient of determination as follows:

\[ R^2_m = 1 - \text{Pe}_1 \cdot \text{Pe}_2 \]
\[ = 1 - (0.239)^2 (0.546)^2 \]
\[ = 1 - (0.057) (0.298) \]
\[ = 0.983 \]
\[ = 98.3\% \]

The value of the coefficient of determination is 98.3%, indicating that 98.3% of the information contained in the data can be explained by the model, while the remainder of 1.7% is explained by errors and other variables outside the model. The number of coefficients on this model is relatively large so it deserves further inner achievements. From the output of SPSS outputs provide a standardized beta value for SMEs units of 0.971 and significant at 0.000 that means the SME units affect the export of SMEs. The coefficient value Standardized beta 0.971 is the value of the path or path P2. In the following table SPSS output, the standardized beta value for SMB unit 0.442 and the SME export factor 0.636 are all significant. The value of the standardized SME units 0.422 is the path value of P1 and the value standardized beta 0.636 SME export factor is the value of the P3 path. The magnitude of the value \( e_1 = (1 - 0.939)^2 = 0.00372 \) and the magnitude of value \( E_2 = (1 - 0.663)^2 = 0.114 \).

![Fig 5. Intervening Analysis](image-url)
The result of the analysis of the pathway shows that the UKM unit can influence directly the economic growth and can also affect indirect is the SME unit to the export factor of SMEs (as intervening) and then to economic growth. The amount of direct influence is 0.442 whereas large indirect influence should be calculated by multiplying the indirect coefficient of (0.971) x (0.636) = 0.618 or the total influence of SME units to economic growth = 0.442 + (0.971 x 0.636) = 1.06, by the value (P2 X P3 > P1) then the SME export factor serves as a intervening variable [8].

The results of the calculations showed indirect influence through the SME's export factor is greater than the direct influence on economic growth. These results show that UKM units have an effect on economic growth through the SME's export factor as an intervening variable, or it can be concluded that the SME's export factor becomes an intervening variable between the SME unit to economic growth. Based on this, the research hypothesis stating that UKM units are influential for economic growth through the export of SMEs received empirical support or can be deduced accepted hypotheses.

3.4 Interpretation of labor on economic growth through SME export factors

In order to prove that the export variable of SMEs is able to intervening between workers to economic growth, it will be calculated direct and indirect influence between labor to economic growth. If the influence of indirect labor on economic growth through the SME exports is greater than the direct influence of labor on economic growth, then the SME export factor can be the intervening variable between energy Work against economic growth. To perform the calculations directly and indirectly performed from the regression coefficients standardized each of the variables independent of the dependent variables [9]. To know the influence of labor through the export factor of SMEs to the economic growth used path analysis. The magnitude of the error value on each effect of the variable independent of the dependent in the can through the following calculations:

\[
\begin{align*}
Pe_1 &= \sqrt{1 - 0.895^2} = 0.446 \\
Pe_2 &= \sqrt{1 - 0.970^2} = 0.243
\end{align*}
\]

In the trimming theory testing the validity of the research model was observed through the calculation of the total coefficient of determination as follows:

\[
R^2m = 1 - P^2e_1 \cdot P^2e_2
\]
\[
= 1 - (0.446)^2 (0.243)^2
\]
\[
= 1 - (0.199) (0.060)
\]
\[
= 1 - 0.012
\]
\[
= 98.8\%
\]

The value of the coefficient of determination is 98.8%, indicating that 98.8% of the information contained in the data can be explained by the model, while the remainder of 1.2% is explained by errors and other variables outside the model. The number of coefficients on this model is relatively large so it deserves further inner achievements. From the output of SPSS outputs provide a standardized beta value for the workforce of 0.895 and significant at 0.000 that means the workforce affects SME exports. The coefficient value Standardized beta 0.895 is the value of the path or path P2. In the following table SPSS output, the standardized
The beta value for Labor 0.340 and the SME export factor 0.435 are all significant. The standardized beta value of the workforce 0.340 is the value of path P1 and the standardized value beta of the SME export factor 0.435 is the P3 path value. The magnitude of the value of e1 = (1-0.789)² = 0.045, and the magnitude of value E2 = (1-0.933)² = 0.0045.

![Fig 6. Intervening Analysis](image)

The result of the analysis of the pathway shows that the workforce can affect directly into economic growth and can also influence the SME unit to the export factor of SMEs (as intervening) and then to economic growth. The amount of direct influence is 0.340 whereas the big indirect influence should be calculated by multiplying the indirect coefficient is (0.895) x (0.435) = 0.390, or total labor influence to economic growth = 0.340 + (0.895 x 0.435) = 0.73. Because the value (P2 X P3 > P1) then the SME export factor serves as an intervening variable.

The results of the calculations showed indirect influence through the SME's export factor is greater than the direct influence on economic growth. These results indicate that the workforce affects the growth of fishermen through the export factor of SMEs as an intervening variable, or it can be concluded that the SME export factor into the intervening variable between labor and Economic growth. Based on that, the research hypothesis that states that the workforce affects economic growth through the export of SMEs gets empirical support or can be deduced accepted hypotheses.

### 3.5 Interpretation Investments in economic growth through SME export factors

In order to prove that the export variable of SMEs can be an intervening variable between investments to economic growth, it will be calculated direct and indirect influence between investments to economic growth [10]. When the indirect influence of investment on economic growth through the SME exports is greater than the direct investment influence on economic growth, the SME export factor can be the intervening variable between investments. To economic growth. To perform the calculations directly and indirectly performed from the regression coefficients standardized each of the variables independent of the dependent variables. To know the influence of investment through the export factor of SMEs to the economic growth used path analysis. The magnitude of the error value on each effect of the variable independent of the dependent in the can through the following calculations:

\[
P_{e1} = \sqrt{1-0.884^2} = 0.468
\]

\[
P_{e2} = \sqrt{1-0.930^2} = 0.606
\]
In the trimming theory testing the validity of the research model was observed through the calculation of the total coefficient of determination as follows:

\[
R^2 = 1 - P^2 e_1 \cdot P^2 e_2
\]

\[
= 1 - (0.468)^2 \cdot (0.606)^2
\]

\[
= 1 - (0.219) \cdot (0.367)
\]

\[
= 0.92
\]

\[
= 92\%
\]

The value of the coefficient of determination is 92%, indicating that 92% of the information contained in the data can be explained by the model, while the remaining 8% is explained by errors and other variables outside the model. The number of coefficients on this model is relatively large so it deserves further inner achievements. From the output of SPSS outputs provide standardized beta value for investments amounting to 0.884 and significant at 0.000 that means investments affect the export of SMEs. The coefficient value Standardized beta 0884 is the value of the path or path P2. In the following table SPSS output, the standardized beta value for investment 0.134 and the SME export factor 0.238 are all significant. The standardized value of investment beta 0134 is the path value of P1 and the value standardized beta export factor SME 0.238 is the value of the P3 path. The magnitude of the value e1 = (1-0.768)^2 = 0.054 and the magnitude of value E2 = (1-0.847)^2 = 0.023.

![Fig 7. Intervening Analysis](image)

The results of the track analysis show that investments can affect directly to economic growth and can also affect indirect is the SME unit to the export factor of SMEs (as intervening) and then to economic growth. The amount of direct influence is 0.134 whereas the big indirect influence should be calculated by multiplying the indirect coefficient of (0.884) x (0.238) = 0.210, or total investment influence to economic growth = 0.134 + (0.884 x 0.238) = 0.344. Because the value (P2 X P3 > P1) then the SME export factor serves as an intervening variable.

The results of the calculations showed indirect influence through the SME's export factor is greater than the direct influence on economic growth. These results show that the investment affects the economic growth through the SME export factor as an intervening variable, or it can be concluded that the SME export factor into an intervening variable between investments to growth Economic. Based on that, the research hypothesis that states that investment affects economic growth through the export of SMEs get empirical support or can be deduced accepted hypotheses.
4 Conclusions and Recommendation

4.1 Conclusion
Based on the research conducted in the role of SME industry to economic growth in Indonesia, it can be concluded as follows:

1) There are results indicating that the UKM unit has a significant effect on economic growth through the SME export factor as an intervening variable, or it can be concluded that the SME export factor into an intervening variable between the SME unit against Economic growth in Indonesia.

2) There are results indicating that the number of workers has a significant effect on economic growth through the SME export factor as an intervening variable, or it can be concluded that the SME export factor into an intervening variable between The number of workers in economic growth in Indonesia.

3) There are results showing that the investment has a significant effect on economic growth through the SME export factor as an intervening variable, or it can be concluded that the SME export factor into an intervening variable between investments to economic growth in Indonesia.

4.2 Recommendation
The suggestions given by the authors are:

1) The Government should consider the SME sector before making a decision to determine the economic policy. This factor is strategically influential in addressing the problems of unemployment and economic growth. By increasing the role of the SME sector through training and funding assistance can improve the welfare of the community in particular and the economic growth of Indonesia in general.

2) The limitations of other factors used as a basis to predict economic growth in Indonesia through the role of SMEs that are limited to the number of SMEs units, the number of workers, investments, and exports of SMEs. It is expected in subsequent studies to pay attention to the influence of other factors that can affect economic growth from other SME's angles.

3) As time goes on and enters the modernization world, the SME sector is required to compete globally to increase its contribution to Indonesian GDP. So that the Government should perform more effective empowerment to improve the competitiveness of the SME sector. Because the government is one of the containers that can bridge the SME sector because considering the greater export opportunities in the SME sector and can compete in the international world later.

4) Improvement of manpower skills or human resources should also be more concerned in order to obtain quality products that have high value as well as high competitiveness as well. With such, it will also help reduce existing unemployment so as to improve welfare in the SME field.
5 References


Dynamics of K, Ca, Mg in Spodosol Land that is Applied Oil Palm Empty Fruit Bunch on Oil Palm Cultivation Land (Elaeis guineensis Jacq.) In Central Kalimantan

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Abstract. The purpose of this study was to evaluate the application dosage of oil palm empty fruit bunch and the most efficient application area in contributing to maintaining soil nutrients, especially bases K, Ca, Mg. This research was conducted at PT. Sawit Graha Manunggal (SGM), Paju Epat Subdistrict, East Barito Regency, Central Kalimantan Province, which has a dominant type of soil Spodosol (Typic plachortod). This research uses a factorial split-plot design with 2 treatment factors. The first factor is where the application of oil palm empty fruit bunches as the main plot consists of 2 levels, namely G1 = palm inter-row, G2 = palm circle. The second factor is the dose of oil palm empty fruit bunches as subplots consisting of 3 levels namely, E1 = 30 mt / ha, E2 = 35 mt / ha, E3 = 40 mt / ha. The analysis was carried out after the application of oil palm empty fruit bunches for five years. The results showed that the most efficient application site was in the oil palm inter-row and the best application of oil palm bunches was 30 mt / ha.

Keywords: Exchange bases, oil palm empty fruit bunches, place of application, application dosage

1 Introduction

The development of the area of oil palm plantations in Indonesia is estimated to have an area of around 12.30 million hectares, an increase of 9.80% from 2016 which amounted to 11.20 million hectares, accompanied by an increase in palm oil production (CPO) of 34.47 million tons or by 9, 46 percent from 2016 amounted to 31.49 million tons [1]. The expansion of oil palm plantations today leads to marginal (sub-optimal) lands, one of which is spodosol soils which have low potential and soil fertility, because these species generally have low nutrient reserves, are acidic, have interchangeable base bases. low, low wet saturation and high (very high) Aluminum (Al) saturation [2].

Spodosols are soil formed from sand or coarse clay material and acid. This soil is characterized by the presence of a spodic B horizon or accumulated horizon of organic and
aluminum amorphous materials, with or without iron [3]. The dominant distribution of Spodosols is found in alluvial and coluvial plains which is a transitional area between structural / tectonic plains of quartz sandstone and marshy / peat plains which are commonly found on Kalimantan Island. The largest distribution of Spodosols is in the province of Central Kalimantan covering 1.51 million hectares, West Kalimantan 0.42 million hectares and East Kalimantan 0.15 million hectares [4]. Spodosol soil is nutrient-poor soil [2,5]. This can be seen from the characteristics of the carbon content (C) which is rather low (0.11-1.31%) and rather high (4.62%) at the spodic horizon. It has low to moderately low Nitrogen (N) content (0.10-0.11%), C / N ratio is rather low (0.10-0.11%) in the upper layer and high in the spodic layer (46.2%). Having low available phosphorus (P) (1-8 ppm) in all layers, cation exchange capacity (CEC) classified as low to moderate in the entire horizon (7.64-14.98), low base saturation (KB) (1-3 %) in all layers, has a acidic pH (pH 3.7-4.5) [6]. Spodosol soils have two weight limiting factors that need attention: the depth of the spodic layer and the texture of sandy soil. The depth of the spodic layer is related to the ease of roots in penetrating the soil, whereas sandy soil texture will result in the low ability of the soil to retain water and the chance of leaching nutrients is also greater. Other limiting factors that can potentially inhibit plant growth are poor drainage and soil acidity [5][7]. According to Surianto [8] that the soil texture of all Spodosol soil profiles is located at PT. Sawit Graha Manunggal (SGM) East Barito regency, dominated by sandy soil with the parameters of Bulk Density (BD) of medium category and soil permeability categorized rather quickly to quickly. Soil chemical parameters including pH, N (%), C (%), C / N, CEC, P-total and available P and exchange bases show low to very low categories.

As it is known that one of the by-products of the palm oil processing industry in the form of solids namely oil palm empty fruit bunches (OPEFB) also has a high potential in ameliorating sandy soils. Amelioration of sandy soil using oil palm empty fruit bunches has chemical and physical function approaches where high concentrations of organic matter will reduce the level of leaching of soil nutrients, especially K, Ca, Mg soils which are very easily washed.

Oil palm empty fruit bunches is a rich source of organic matter, N, P, K and Mg. The number of oil palm empty fruit bunches is estimated at 23% of the total number of processed fresh fruit bunches. In each ton of oil palm empty fruit bunches containing 1.5% N nutrients, 0.5% P, 7.3% K and 0.9% Mg that can be used as fertilizer substitutes for oil palm plants [9][10] research results showed that oil palm empty fruit bunches (OPEFB) are organic materials containing 0.80% N, 0.22% P2O5, 2.90% K2O, [11] determined the dose for the plot given EFB mulch around 200 kg (fresh weight) EFB per staple per year, applied in a circle around the base of the plant at the time of planting. In addition, oil palm empty fruit bunches (EFB) can also be applied between 4 points for one point on mature plants at a dose of 250 kg/staple [12]. Meanwhile, according to [13] that to increase the capacity to hold water and increase the exchange of cautions in the soil carried out the addition of oil palm empty cage (EFB) of 200 kg/staple.

Therefore, taking into account the aspect of fertilizing the garden regime (Spodosol soil), it can be evaluated at which application dosage of Oil Palm Empty Fruit Bunch (TKKS) (30, 35, 40 tons/ha) and in which application area (palm inter-row or palm circle) which can most efficiently contribute to maintaining soil nutrients, especially soil bases K, Ca, Mg.
2 Research Method

The materials to be used in this study are oil palm plants in 2009 and 2010 planting types with planting material Socfindo and BLRS (Lonsum) and oil palm empty fruit bunches derived from the rest of the palm oil mill processing of PT. Palm Graha Manunggal which has been applied as mulch for more than five years.

This research was conducted at PT. Sawit Graha Manunggal (SGM), Paju Epat Subdistrict, East Barito Regency, Central Kalimantan Province which has a dominant type of Spodosol (Typic plachortod) soil in May-October 2019.

Specifically to determine the effect of the OPEFB treatment in two different places (palm inter-row or palm circle) on the dynamics of the base of the exchange of land (K, Ca, Mg), used factorial Split Plot Design using 3 replications, as for the second Factors studied were: The first factor, namely the locations of application of oil palm empty fruit bunches consisted of 2 locations namely G1 = gawangan, G2 = disc. The second factor, namely the application dose of oil palm empty bunches consists of 4 levels, namely E1 = 30 mt/ha, E2 = 35 mt/ha, E3 = 40 mt/ha.

3 Results and Discussion

3.1 Potassium (K)

Table 1. below presents the average potassium nutrient in oil palm leaves due to differences in location and application dose of oil palm empty fruit bunches

<table>
<thead>
<tr>
<th>Locations of application</th>
<th>Doses of application</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>30 mt/ha (E1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>35 mt/ha (E2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>40 mt/ha (E3)</td>
<td></td>
</tr>
<tr>
<td>Palm inter-row (G1)</td>
<td>1.10 a</td>
<td>1.13 a</td>
</tr>
<tr>
<td>Palm circle (G2)</td>
<td>1.11 a</td>
<td>1.06 a</td>
</tr>
<tr>
<td>Mean</td>
<td>1.11 a</td>
<td>1.10 a</td>
</tr>
</tbody>
</table>

The results of the analysis showed that the administration of oil palm empty fruit bunches did not significantly affect the percentage of potassium nutrient content in the oil palm leaf tissue. The percentage of potassium nutrient content in leaf tissue is higher in oil palm empty fruit bunches which are applied in palm inter-row (1.13%) than in the palm circle (1.12%). In addition, the provision of oil palm empty fruit bunches 35 mt / ha showed the highest percentage of potassium among other treatments, amounting to 1.17%. However, this percentage is still relatively low.
compared to the critical limit of potassium nutrient levels that must be available on oil palm leaves [14] reported that the critical limit of K nutrient in the 9th fronds of oil palm was 1.25%.

3.2 Calcium (Ca)

**Table 2** below presents the average calcium nutrient in palm oil leaves due to differences in location and application dosage of oil palm empty fruit bunches

<table>
<thead>
<tr>
<th>Locations of application</th>
<th>Doses of application</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>30 mt/ha</td>
<td>35 mt/ha</td>
</tr>
<tr>
<td>Palm inter-row (G₁)</td>
<td>0.59 a</td>
<td>0.57 a</td>
</tr>
<tr>
<td>Palm circle (G₂)</td>
<td>0.62 a</td>
<td>0.56 a</td>
</tr>
<tr>
<td>Mean</td>
<td>0.60 a</td>
<td>0.57 a</td>
</tr>
</tbody>
</table>

The results of the analysis showed that the highest calcium nutrient levels were found in the application of oil palm empty fruit bunches in the palm circle and the application dosage which showed the highest calcium nutrient levels was 30 mt/ha. Giving oil palm empty fruit bunches can supply nutrients both macro and micro including calcium. This is because during the decomposition process the oil palm empty mark will release base cations such as K, Ca, Mg, and Na in the available form [15].

3.3. Magnesium (Mg)

**Table 3** below presents the mean magnesium nutrients in oil palm leaves due to differences in location and application dosage of oil palm empty fruit bunches

<table>
<thead>
<tr>
<th>Locations of application</th>
<th>Doses of application</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>30 mt/ha</td>
<td>35 mt/ha</td>
</tr>
<tr>
<td>Palm inter-row (G₁)</td>
<td>0.34 a</td>
<td>0.32 a</td>
</tr>
<tr>
<td>Palm circle (G₂)</td>
<td>0.30 a</td>
<td>0.30 a</td>
</tr>
<tr>
<td>Mean</td>
<td>0.32 a</td>
<td>0.31 a</td>
</tr>
</tbody>
</table>
Based on the analysis of Mg nutrient content in the palm oil leaf tissue, it can be seen that the application of the best oil palm empty fruit bunches is in the palm inter-row and the best dose which shows the highest nutrient content is 30 mt/ha.

Oil palm empty fruit bunches not only contain elements N, P, K, but also contain macro and micro nutrients, one of which is Mg. Lingga [16] stated that the Mg element plays a role in the formation of chlorophyll so that the formation of perfect leaf green for plants, besides that the Mg element plays a role in neutralizing the saturation of substances that poison the soil and plants such as excess Al, Fe and Cu.

4 Conclusion

The most efficient provision of oil palm empty fruit bunches is in the oil palm inter-row and the best dose for increasing K, Ca, Mg nutrients is 30 mt/ha. Further research is needed for soil nutrient analysis due to the provision of oil palm empty fruit bunches.

5. References


Mapping The Location Kuliah Kerja Nyata (KKN) State University Students Field in District Province North Sumatra

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Abstract. Kuliah Kerja Nyata (KKN) as a form of community service performed by college students through partnerships with provincial and local governments as one embodiment of the tri dharma college. KKN is a compulsory subject for students since the implementation of the curriculum at the University of Medan KKNI for students Strata 1 (S1) and the Education Program Non Education Program with weights 3 credits. Mapping the location of the exercise of this corruption has never been done before in the State University of Medan. Optimization efforts should be made to map the location of KKN. KKN is preparation for the 2020 school year. The research objective is to map the location of Kuliah Kerja Nyata (KKN) State University of Medan student. Outcomes research is the Standard Operational Procedure (SOP) Implementation of Kuliah Kerja Nyata (KKN) Students of State University of Medan, the publication of the proceedings of an international seminar, expected to be a policy of determining the location of State University of Medan student service learning and institutional quality improvement. This research is a descriptive research. The population in this study is all districts in North Sumatra province, amounting to 25 districts. Samples were taken from five districts of Deli Serdang, Langkat district, Serdang Berdagai, Karo and Samosir regency. The sampling technique used purposive sampling technique. The result of this research is to produce a draft Operational Standard Procedure (SOP) Implementation of Field Work Experience Student University of Medan. Instruments used in mapping the location of KKN will be used otherwise valid by the validator.

Keywords: Kuliah Kerja Nyata (KKN), Mapping, District.

1 Introduction

Tri dharma college is the duty of universities to provide education, research, and community service. In this respect, dedication to the community in question is the academic community activities that utilize science and technology to promote the welfare of society and intellectual life of the nation.

Law of the Republic of Indonesia Number 12 of 2012 on Higher Education in article 4 stating that higher education serves the academic community to develop an innovative, responsive, creative, skilled, competitive, and cooperative through the implementation of three dharma [1]. Furthermore, Article 5 states that the Higher Education aims to produce science and technology through research that observe and apply the value of the humanities in order to benefit the nation's progress, the progress of civilization, the welfare of mankind and the
realization of community service-based reasoning and research works that are beneficial in promoting the general welfare and educating the nation.

Dedication to the community is an activity in the academic community and cultivate the practice of science and technology to promote the general welfare and educating the nation. Community service carried out in various forms of activities in accordance with the academic culture, expertise, and / or the autonomy of science academicians and social and cultural conditions. The results of community service is used as the process of the development of science and technology, the enrichment of learning resources, and / or for learning and maturation of the academic community [2].

Candy Ristekdikti Number 96 Year 2016 on the Statute of the University of Medan states that Unimed implement community service activities in order to utilize, utilization, development of science and technology, and other good practices. Community service carried out by the faculty and / or students and educators can engage.

Community service activities undertaken to provide contribution to regional development, innovation and transfer of technology, solutions to social issues, poverty alleviation and community empowerment

Kuliah Kerja Nyata (KKN) as a form of community service performed by college students through partnerships with provincial and local governments as one embodiment of the tri dharma college. KKN is a lecture held directly in the middle of the community as the application of knowledge, skills and attitudes of students obtained on campus[3].

KKN as a learning process students through various activities directly in the middle of society, and actively and creatively involved as part of the community. Student involvement in corruption not only provide an opportunity for students to learn from the community, also have a positive impact on the optimal development potential of the village so as to give a new color in the society as a positive development that could ultimately improve the quality of people's lives.

One of the activities in the preparation phase is the implementation of service learning mapping and site characterization surveys of corruption. Survey mapping and location characteristics of corruption is an important thing to do as the initial stage of implementation of corruption.

This phase is conducted to obtain information about (1) the geographic description includes the distance to the district, the distance to the county, access to transport and communication access; (2) the potential for the village; (3) business unit village; (4) the characteristics of the village; (5) village program and (6) the number and level of school.

The results of this survey are used as a reference for the variation in the placement science students participating in service learning. Survey mapping and characterizing the location of corruption carried out in the district of North Sumatra province.

**Development Master Plan Unimed**

Based On Development Master Plan (RIP) Unimed Year 2011-2025, milestones achievements (milestones) of the goals stated in the Unimed target is further elaborated in the form of a Strategic Plan (Plan) five years. This means that the long-term trajectory of development Unimed 2011-2025 give emphasis to the 3 (three) profile through three stages of strategic plan goals, namely (1) the strengthening of services; (2) national competitiveness; and (3) regional competitiveness [4].

Unimed Development Year 2016-2020 in terms of national competitiveness that Unimed as a center of educational innovations that support the planning, execution, control, quality assurance and product familiarization national level research-based education. This is part of
the implementation to realize the vision of Unimed, namely "Being a University of Excellence In Education, Engineering Industry and Culture".

Superior (excellence) has a meaning that is worth competitiveness or competitiveness. Unimed as a superior university is a form of existence that is more similar among universities in Indonesia in 2025. The Unimed Excellence is built based on projections, predictions and estimates on the achievements of the current actual condition.

Unimed excellence indicators at the national level in 2025, particularly the field of education is:

a) Become a referral institution in developing a learning system educators;

b) A reference in the development of curriculum-based character building and development;

c) Being the center of the assessment and development of characters (character building) and its internalization in education, management and leadership; and

d) Being a pioneer in the development of quality culture, including quality of service, education and learning, graduates and publications.

To meet the educational indicators, Unimed continue to review and develop the quality of learning by using a variety of approaches. The purpose of the assessment is to meet the needs of the graduates and their relevance to the actual conditions of Unimed existing resources. For that, there are 2 main focus of the study are (1) identifying competencies user needs research-based graduate or known as a profile of graduates, and (2) assessment of the optimization of the role and functions as well as the fulfillment of internal resources [5].

Kuliah Kerja Nyata (KKN)

KKN is a compulsory subject for students since the implementation of the curriculum at the University of Medan KKNI for students Strata 1 (S1) and the Education Program Non Education Program with weights 3 credits.

As subjects, the implementation of service learning gives students the opportunity to develop competencies through real learning in rural communities. A wide range of knowledge, skills and attitudes acquired in college can be implemented directly in the community such as the ability to think and reason analytically through the source of empirical and realistic, so as to design and implement programs to address the problems that exist in society, in collaboration with others both fellow student service learning and community participants, manage yourself, and train skills in working either as individuals or groups.

Thus, through the interaction of students and the public on the implementation of KKN obtained insight, experience, and skills of the basic formation of character formation of students.

Vision KKN University Of Medan is building the country of campus and student teaches of the village. KKN Mission State University of Medan is:

1) Educating students to apply and develop the competencies of knowledge, skills and attitudes in society; and

2) Empowering rural communities explore and exploit its potential to improve well-being.

Implementation of Kuliah Kerja Nyata (KKN) for students University of Medan aims to train and develop students' competencies in applying information theory and knowledge, skills and attitudes that have been obtained to the public with think and reason analytically through empirical and realistic sources, so as to design and implement programs to develop the potential of rural communities [3].

Kuliah Kerja Nyata (KKN) Unimed student involves four (4) components, namely the students, the community, the district and Unimed.
The benefits of each component are as follows:

1) Building a multidisciplinary collaborations in thinking and working to solve a problem at the site of corruption;
2) Develop knowledge, skills and attitude in applying science and technology at the site of corruption; and
3) Train the ability to think in observation, study, formulating and solving the problem comprehensively based on empirical and realistic sources so that it can become an initiator and motivator for the empowering potential of rural communities KKN location.

The benefits society as a partner KKN implementation are as follows:

1) Acquire knowledge and skills to make observations, formulate, plan and implement rural development;
2) Acquire knowledge and experience in observing and empower rural potential to improve people's lives; and
3) Acquire the knowledge and skills of how to empower rural communities in order to form cadres to actively participate in sustainable development.

The benefits obtained by the KKN implementation partner districts Medan State University students are as follows:

1) Obtain information about the potential of the village through a comprehensive observation made by the student service learning; and
2) The results of the review, formulation and problem solving in a comprehensive plan based on empirical and realistic sources in which students can be used as initial information for rural development plan partners.

Unimed benefits gained in the implementation of service learning Medan State University students are as follows:

1) Pioneering and developing cooperation between the University of Medan with the District and the community can be as an initiator and motivator rural community empowerment; and
2) Got real information about phenomena that exist in society so to be used as reference in curriculum development University of Medan.

**North Sumatra Province**

North Sumatra is a province in Indonesia located in the northern part of the island Sumatra, This provincial capital is field, North Sumatra province consists of 25 districts and 8 cities; 325 districts and 5,456 villages / villages. 2015 population census, the population of North Sumatra 13,937,797 inhabitants, with a population density of 191 people / km².

Based on the 2010 Census, the majority of North Sumatera vagabond, Inclusive of all sub-tribe of Batak. ThenJava, nias, Malay, Chinese, Minang, Aceh, row, India, and others.

In general, the language that is used extensively by the people of North Sumatra is Indonesian.

North Sumatra is rich in natural resources such as natural gas in the area Tandam, Binjai and petroleum Pangkalan Brandan, Langkat which has been explored since the days Dutch East Indies, Kuala Tanjung in Asahan there PT Inalum engaged in ore mining and smelting aluminum which is the only one in Southeast Asia.

The rivers that disgorge in the surrounding mountains Lake Toba is a natural resource that is sufficient potential to be a resource to be exploited hydroelectric plants. hydropower
Asahan which is the largest hydropower plant in Sumatra are in Toba Samosir, The province is famous for its plantation area, up to now, the plantation economy of the province remains to be excellent. The plantations are managed by private companies and the state. SOE Plantation area is located in North Sumatra, including PT Perkebunan Nusantara II (PTPN II) PTPN III and PTPN IV.

3 Research Method

This research is a descriptive research. Descriptive research is research that is intended to gather information about the status of an existing symptoms, the symptoms according to what their circumstances at the time of research [6]. This study aimed to get a picture of the studied subject. Processing of the data is based on the percentage of analysis and trend analysis (trend) without linking the state of the population in which the data was taken. The population in this study are all districts in the province of North Sumatra as many as 25 districts and samples in this study were 5 districts purposive sampling.

The data in this study were obtained through questionnaires and documents [7]. Questionnaire used to collect information sourced respondents from government and villagers in the district of North Sumatra, while documentation is the whole thing can be obtained from the field, can be data or photographs.

This research data analysis techniques in accordance with the purpose of this study was to determine the results of the survey and student service learning site characterization State University of Medan in North Sumatra province, the research data that have been collected then analyzed by qualitative descriptive.

4 Results and Discussion

Kuliah Kerja Nyata (KKN) University of Medan is one of the compulsory subjects are coordinated by the Institute for Research and Community Services (LPPM) Unimed. CCN in Unimed aims to provide a learning experience to the students through the application of science, technology and art. CCN provides a positive contribution to the development of society and the state. CCN is held once a year.

a. Problem analysis

From the identification of the problem conducted by the Center of corruption, PPL, and Internship Unimed, the problems that occur are Unimed not yet have a location mapping as a student service learning. Constraints of the lack of such mapping Unimed difficult to place students attend learning programs.

To overcome these problems, an optimization effort is needed to map the location of the community service program so that the implementation of the community service program will not become an obstacle for University of Medan.

b. Data Needs Analysis

To perform the mapping required the input of the data that will be analyzed in order to provide information regarding the location of Kuliah Kerja Nyata (KKN) and can be used as a policy of determining the location of KKN. Data and information needs for mapping the
location of the data service learning for students is a village or district as the location KKN. KKN will be a place for students, namely in the form of (1) an overview covering geographic distance from the village to the township, village distance to the county, access to transport and communication access, (2) the potential for the village; (3) business unit village; (4) the characteristics of the village; (5) village program; and (6) the amount and level of school.

c. Instrument Validation Results

Once the analysis stage of problem analysis and data needs, the next step of this research is the validation of the instruments mapping the Kuliah Kerja Nyata (KKN). This validation is useful for determining and revising the need to be assessed in mapping the location of Kuliah Kerja Nyata (KKN).

Validator is an expert who is experienced in knowing the location of the villages in the province of North Sumatra. Validation of experts validate KKN location mapping instrument that will be used by the validator to validate the Standard Operational Procedures (SOP) Implementation of student service learning Unimed, But the discussion of these results only up to the validation of the instrument.

In the validation phase of instruments, there is some input from the respective experts and are summarized as follows:

<table>
<thead>
<tr>
<th>No.</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Validator 1 and 2</td>
</tr>
<tr>
<td></td>
<td>Validation of the results is as follows:</td>
</tr>
<tr>
<td></td>
<td>a) Questions or statements on the location of the more refined instrument in order to obtain sufficient information on the location of the village KKN</td>
</tr>
<tr>
<td></td>
<td>b) Coverage questions / statements designed instrument in question please expanded field</td>
</tr>
<tr>
<td></td>
<td>c) Arranged inside the instrument has been no question / statement education. These learning programs need to know the state of education in each village.</td>
</tr>
<tr>
<td></td>
<td>d) Programs village excavated in the instrument is too narrow so that information about the village program that has been implemented, ongoing and will be implemented has not been unraveled.</td>
</tr>
</tbody>
</table>
d. Results Mapping Each District

Description of the mapping results in each district is as follows:

a. Samosir

Samosir picture as the location of Kuliah Kerja Nyata (KKN) University of Medan students based on data obtained in the field and after the analysis with statistical analysis, it can be seen in the following table:

<table>
<thead>
<tr>
<th>NO</th>
<th>COMPONENT</th>
<th>PERCENT</th>
<th>CRITERIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Geographical overview</td>
<td>50%</td>
<td>Average</td>
</tr>
<tr>
<td>2</td>
<td>Potential Village</td>
<td>87.5%</td>
<td>Very high</td>
</tr>
<tr>
<td>3</td>
<td>Business Unit Desa</td>
<td>45%</td>
<td>Average</td>
</tr>
<tr>
<td>4</td>
<td>Village characteristics</td>
<td>75%</td>
<td>High</td>
</tr>
<tr>
<td>5</td>
<td>Village program</td>
<td>75%</td>
<td>High</td>
</tr>
<tr>
<td>6</td>
<td>Jejang And Number Of Schools</td>
<td>77.5%</td>
<td>High</td>
</tr>
</tbody>
</table>

Average 68.3% High

More specifically readiness Samosir district as the location of University of Medan student service learning can be presented graphically in the following charts:

![Fig 1. Overview Samosir](image)
b. Langkat
Langkat picture of the condition can be seen in the following table:

<table>
<thead>
<tr>
<th>NO</th>
<th>COMPONENT</th>
<th>PERCENTAGE</th>
<th>CRITERIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Geographical overview</td>
<td>75%</td>
<td>High</td>
</tr>
<tr>
<td>2</td>
<td>Potential Village</td>
<td>72.5%</td>
<td>High</td>
</tr>
<tr>
<td>3</td>
<td>Business Unit Desa</td>
<td>50%</td>
<td>Average</td>
</tr>
<tr>
<td>4</td>
<td>Village characteristics</td>
<td>60%</td>
<td>Average</td>
</tr>
<tr>
<td>5</td>
<td>Village program</td>
<td>75%</td>
<td>High</td>
</tr>
<tr>
<td>6</td>
<td>Jejang And Number Of Schools</td>
<td>80%</td>
<td>High</td>
</tr>
</tbody>
</table>

Average 68.75% High

![Gambaran Kabupaten Langkat](image)

Fig 2. Overview Langkat
c. Karo

Langkat picture of the condition can be seen in the following table:

<table>
<thead>
<tr>
<th>NO</th>
<th>COMPONENT</th>
<th>PERCENTAGE</th>
<th>CRITERIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Geographical overview</td>
<td>45%</td>
<td>Average</td>
</tr>
<tr>
<td>2</td>
<td>Potential Village</td>
<td>82.5%</td>
<td>Very high</td>
</tr>
<tr>
<td>3</td>
<td>Business Unit Desa</td>
<td>60%</td>
<td>Average</td>
</tr>
<tr>
<td>4</td>
<td>Village characteristics</td>
<td>72.5%</td>
<td>High</td>
</tr>
<tr>
<td>5</td>
<td>Village program</td>
<td>75%</td>
<td>High</td>
</tr>
<tr>
<td>6</td>
<td>Jejang And Number Of Schools</td>
<td>82.5%</td>
<td>Very high</td>
</tr>
</tbody>
</table>

**Average** 69.58% High

![Gambaran Kabupaten Karo](image)

**Fig 3. Results Mapping Karo**
d. Serdang Berdagai

Overview Serdang Berdagai conditions seen in the following table:

<table>
<thead>
<tr>
<th>NO</th>
<th>COMPONENT</th>
<th>PERCENTAGE</th>
<th>CRITERIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Geographical overview</td>
<td>75%</td>
<td>High</td>
</tr>
<tr>
<td>2</td>
<td>Potential Village</td>
<td>70%</td>
<td>High</td>
</tr>
<tr>
<td>3</td>
<td>Business Unit Desa</td>
<td>57.5%</td>
<td>Average</td>
</tr>
<tr>
<td>4</td>
<td>Village characteristics</td>
<td>67.5%</td>
<td>High</td>
</tr>
<tr>
<td>5</td>
<td>Village program</td>
<td>70%</td>
<td>High</td>
</tr>
<tr>
<td>6</td>
<td>Jejiang And Number Of Schools</td>
<td>75%</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Average</td>
<td>75%</td>
<td>High</td>
</tr>
</tbody>
</table>

Fig 4. Overview Serdang Berdagai
e. Deli Serdang

Deli Serdang picture of the condition can be seen in the following table:

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>PERCENTAGE</th>
<th>CRITERIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 geographical overview</td>
<td>77.5%</td>
<td>High</td>
</tr>
<tr>
<td>2 potential Village</td>
<td>67.5%</td>
<td>High</td>
</tr>
<tr>
<td>3 Business Unit Desa</td>
<td>65%</td>
<td>High</td>
</tr>
<tr>
<td>4 Village characteristics</td>
<td>70%</td>
<td>High</td>
</tr>
<tr>
<td>5 Village program</td>
<td>65%</td>
<td>High</td>
</tr>
<tr>
<td>6 Jejang And Number Of Schools</td>
<td>85%</td>
<td>Very high</td>
</tr>
</tbody>
</table>

**Average 71.66% High**

Fig 5. Overview of Deli Serdang

**Discussion**

According Nieveen in Subekti in [4,8] the validity of a product can be attributed to two things: 1) whether the development is based on a strong theoretical rationale, and 2)
whether there is internal consistency. In addition, the determination of validity is determined by experts (experts) or people who know about a product. KKN location mapping instrument Unimed student has been revised by the validator and declared worthy instruments to obtain information on the mapping of districts in North Sumatra province. Results of mapping each district has a high potential to be the location of Kuliah Kerja Nyata (KKN) University of Medan student.

4 Conclusion

From the research and discussion above, this research has resulted in several conclusions as follows:

1) KKN location mapping instrument was revised by the validator and worth as a tool to obtain information about the location of corruption in the district of North Sumatra Province
2) Mapping results Samosir earned an average of 68.3% with a high criteria, Langkat district earned an average of 68.75% with a high criteria, Karo earned an average of 69.58% with a high criteria, Serdang Berdagai obtain the mean average 69.1% with high criteria and Deli Serdang district earned an average of 71.66% with high criteria.

Based on the above conclusion, this study resulted in the following recommendations:

1) The study has recommended that Samosir regency, Langkat, Karo, Serdang Berdagai and Deli Serdang worthy KKN location University of Medan students.
2) The results could provide input for sample districts in North Sumatra province to be able to add information about the district.

5 References

The Development of Learning Planning Book Based On Problem Solving on Students of Economic Education Study Program at Faculty of Economics in Medan State University

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Faculty of Economics, Medan State University, Medan, Indonesia¹,²,³,⁴
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The cause of low mastery of students in understanding the material of Learning Planning course is the lack of literature or references related to Learning Planning materials. The book used so far only contains theories without examples, assignments, and understanding to solve problems. To respond this, an optimization effort of the development of learning media is needed, especially the development of book. One of the optimization efforts that can be done is develop book based on problem solving. This method is considered effective to increase students mastery in mastering Learning Planning materials. Through the application of problem solving, students are required to learn actively so that students learning activities are more dominant than lecturers’ activities in learning. This study aims are to produce valid, practical, and effective Learning Planning course book based on problem solving and publication in proceeding at international seminar and can become book for students. This study uses 4D models consisting of 4 main stages, namely: 1) define, 2) design, 3) develop, and 4) disseminate. In this study, only carried out until the develop stage, while the desseminate stage was not carried out due to limited cost and time. The trial subject of the development of Learning Planning course book based on problem solving is the third semester students of the Economic Education study program in 2019/2020 at Faculty of Economics in Medan State University. The criteria used to choose the location and trial class is the condition of students in accordance with the needs of researchers where the class has never used book based on problem solving. The results of this study show that Learning Planning course book based on problem solving produced are valid, practical and effective. The value of the validity of book based on validators' assessment are 83.7% and the book can be categorized valid. The practicality value of book assessed by students are 81.57% and the book can be categorized as practical in the learning process.

**Keywords**: Problem Solving, Learning Planning Course, Book, Development.

1 Introduction

Higher Education is an important pillar in the development of a nation and and has a crucial role in improving human resources and competitiveness. Higher education in Indonesia is a national education subsystem that includes diploma, bachelor, master, specialist and
doctoral programs organized by Higher Education. Higher Education is obliged to organize education, research and community service [1].

Medan State University is one of the Producing Institution of Educational Personnel that produces products in the form of teachers. The Faculty of Economics as an integral part of Medan State University also participates in the success of Medan State University's mission to answer challenge, opportunity, community guidance, and prepare professional and competitive teacher candidates.

The profile of graduates in the form of professional and competitive teachers can be achieved by enhancing students' intellectual abilities and leading to broad educational goals, useful, tangible, meaningful in preparing students to face future challenges especially the Industrial Revolution 4.0. The quality of learning can be seen from the understanding of learning that is from the results and the learning process carried out.

To answer these challenges, the development of learning needs to be done at the Department of Economic Education in Medan State University. One of the main highlights in the development of learning undertaken is to increase mastery of the Learning Planning course. Based on observation, the cause of the low mastery of students in understanding Learning Planning course material is allegedly due to lack of literature or references related to Learning Planning materials. Students only refer to the book that have been used by lecturers without any other learning resources. In addition, the existing book only contain theories without examples, assignments, and understanding to solve problem.

To respond this, an optimization effort of the development of learning media is needed, especially the development of book. One of the optimization efforts that can be done is develop book based on problem solving. This method is considered effective to increase students mastery in mastering Learning Planning materials. Problem solving is expected to give students a more meaningful learning experience, because it was developed to help students learn about solving problems that arise in their experiences.

Through the application of problem solving, students are required to learn actively so that students learning activities are more dominant than lecturers activities in learning. The development of book based on problem solving begins with the arrangement of materials that suit with the needs. In presenting the material is equipped with a problem and solving as example of question and discussion. And at the end of the material created a problem (in the form of question) and students are asked to complete solving (as an answer).

Based on the reality, it is important to develop Learning Planning course book based on problem solving among students of the Department of Economic Education, Faculty of Economics, Medan State University. This book was developed using simple language and easily understood by students, and arranged as interesting as possible so that students can learn independently. This book is different from other books which are developed based on problem solving and are expected to provide solution for students who have difficulty in mastering Learning Planning materials.

Teaching Materials

Teaching materials occupy an important position in achieving learning objectives. This is in line with the opinion of Prastowo [2] which stated that teaching materials are all materials (both information, tools, and texts) that are arranged systematically that displays a complete figure of competencies that will be mastered by students and used in the learning process with the aim of planning and studying learning implementation.

Outlined, books consist of knowledge, skills, and attitudes that students must learn that are arranged systematically so that they can accumulatively achieve learning outcomes. The
standard teaching function for lecturers is to direct student activities in the learning process as well as being a substance that must be elaborated to students, while for students, teaching material serves as a guide in the learning process and is a learning outcomes that must be achieved.

Books are the development of instructional design that emphasizes the principles adopted from theories and research findings about learning. The orientation of teaching materials is to optimize learning activities to achieve learning outcomes. Therefore, teaching materials must be able to present learning material that is meaningful to students as learning subjects.

BSNP [3], explaining that the feasibility of books can be seen from four dimensions, namely: (1) the feasibility of content means that a good book should contain material that supports learning outcomes and has indicators namely material breadth, material depth, material completeness, and material accuracy; (2) the feasibility of presentation means that the presentation of books can be assessed from several sub-components and/or indicators such as presentation techniques, supporting presentation, consistency of presentation, and presentation of learning materials; (3) the feasibility of language means that books are written in terms and rules that are correct, clear, and in accordance with the conditions of the development of the reader. The indicators are the use of Indonesian language rules that are good and right, follow improved spelling rules, terminologies in accordance with the concepts being the subject, there are explanations for terms that are difficult or not common, the language used is simple, straightforward and easy to understand for students, and the language is adjusted with the level of student and communicative development and developing students' thinking skills; and (4) the feasibility of graphic means that books can be seen from aspects of book size, book skin design, and book content design.

Learning Planning Course

Learning Planning course are the course in semester three and must be given to students at Faculty of Economics and the Department of Economic Education in Medan State University. The basic consideration of the distribution of courses in KKNI put out Learning Planning course in semester three so that students as prospective teachers are equipped with knowledge on how to plan learning correctly so that students are expected to become professional teachers later.

Problem Solving Method

Problem solving according to Sadirman, et al. [4] is a way of presenting learning material by making problems as a starting point for discussion to be analyzed and synthesized in an effort to find solutions or answers by students. Problem Solving is often called or also called the experimental method, reflective thinking method, or scientific method.

Thus, Problem solving is a learning method that seeks to discuss problems to find solutions or answers. As teaching methods, problem solving methods are very good for developing scientific attitudes in students. Children who are used to solving problems mean they are used to thinking at a high level. Conversely, higher order thinking is very necessary in solving various problems in life. Besides being trained in thinking, students must also be trained to be independent. The ability to solve problems is the forerunner of an independent attitude or in other words the ability to solve problems will give birth to an attitude of independence. Meanwhile, independence must be owned by students to face their future.

Sanjaya [5] stated that the advantages of problem solving are as follows: (1) problem solving is a pretty good technique to more understanding the contents of the lesson; (2) problem solving can challenge students' abilities and provide satisfaction to discover new
knowledge for students; (3) problem solving can improve student learning activities; (4) problem solving can help students on how to transfer their knowledge to understand problems in real life; (5) problem solving can help students to develop their new knowledge and be responsible for the learning they are doing. In addition, problem solving can also encourage self-evaluation of both the result and the learning process; (6) problem solving can show students that each material, basically is a way of thinking and something that must be understood by students is not just learning from the teachers or books; (7) problem solving is considered more fun and liked by students; (8) problem solving can develop students' ability to think critically and develop their ability to adapt to new knowledge; (9) problem solving can provide opportunities for students to apply the knowledge they have in the real world; and (10) problem solving can develop students' interest to learn continuously even if learning in formal education has ended.

3 Research Method

This study uses 4D model. Thiangarajan in Trianto [6], this model consist of four main stage such as: 1) define, 2) design, 3) develop, dan 4) disseminate. In this study, only carried out until the develop stage, while the disseminate stage was not carried out due to limited cost and time.

The steps for the design of the book can be detailed as follows: (1) The define stage, which is aimed at defining the objectives of the course in the curriculum, namely curriculum analysis, concept analysis and student analysis. Curriculum analysis by analyzing learning outcomes based on KKNI. Meanwhile, concept analysis aims to make students master the main concepts of Learning Planning course, while analysis of students to determine students characteristics include age, motivation, knowledge and skills; (2) Design stage, aims to design book based on problem solving and (3) Develop stage aims to produce book based on problem solving that are valid, practical, and effective.

The trial subject of the development of Learning Planning course book based on problem solving is the third semester students of the Economic Education study program in 2019/2020 at Faculty of Economics in Medan State University. The criteria used to choose the location and trial class is the condition of students in accordance with the needs of researchers where the class has never used book based on problem solving.

Data analysis techniques used in this study were (1) validation data analysis. To analyze the validation, the Likert scale is used based on the validation sheet with the steps: (a) give a score for each item with: very good answers (5), good (4), enough (3), less (2), bad (1); (b) add up the total score for each validator for all indicators; (c) providing validator values. For analyzing validity data using the formula:

\[
Validity = \frac{\text{score earned}}{\text{maximum score}} \times 100\%
\]
Table 1. The Achievement Level of Validity of Book

<table>
<thead>
<tr>
<th>No.</th>
<th>Degree of achievement (%)</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>90-100</td>
<td>Very valid</td>
</tr>
<tr>
<td>2</td>
<td>80-89</td>
<td>Valid</td>
</tr>
<tr>
<td>3</td>
<td>65-79</td>
<td>Quite Valid</td>
</tr>
<tr>
<td>4</td>
<td>55-64</td>
<td>Less Valid</td>
</tr>
<tr>
<td>5</td>
<td>0-54</td>
<td>Very Less Valid</td>
</tr>
</tbody>
</table>

The book is said to be valid if has reached a validity level above 80%; and (2) practicality data analysis. To analyze the practicality of book is using questionnaire given to students. The questionnaire was arranged in a Likert scale with a positive category using a modified formula from Lubis.

\[
\text{Degree of achievement} = \frac{\sum \text{each item}}{\sum \text{high score}} \times 100\%
\]

Table 2. The Level of Practicality of Book

<table>
<thead>
<tr>
<th>No.</th>
<th>Degree of Achievement (%)</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>90-100</td>
<td>Very Practical</td>
</tr>
<tr>
<td>2</td>
<td>80-89</td>
<td>Practical</td>
</tr>
<tr>
<td>3</td>
<td>65-79</td>
<td>Practical Enough</td>
</tr>
<tr>
<td>4</td>
<td>55-64</td>
<td>Less Practical</td>
</tr>
<tr>
<td>5</td>
<td>0-54</td>
<td>Very Less Practical</td>
</tr>
</tbody>
</table>

The book is said to be practical if has reached a practical level above 80%.

4 Results and Discussion

A. Curriculum Analysis

In an effort to qualify college graduates in Indonesia, the government has issued Perpres No. 08 year 2012 concerning the Kerangka Kualifikasi Nasional Indonesia (KKNI). The curriculum, which initially refers to the achievement of competencies, refers to learning outcomes. In summary, KKNI consists of nine levels of Indonesian human resources academic qualifications. The implementation of KKNI through 8 stages, namely through the determination of graduation profiles, formulating learning outcomes, formulating the competence of study materials, packaging subjects, preparing curriculum frameworks, preparing lecture plans.

Curriculum analysis is done by analyzing the Competency Standards and Basic Competency in the Learning Planning course. The results of the analysis of competency standards and basic competency become the formulation of learning indicators are as follows:
1) Understand the nature of learning planning;
2) Understand the learning system design model oriented towards achieving goals;
3) Understand the planning of learning programs;
4) Understand the development of competency as a learning goal;
5) Understand learning strategies;
6) Design learning activities;
7) Understand the development of learning resources and learning media;
8) Understand the techniques for drafting and implementing evaluation of learning outcomes.

B. Concept Analysis

Concept analysis aims to be the basis for the main concepts that must mastered by the students in the learning process. In the analysis of concepts compiled, identification and formulation of the main concepts that will be arranged in the material in the book based problem solving. Based on the indicators and learning objectives, the main concepts are determined as follows:

1) Definition, importance, benefit, function, learning planning criteria and steps for drafting learning plans;
2) Definition of curriculum based competency, characteristics of curriculum based competency, expected competencies in learning, development and implementation of syllabus, and instructional system design models for achieving competence;
3) The nature of learning planning, learning program development, syllabus, annual program planning, and semester program planning;
4) The nature of learning objectives, the hierarchy of educational and learning objectives, the classification of learning objectives, and the format of designing learning objectives;
5) Understand of learning strategies, understanding of approaches, strategies, methods, techniques and learning models, principles of using learning strategies, and organizing learning strategies;
6) The importance of preparing the lesson plan, the definition and function of the lesson plan, and the components of the lesson plan;
7) Utilization of learning resources, choosing learning resources, learning media, benefits and functions of learning media, use of learning media, classification and types of learning media, characteristics of learning media, and selection and use of learning media
8) The steps of drafting the evaluation of learning outcomes, planning the drafting of learning outcomes evaluation, writing items evaluation of learning outcomes, strengths and weaknesses of the description test, the use of description test, the classification of description test, and techniques for implementing learning outcomes evaluation.

C. Student Analysis

Student analysis is conducted to determine student characteristics. The intended student characteristics include age, motivation, background knowledge of students, academic abilities, and social skills. Furthermore, psychological changes that occur such as the search for identity, begin to emerge the aspiration for the future, freedom to do things. The role expected by students in social groups in the community where students interact. This causes problems
for students, in the form of changing interests, behavior, and values in life. In adolescence, students act without worrying about the risks posed to themselves and others.

1) **Design Stage**

   At this design stage, researchers design and arrange Learning Planning book based on problem solving. The design stage compiles the product specifications that will be produced. The draft product specifications are as follows:

   a. **Cover Appearance**

   ![Book Cover](image)

   **Fig 1.** Book Cover

   b. **Formulation of Learning Objectives**

   The formulation of learning objectives is arranged specifically and systematically based on curriculum provision. The formulation of learning objectives starts from setting competency standards, basic competencies and indicators of achieving learning objectives.

   From the indicators formulated learning objectives that must be mastered by students.

   Cognitive and psychomotor learning goals are formulated based on competency standards, basic competency and indicators established by the curriculum.

   c. **Description of Contents of Planing Learning Book**

   The description of the material or the content of teaching materials refers to the Kerangka Kualifikasi Nasional Indonesia (KKNI). The curriculum, which initially refers to the achievement of competencies, refers to learning outcomes. In summary, KKNI consists of nine levels of Indonesian human resources academic qualifications.

2) **Develop Stage**

   The develop stage includes expert validation and book based on problem solving testing to see the validity, practicality and effectiveness of the book developed.

   The book that has been develop, then validated by two validators consisting of one expert in the field of Learning Planning and one linguist.

   Assessment for practicality is carried out by students. The book is said to be practical, if the book can help students in understanding the material that has been developed.
The develop stage of Learning Planning book based on problem solving are explained as follows:

**a. Expert Validation**

Expert validation consists of 2 phases namely:

1. Validate the questionnaire validation sheet which will be used by the validator to validate material.
2. Validation of book using revised questionnaire validation sheet and scoring for assessment of material.

Validate questionnaire validation sheet, useful to determine and revise the needs to be assessed in validating material by the validator. The validation questionnaire validation sheet was revised by two experts according to their respective fields.

At the validation stage, the validation of questionnaire validation sheet contained several sections that were revised. The revision results of each questionnaire validation sheet from experts in general can be seen in the following table:

<table>
<thead>
<tr>
<th>No.</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Material Expert</td>
</tr>
<tr>
<td>(1)</td>
<td>The validation results are as follows:</td>
</tr>
<tr>
<td>(2)</td>
<td>a) The KKNI model is adapted to Medan State University KKNI curriculum.</td>
</tr>
<tr>
<td></td>
<td>b) Learning Planning book based on problem solving have not been fully integrated in the material.</td>
</tr>
<tr>
<td></td>
<td>c) Practice questions should more represent learning outcomes.</td>
</tr>
<tr>
<td></td>
<td>d) The concept of problem solving book is more sharpened in the material.</td>
</tr>
<tr>
<td>2</td>
<td>Linguist</td>
</tr>
<tr>
<td></td>
<td>The arrangement of the grid to be developed into question should be according to the needs (all languages grid are improved) and with the improvements results of the following:</td>
</tr>
<tr>
<td></td>
<td>1. The choice of words appropriate and in accordance with science.</td>
</tr>
<tr>
<td></td>
<td>2. The structure of sentences and words / terms in accordance with standard language rules.</td>
</tr>
<tr>
<td></td>
<td>3. Simple and clear sentences.</td>
</tr>
<tr>
<td></td>
<td>4. The writing is in accordance with the EYD.</td>
</tr>
<tr>
<td></td>
<td>5. The use of language and sentence structure in accordance with the level of ability of students.</td>
</tr>
</tbody>
</table>

After the validation sheet is revised and declared ready to be used by experts, then the book validation is carried out. The validator of all variables is validated by each expert. The revision results of book validation for each validator in general can be seen in table 4 below:
Table 4. The Revision Results of Book

<table>
<thead>
<tr>
<th>No.</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>1</td>
<td>Material Expert</td>
</tr>
<tr>
<td></td>
<td>1. Add the terms of Medan State University KKNI in book.</td>
</tr>
<tr>
<td></td>
<td>2. Add evaluation term into book.</td>
</tr>
<tr>
<td></td>
<td>3. The exercise questions are designed to meet C4 at the cognitive level, which is analysis.</td>
</tr>
<tr>
<td>2</td>
<td>Linguist</td>
</tr>
<tr>
<td></td>
<td>1. Improve writing of sentences / paragraphs.</td>
</tr>
<tr>
<td></td>
<td>2. Simplify sentences that are too complex.</td>
</tr>
<tr>
<td></td>
<td>3. Guidelines according to EYD.</td>
</tr>
</tbody>
</table>

After the book was revised, then each of validators gave score. Expert in the field of Learning Planning assesses all variables of the concept of material, and linguist evaluates the book language variable.

Table 5. Experts Score

<table>
<thead>
<tr>
<th>No.</th>
<th>RATED ASPECT</th>
<th>EXPERT 1 SCORE</th>
<th>EXPERT 2 SCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>FORMAT / CONSTRUCT</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. Clarity in material distribution</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>b. Display and layout</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>c. Appropriate type and size of letters</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>LANGUAGE</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. The material is delivered directly by choosing a simple language</td>
<td>-</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>b. The material is delivered in communicative and interactive language</td>
<td>-</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>c. Writing is done with a good Indonesian structure</td>
<td>-</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>d. Writing is done using good Indonesian language rules.</td>
<td>-</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>e. Writing is done with effective sentences</td>
<td>-</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>f. Writing is done with efficient sentences</td>
<td>-</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>CONTENT</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. Having material truth</td>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>b. Having sufficient competence</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>c. In accordance with the</td>
<td>4</td>
<td>-</td>
</tr>
</tbody>
</table>
85

<table>
<thead>
<tr>
<th>No.</th>
<th>RATED ASPECT</th>
<th>EXPERT 1</th>
<th>EXPERT 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>objectives and learning outcomes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d.</td>
<td>In accordance with the implementation of problem-based learning</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>e.</td>
<td>Having a decent and complete source of material</td>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td>f.</td>
<td>Content weight according to time allocation</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>g.</td>
<td>The material presented is in accordance with stakeholder needs</td>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td>h.</td>
<td>Equipped with assignments and evaluation tests that are compatible with the material, objectives, and learning outcomes</td>
<td>4</td>
<td>-</td>
</tr>
</tbody>
</table>

The results of data analysis of the validator assessment scores can be seen in table 6 below.

<table>
<thead>
<tr>
<th>No.</th>
<th>Variable</th>
<th>Degree of achievement (%)</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Content</td>
<td>84.44</td>
<td>Valid</td>
</tr>
<tr>
<td>2</td>
<td>Construct</td>
<td>80</td>
<td>Valid</td>
</tr>
<tr>
<td>3</td>
<td>Language</td>
<td>86.66</td>
<td>Valid</td>
</tr>
</tbody>
</table>

Average 83.7 Valid

The results of the validator assessment score analysis in table 6 consists of 4 variables, as follows: 1) contents with an achievement level of 84.44% are categorized valid, 2) constructs with an achievement level of 80% are categorized valid, 3) languages with an achievement level of 86.66% categorized as valid. In general, the average validity of Learning Planning book with a degree of achievement of 83.7% and book can be categorized as valid.

The comparison of degree of achievement of validation results of each variable by the validators for more details can be observed in the following:

![Validator Assessment](image)

Fig 2. The Validity Results of Book
b. Book Trial

A limited trial of book based on problem solving was conducted in class C of the Economic Education Study Program, Faculty of Economics, Medan State University. The trial serves to assess the practicality of book by students as users of teaching material. The effectiveness of teaching material can be seen from the activities of students during the learning process by using book. In addition, also evaluation to see student learning outcomes.

c. Practicality of Book

The practicality assessment of book is assessed by students as user / stakeholder of Learning Planning book. The practicality of Learning Planning book based on problem solving is assessed by students of Class C of Economic Education Study Program who are also trial subject of book. After practicality assessment of Learning Planning book based on problem solving by students, then data analysis is performed. The results of data analysis can be seen in table 7.

<table>
<thead>
<tr>
<th>No.</th>
<th>Variables</th>
<th>Level of Achievement (%)</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Learnability</td>
<td>83.52</td>
<td>Practical</td>
</tr>
<tr>
<td>2</td>
<td>Efficiency</td>
<td>80.71</td>
<td>Practical</td>
</tr>
<tr>
<td>3</td>
<td>Effectiveness of time</td>
<td>80.48</td>
<td>Practical</td>
</tr>
<tr>
<td></td>
<td>Average</td>
<td>81.57</td>
<td>Praktis</td>
</tr>
</tbody>
</table>

The analysis results of practicality assessment data by Class C students of Economic Education Study Program who are also the trial subject of Learning Planning book based on problem solving which consists of three variables, namely 1) Learnability with an achievement level of 83.52% and categorized as practical for users, 2) Efficiency with an achievement level of 80.71% and categorized as practical use in the learning process, and 3) effectiveness of time with an achievement level of 80.48% and categorized can make time effective in the learning process. The practicality value of teaching materials by students with level of achievement is an average of 81.57% and can be categorized as practical.

Fig 3. Students Practicality Value
Discussion

According to Depdiknas [3] that a teaching material is said to be good and easy for students to understand if the material in one unit is intact according to the users' ability (Self Contained). According to Nieveen, the validity of a product can be related to two things: 1) whether the results of development are based on rational of strong theoretical, and 2) whether there is internal consistency. In addition, the determination of validity is determined by expert or people who understand the learning material.

The presentation of teaching materials is according to students' abilities with a value of 83.7% is considered valid. The description of the content / teaching materials is arranged systematically so that users can easily understand the teaching materials. Teaching materials are formulated in a clear learning unit starting from the presentation of materials, instructions for use, and evaluation tools. Presentation of the formulation of teaching materials is in accordance with the level of students' abilities.

Learnability of teaching materials in the learning process with a value of 83.52% categorized as practical for users. Because teaching materials have instructions for use, language is appropriate to the characteristics of students, can be used individually and exercises can help lecturers in directing students to understand concepts. Books are designed to facilitate lecturers in guiding students in the learning process.

According to Depdiknas [3], one of the objectives of teaching materials is to clarify and facilitate the presentation of messages so they are not too verbal. According to Sanjaya [5], one of the objectives of teaching materials is to increase the effectiveness and efficiency of achieving educational and teaching goals. Efficiency with a value of 80.71% is categorized as practical because book can help students in explaining concepts. A practical book is expected to be able to help lecturers direct students in the learning process.

According to Depdiknas [3], a good book can overcome the limitations of time, space, and sense power, for the teacher / supervisor in the learning process. Teaching materials that are practical in the effectiveness of time with a value of 80.48% categorized as practical. Teaching materials developed are practical used by lecturers to guide students in the learning process. Thus, lecturers can utilize minimal time with maximum results.

Based on observations observed by one observer, generally students are active in the learning process. This shows that the book based on problem solving are practical used in the learning process.

4 Conclusion

From the results of research and discussion above, this study produced several conclusions as follows:

1) A teaching book based on problem solving has been produced that is valid and practical.

2) The value of the validity of Learning Planning book based on problem solving with content, construct, and language variables obtained an average of 83.7% and the book can be categorized valid.

3) The practicality value of Learning Planning book based on problem solving by students is 81.57% and teaching book can be categorized as practical in the learning process.
Based on the conclusions above, this study produces the following recommendations:

1) This study has practical recommendation for lecturers to design book based on problem solving in other subjects because the use of problem solving in delivering learning material can stimulate students' creative thinking abilities related to solve the material being taught.

2) For stakeholders, it can review instructional material that has been developed, re-validated, and further developed so that it can be generally accepted and used in a standard both at the study program and faculty level.

8. References


The Therapeutic Effect of Nigella Sativa Extract on Female Wistar Rats Vaginal Candidiasis Model

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Abstract. Candidiasis is the most common fungal infection of humans caused by Candida albicans. Immediate and proper management of vaginitis candida must be done to prevent complications. Nigella sativa has pharmacological effects as antimicrobial, anti-inflammatory, immune stimulation and anti-cancer properties. Nigella sativa was proven have antifungal effect in vitro, and this study was to assess the antifungal effects and possibility of in vivo therapy. This study is an analytical study that assesses the therapeutic effect of Nigella sativa in a rat vaginal candidiasis model. Subjects were 28 rats that had been inoculated with Candida albicans and divided into 4 groups: Nigella sativa group, fluconazole group, combination of Nigella sativa with fluconazole group and control group. Candida albicans colony was measured to assess the therapeutic effect of the treatment. There were no difference number of Candida albicans colony between all group before inoculation (p = 0,274) and after inoculation (p = 0,323). There were significant decreased number of Candida albicans colony on the 24 hours after the treatment between the three types of treatment with the control group (Nigella sativa group p = 0,046; Fluconazole group p = 0,002; Nigella sativa + fluconazole p = 0,002). There was therapeutic effect of Nigella sativa by reducing the number of Candida albicans colonies.

Keywords: Fungal Inoculation, Pseudoestrus, Candida Albicans, Nigella Sativa, Vaginal Candidiasis, Fluconazole

1 Background

Candida albicans is the most common fungal infection of humans causing Candidiasis [1]. Complications of VVC that often occur is pelvic inflammatory disease which can ultimately cause infertility in sexually active women and chorioamnionitis which leading miscarriage or premature birth in women who are pregnant. Immediate and proper management of VVC must be done to prevent complications [2,3].

Nigella sativa is a member of the Ranunculaceae family. It has been used as a natural food and medicine which grows in Asia and the Middle East [4]. It contains Thymoquinone,
Thymohydroquinone, Dithymoquinone and Thymol. Thymoquinone inhibits the oxygen cycle as an inflammatory balance process with lipo-oxygenizens. *Nigella sativa* has pharmacological effects as antimicrobial, anti-inflammatory, immune stimulation and anti-cancer properties [5,6].

The inhibitory effect of fungal by *Nigella sativa* extract has been proved by a study both in vitro and in vivo against some pathogenic fungal such as *Candida albicans*, dermatophytes, non-dermatophytes and some aflatoxin-producing fungi. It has shown *Nigella sativa* had a high inhibitory effect on candidiasis in rats in vivo and can reduce the number of *Candida albicans* 5-fold in the kidneys, 8-fold in the liver and 11-fold in the spleen. The antifungal effect of *Nigella sativa* treatment for single day on rats that had been inoculated with the *Candida albicans* apparently inhibited the growth of this pathogen [7,8].

There is no *in vivo* studies have been found in rats with vaginal candidiasis. Further research is needed to evaluate the anti-fungal activity of *Nigella sativa* in Vaginal Candidiasis. Asdadi had conducted the research to assess the Minimum Inhibitory Concentration (MIC) and Minimum Fungicidal Concentration (MFC) of *Nigella sativa* in *Candida albicans* [9].

### 2 Research Method

This research was an experimental study to assess therapeutic effect of *Nigella sativa* extract on vaginitis candida. This research was conducted in July - October 2019 on Animal House - Faculty of Mathematics and Natural Sciences, Universitas Sumatera Utara. Ethical clearance is obtained from Animal House - Faculty of Mathematics and Natural Sciences, Sumatera Utara University.

This study use 28 female Wistar rats (*Rattis norvegicus sp*) aged 2 – 3 months with weight range of 101-240 grams that had fulfilled the inclusion and exclusion criteria. Before we do inoculation, we give Estradiol Valerate 2 mg subcutaneously intraperitoneal 3 days before inoculation and 4 days after inoculation to make the rat in pseudoestrus state that needed to maintenance the *Candida albicans*, and prevent self-healing.

The breeding of *Candida albicans* was held in the microbiology laboratory, Universitas Sumatera Utara General Hospital. By swapping the vagina with a cotton swab dipped in ATCC 14503 3 McFarland Candida albicans cells, the inoculation was done.

The *Nigella sativa* extract was given from pharmacological laboratory, Faculty of Pharmacy, Universitas Sumatera Utara, using Sodium Carboxymethyl cellulose (Cmc Na) solvent in order to obtain the extract of *Nigella sativa* 5 mg / mL.

We divided samples into 4 groups: 7 rats in the control group, 7 rats were given *Nigella sativa* extract 5 mg / mL with dose of 6.6 ml /kg of body weight, 7 rats were given 10 mg/kg of body weight, and 7 rats were given a combination of *Nigella sativa* extract 6.6 ml /kg of body weight and fluconazole 10 mg /kg of body weight.

After 24 hours inoculation, the therapy was given for 24 hours. The colonies of *Candida albicans* on the rats vagina was measure before inoculation and 24 hours after therapy. Vaginal smear samples were obtained, incubated for 48 hours on temperature 37° C and counted in the microbiology laboratory of the Universitas Sumatera Utara Hospital.

Data analyzed was using SPSS 22. We used Kruskal Wallis to assess differences in the four groups, T independent test and Mann Whitney to assess differences in the number of *Candida albicans* colonies in all four groups.
3 Results and Discussion

Table 1. Colonies count of Candida albicans before inoculation

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>Colonies count of Candida albicans, CFU/Plate</th>
<th>Mean</th>
<th>SD</th>
<th>Median</th>
<th>Min – Max</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>7</td>
<td></td>
<td>2,14</td>
<td>2,48</td>
<td>2</td>
<td>0 – 6</td>
<td>0,274 a</td>
</tr>
<tr>
<td>B</td>
<td>7</td>
<td></td>
<td>10</td>
<td>18,68</td>
<td>0</td>
<td>0 – 51</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>7</td>
<td></td>
<td>0,57</td>
<td>0,79</td>
<td>0</td>
<td>0 – 2</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>7</td>
<td></td>
<td>0.14</td>
<td>0,38</td>
<td>0</td>
<td>1 – 1</td>
<td></td>
</tr>
</tbody>
</table>

*Kruskal Wallis
Note: A = Nigella sativa group, B = fluconazole group, C = Nigella sativa group + fluconazole, D = control group.

The highest mean of number of Candida albicans colonies was found on the Fluconazole group with 10+18,68 CFU/plate and lowest mean on the control group with 0,14+0,38 CFU/plate. There was no difference of mean number colonies between four groups before inoculation with p = 0,274.

Fig 1. The number of Candida albicans colonies before inoculation. Note: A = Nigella sativa group, B = fluconazole group, C = Nigella sativa group + fluconazole, D = control group.

Table 2. Colonies Count of Candida albicans after inoculation

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>Colonies Count, CFU/Plate</th>
<th>Mean</th>
<th>SD</th>
<th>Median</th>
<th>Min – Max</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>7</td>
<td></td>
<td>164,57</td>
<td>124,69</td>
<td>66</td>
<td>60-300</td>
<td>0,323 a</td>
</tr>
<tr>
<td>B</td>
<td>7</td>
<td></td>
<td>136,86</td>
<td>115,77</td>
<td>78</td>
<td>28-300</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>7</td>
<td></td>
<td>210</td>
<td>95,67</td>
<td>243</td>
<td>56-300</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>7</td>
<td></td>
<td>237,86</td>
<td>106,46</td>
<td>300</td>
<td>68-300</td>
<td></td>
</tr>
</tbody>
</table>

*Kruskal Wallis
Note: A = Nigella sativa group, B = fluconazole group, C = Nigella sativa group + fluconazole, D = control group.
After the inoculation, remeasurement of vaginal colonies was done. The highest number of *Candida albicans* colonies was found on the control group with 237,86±106,46 CFU/plate and the lowest fungal colonies was in *Nigella sativa* group with 164,57±124,69. There was no difference of mean number colonies between four groups after inoculation with p = 0,323.

**Fig 2.** Colonies count of *Candida albicans* after inoculation. Note: A = *Nigella sativa* group, B = fluconazole group, C = *Nigella sativa* group + fluconazole, D = control group.

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>Colonies Number, CFU/Plate</th>
<th>p</th>
<th>Post hoc</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Median</td>
</tr>
<tr>
<td>A</td>
<td>7</td>
<td>88,29</td>
<td>99,63</td>
<td>53</td>
</tr>
<tr>
<td>B</td>
<td>7</td>
<td>4,29</td>
<td>1,11</td>
<td>4</td>
</tr>
<tr>
<td>C</td>
<td>7</td>
<td>2,86</td>
<td>1,86</td>
<td>3</td>
</tr>
<tr>
<td>D</td>
<td>7</td>
<td>229,29</td>
<td>120,89</td>
<td>300</td>
</tr>
</tbody>
</table>

<sup>a</sup>Kruskal Wallis, <sup>b</sup>Mann Whitney, <sup>c</sup>T Independent

Note: A = *Nigella sativa* group, B = fluconazole group, C = *Nigella sativa* group + fluconazole, D = control group

After 24 hours treatment, the therapeutic effect measured, we found that the lowest number of *Candida albicans* colonies belong to the combination group with 2,86±1,86 CFU/plate, meanwhile the highest was in control group with 229,29±120,89 CFU/plate. There was significant difference of the mean number of colonies between four groups after 24 hours of treatment (p <0,001). There were significant difference between all four groups (p<0,05) after Post Hoc Test.
Discussion

Creating, supporting and maintaining pathogens for vaginal candidiasis rat model were need a special treat. The Estradiol Valerate 2 - 5 mg was administered subcutaneously intraperitoneal 3 days before inoculation and 4 days after to decrease rat immunity or creating a pseudoestrus situation. If needed, it can be repeated weekly [10].

The environment changing of vaginal candidiasis will quickly recover so that the infection will heal quickly without creating a pseudoestrus situation. The number of Candida albicans fungal colonies in all groups was increased (Nigella sativa: 2,14±2.48 vs 164.57±124.69; Fluconazole: 10±18.68 vs 136.86±115.77; Combination group: 0.57±0.79 vs 210±95.67 and Control group: 0.14±0.38 vs 237.86±106.46). This indicated that the rats were successfully became vaginitis candida model.

Nigella sativa Linn, Ranunculaceae family, was grown in many parts of the world, especially the Mediterranean region, North Africa, the Middle East and parts of Asia and used by herbal therapy for many diseases [7].

The component of Nigella sativa were thymoquinquinone (TQ), alcoid (nigellicines and nigelledine), saponins (alpha-hederin), flavonoids, proteins, fatty acids, and many others, which have various therapeutic effects [12].

Nigella sativa extract have the strongest antifungal effect against various pathogenic fungal strains, including methanol, ethanol and chloroform extracts [6]. Even water extracts from Nigella sativa seeds showed an inhibitory effect on candidiasis in rat [13]. From the results of this study the administration of Nigella sativa extract with Sodium Carboxymethyl cellulose can reduce the number of vaginal colonies of the Candida albicans (p = 0.002).
On previous study on systemic candidiasis, therapeutic effect of *Nigella sativa* in the 24-hour observation after administration can reduce 5-fold the number of candida organisms in the kidney, 8-fold in the liver and 11-fold in the spleen [14][15][16].

Based on the treatment groups comparison, all the three treatment groups include were *Nigella sativa* extract group, fluconazole group and combination of *Nigella sativa* and fluconazole extract group can reduce number of fungal colonies compared with the control group (p = 0.046; p = 0.002; p = 0.002).

4 Conclusions

Based on this study, we conclude that the therapeutic effect of *Nigella sativa* reduce the number of *Candida albicans* colonies.

5 Reference


Macrofauna Soil Diversity in Chili Plants (*Capsicum Annum* L.) With the Use of Organic and Inorganic Mulch

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Abstract. Chili is one of the vegetable commodities that have great prospects for development, one of which is by increasing the production of chili with organic and inorganic mulch. In addition to increasing the production, mulch can determine macro beneficial soil fauna in crops chili. This research was conducted on agricultural land, Faculty of Agriculture, USU. This research used Randomized Block Design (RDB) non factorial with 4 treatments (organic mulch, organic mulch + Bacillus Sp., organic Mulch + Bacillus Sp. + Trichoderma, mulch Plastic). This diversity is determined by diversity index assessed (Shannon-Wiener). The results indicated that the macro fauna species caught are the family Salticidae, Formicidae, Gryllidae.

Keywords: Chili, organic mulch, inorganic mulch.

1 Introduction

Chili is one of the horticultural crops developed in Indonesia, because chili is a horticultural plant that is part of the food culture of Indonesian people. In addition chili also has many benefits for health because the content in it [1]. In an effort to increase the production of red chili plants requires good cultivation techniques, one of which is the use of mulch. Mulch is covering materials into soil around plants to create more beneficial conditions for growth, development and improvement of crop yields. Generally, there are two types of mulch are inorganic and organic mulch. Organic mulch can be a waste of crops such as leaf litter, crop stalks, rice straw, etc. Inorganic mulches are obtained from synthetic materials, for example is the plastic mulch. Effect of mulch applications is determined by the type of mulch material itself [2].

The use of organic mulch will reduce erosion, maintain soil moisture, pH control, increase drainage, reduces soil compaction, increase ion exchange capacity, and increase soil biological activity [3]. Silver-colored plastic mulch is one component that can be used to control in the disease in chili plants by vector control, controlling several pathogens that are transmitted through soil and grasses, improve quality and yields, and recommended as the one component of integrated pest management [4].

The life of macrofauna in soil is influenced by environmental factors, such as, the factors of micro and macro-environmental factors the soil surface. Micro factors which affect soil
insects is the thickness of the organic mulch, organic matter content, pH, fertility, soil type, soil density and soil moisture, but macro factors are climate, altitude, types of plants, mulching and land use [5].

The aim of this research to determine the macro diversity of soil fauna on chili plants with organic and inorganic mulch.

2 Research Method

a. Time and Place of Research

The research was conducted in Agricultural Land and multiplication of bacteria symbiont larvae of *Oryctes rhinoceros* in Disease Laboratory Faculty of Agriculture, University of North Sumatra in April until November 2019.

b. Research Procedures

Oil palm empty fruit bunches compost with the help of *Bacillus* Sp. and *Trichoderma* for 6 weeks. The treatment consisted of four, namely T0 = organic mulch, T1 = organic mulch + *Bacillus* sp., T2 = organic mulch + *Bacillus* sp. +*Trichoderma*, T3 = plastic mulch. The tools used in this study are pitfall trap by using plastic cups which were applied as many as 4 point made diagonally to the right front, left front, right rear and left rear boundary chili plant canopy.

c. Parameters

Macrofauna Soil Index Diversity, done by observing the number of insects trapped soil macrofauna, and counted per species populations. The index is used to assess the level of diversity (Shannon-Wiener).

3 Results and Discussion

a. Soil macrofauna type

Based on research conducted at the Faculty of Agriculture of Land North Sumatra on chili plant in April until November 2019 using traps (pitfall trap) gained as much as 44 soil insects macrofauna derived from the phylum Arthropoda. [6] explained that the Arthropod phylum is a land animal groups that generally show the highest dominance among the organisms making up the community land animals. Most species totaling 29 species of 46 species were found to originate from the class Insecta. According to Borror class Insecta is the dominant animal on earth.
Table 1. Macrofauna soil on chili plant

<table>
<thead>
<tr>
<th>Ordo</th>
<th>Family</th>
<th>Treatment</th>
<th>Week</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Araenida</td>
<td>Salticidae</td>
<td>T0</td>
<td>1 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>I</td>
<td>1 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>II</td>
<td>0 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>III</td>
<td>0 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>IV</td>
<td>0 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>V</td>
<td>0 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>VI</td>
<td>0 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>VII</td>
<td>0 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>VIII</td>
<td>0 0</td>
</tr>
</tbody>
</table>

|        | Hymenoptera     | Formicidae | T0   | 2 1   |
|        |                 |            | I    | 2 1   |
|        |                 |            | II   | 0 0   |
|        |                 |            | III  | 1 0   |
|        |                 |            | IV   | 0 0   |
|        |                 |            | V    | 0 0   |
|        |                 |            | VI   | 0 0   |
|        |                 |            | VII  | 0 0   |
|        |                 |            | VIII | 0 0   |

|        | Orthoptera      | Gryllidae  | T0   | 0 0   |
|        |                 |            | I    | 0 1   |
|        |                 |            | II   | 0 0   |
|        |                 |            | III  | 0 0   |
|        |                 |            | IV   | 0 0   |
|        |                 |            | V    | 0 0   |
|        |                 |            | VI   | 0 0   |
|        |                 |            | VII  | 0 0   |
|        |                 |            | VIII | 0 0   |

namely T0 = organic mulch, T1 = organic mulch + Bacillus sp., T2 = organic mulch + Bacillus sp. + Trichoderma, T3 = plastic mulch.

Based on the results of research conducted at the Agricultural Land Agricultural Faculty in Table 1, it is known that this type of macrofauna soil most trapped namely family Formicidae and the lowest of the family Gryllidae. It is caused macrofauna soil are mobile depending on the climatic conditions and the environment around planting.

b. Absolute and Relative Density Value

Absolute density indicates the number of insects found in habitats that are expressed implicitly. Based on research conducted at the Universitas Sumatera Utara Faculty of Agriculture on chili plant in April until November 2019 with the results that the calculation of absolute density and relative density in Table 2.
Table 2. The value Absolute and Relative Density

<table>
<thead>
<tr>
<th>No</th>
<th>Family</th>
<th>Treatment</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
<th>VI</th>
<th>VII</th>
<th>VIII</th>
<th>KM</th>
<th>KR (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Salticidae</td>
<td>T0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>6.82</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>T1</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>5</td>
<td>11.36</td>
</tr>
<tr>
<td></td>
<td></td>
<td>T2</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>9.10</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>T3</td>
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<td>0</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>2</td>
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<td>T0</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>7</td>
<td>15.90</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>T1</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>6</td>
<td>13.64</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>T2</td>
<td>1</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>13.64</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>T3</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>6</td>
<td>13.64</td>
<td></td>
</tr>
<tr>
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<td>T0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
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</tr>
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<td>1</td>
<td>0</td>
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<td>0</td>
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<td>0</td>
<td>3</td>
<td>6.82</td>
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<td>0</td>
<td>0</td>
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<td>0</td>
<td>0</td>
<td>1</td>
<td>2.27</td>
</tr>
<tr>
<td></td>
<td></td>
<td>T3</td>
<td>1</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2.27</td>
</tr>
</tbody>
</table>

Based on the results of research was conducted at the Faculty of Agriculture Agricultural Land in Table 2, absolute density and relative density of the highest-dominated family Formicidae T0 with 7 KM and KR is 15.90%, while the lowest for the family Silicide treatment T3 with KM 0 and KR is 0%.

Based on the results above, density of macrofauna family is different. Macrofauna types of soil found on the different treatment can be caused due to the soil macrofauna are mobile (moving). When the environmental conditions are not good then the soil macrofauna will change places. The existence of soil fauna is influenced by environmental factors: factors biotic and abiotic factors. Factors which affect abiotic environment are physical factors such as: soil texture, soil structure, and chemical factors include pH, salinity, organic matter and soil mineral. While the biotic factors affected by microflora and plants. Plants can improve soil moisture and as a producer of litter preferred soil fauna [7].

c. Soil Macrofauna Insect Diversity Index

Macrofauna soil is an indicator that is most sensitive to changes in land use, so it can be used to predict the quality of the land. In carrying out his activities, soil macrofauna need specific requirements. The environmental conditions are the main factors that determine survival.
Table 3. Shannon Wiener Index ($H'$) soil macrofauna

<table>
<thead>
<tr>
<th>Family</th>
<th>Treatment</th>
<th>Week</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
<th>VI</th>
<th>VII</th>
<th>VIII</th>
<th>Total</th>
<th>Pi</th>
<th>$H'$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salticidae</td>
<td>T0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>.0681</td>
<td>.1829</td>
<td></td>
</tr>
<tr>
<td></td>
<td>T1</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>5</td>
<td>.1136</td>
<td>.2470</td>
<td></td>
</tr>
<tr>
<td></td>
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<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>.0909</td>
<td>.2179</td>
<td></td>
</tr>
<tr>
<td></td>
<td>T3</td>
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<td>0</td>
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</tr>
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<td>0</td>
<td>0</td>
<td>1</td>
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<td>2</td>
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</tr>
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<td></td>
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<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>6</td>
<td>.1363</td>
<td>.2716</td>
<td></td>
</tr>
<tr>
<td></td>
<td>T2</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>6</td>
<td>3</td>
<td>.1363</td>
<td>.2716</td>
<td></td>
</tr>
<tr>
<td></td>
<td>T3</td>
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<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>6</td>
<td>.1363</td>
<td>.2716</td>
<td></td>
</tr>
<tr>
<td>Gryllidae</td>
<td>T0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>.0454</td>
<td>.1403</td>
<td></td>
</tr>
<tr>
<td></td>
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<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>.1681</td>
<td>.1829</td>
<td></td>
</tr>
<tr>
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<td>T2</td>
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<td>0</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
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<td>.0859</td>
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<td>0</td>
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<td>0</td>
<td>1</td>
<td>.0227</td>
<td>.0859</td>
<td></td>
</tr>
</tbody>
</table>

Based on the results of research conducted at the Faculty of Agriculture in Table 3, insect diversity index of soil in chili with application of organic and inorganic mulches namely 2.032 included in the medium category. This is due to the presence of compounds released by Oil palm empty fruit bunches that are resisting insects. The compound fermented BKS TKS + can also be used as a repellent (insect repellent) for their organic acids are formed. These organic acids are to short-chain hydrocarbons volatile [8].

In the inorganic mulch the soil surface covered by black plastic mulch silver which controls the presence of insects in the crop by using silver mulch ability to reflect sunlight like insects. Silver-colored plastic mulches has the ability to reflect about 33 percent of the sunlight that hits its surface, depending on the amount of dye used and the thickness of the mulch. The reflection of light is able to reduce the heating effect rhizosphere under the plastic surface, and also a range of light favored by insects. So the insects will follow the direction of reflection and leaving crop. So populations of insects, such as aphids and thrips, may be reduced in the zone of crops cultivated [1].

4 Conclusion

Type macrofauna found based on the results of research conducted at the Faculty of Agriculture Agricultural Land consists of family Salticidae, Formicidae, Gryllidae. Insect Diversity Index value ($H'$) is medium 2.032.
5 References


Development of Production-Based MPDW Teaching Materials to Increase Students’ Entrepreneurship Competency in Office Administration Education, Faculty of Economics Universitas Negeri Medan

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Abstract. The development of the tourism industry and the increase in the desire to travel the community provides opportunities for students to become travel industry actors. Answering these needs the Office Administration Education Study Program formed a Subjects of Travel Management and Tourism (MPDW), to equip students with entrepreneurial skills in the travel business. To support the ongoing learning process, it requires the availability of comprehensive MPDW teaching materials, which are arranged systematically to be used in learning to produce competent students who are able to produce travel service products that are ready to be entered into the tourism industry market. The purpose of this research is to develop comprehensive production-based MPDW teaching materials in order to improve the entrepreneurial competency of office administration education students in travel business. This research uses a research and development approach (R&D) by adopting a model developed by Dick & Carey. The research began with an analysis of the need for MPDW textbooks, establishing learning experiences and general goals. Followed by the design of teaching materials that will be developed beginning with the Forum Group Discussion with the lecturer team, then a draft of teaching materials is prepared. The next step is validating tourism and business travel experts, tourism marketing experts and book design experts. After getting the eligibility from experts, it was followed one by one experiment with 3 students, small-group trials with 20 students and large-group trials with 38 students. From the tests conducted, it was found that: 1) MPDW teaching materials based on production are interesting; 2) this teaching material facilitates students to dare to design a travel bureau business (travel); 3) able to design attractive travel packages according to market requirements; 4) MPDW teaching materials developed facilitate students to dare to market the developed travel packages and 5) facilitate students to be able to become tour leaders and tour guides for the resulting travel packages.

Keywords: Production Based Learning, Teaching Materials, Development Research.

1 Introduction

Tourism has become a very promising business nowadays. Millions of people spend big money to satisfy or make themselves happy in order to spend leisure time, travel, treatment, religious travel and so on. The CEO of the World Travel & Tourism Council (WWTC) said
travel and tourism were important contributors to the Indonesian economy which accounted for more than 55 percent of Indonesia's service sector exports. The development of the tourism industry is also an opportunity for job creation for job seekers. According to WWTC data, the travel and tourism sector creates 2.4 million new jobs in Indonesia and contributed 6.2 percent to Indonesia's gross domestic product.

The development of the tourism industry will require graduates who are ready to enter the tourism industry market. Responding to the market's need to produce graduates of Office Administration Education Study Program who are competent to become entrepreneurs in the tourism industry, relevant subjects are needed. The Subjects of Travel Management and Tourism (MPDW) is one of the supporting subjects, in addition to other subjects. Through MPDW learning activities, students are expected to master entrepreneurial competencies in the tourism sector and be interested in becoming businessman in this sector that can create job opportunities in this labor-intensive sector.

According to BPS data from February 2017 to February 2018, the unemployment rate for university graduates increased by 1.13% from 5.18% to 6.31%. Likewise for diploma graduates there was an increase of 1.04% from 6, 88% to 7.92%. The amount of unemployment with a university level is due to the orientation of scholar graduates who tend to be picky about jobs. The desire of students to become an entrepreneur is still low. While the current conditions the opportunity to become entrepreneurs is wide open with the development of the media and the development of the creative economy, especially the tourism sector.

The low desire of graduates to become entrepreneurs is due to their low entrepreneurial competence. Graduates are not able to see business opportunities that exist with the rapid tourism industry nowadays. For this reason, it is deemed necessary to improve students' entrepreneurial competencies, especially in tourism and travel. The initial survey conducted for students of the Office Administration Study Program of 2016 generation in May 2019 obtained data that the low interest of students for entrepreneurship, only around 42.5% were interested in becoming entrepreneurs out of 110 students. The low interest in entrepreneurship can be caused by several factors including, first, lecture material on the subject does not touch the technical issue to go right into the business world, second, the lack of students' understanding of the basic concepts of the tourism industry, especially in the travel business. Third, the lack of teaching materials or books that discuss about travel management and tourism business materials that focus on entrepreneurial practices, and Fourth, the lack of a successful entrepreneur profile in the travel industry exposed by the media. This competency improvement effort must be supported by lecturers and appropriate teaching materials. The teaching materials needed are teaching materials that emphasize the ability of students to produce products, both in the form of goods and services needed in the tourism industry. Students are educated with learning experience in contextual situations following the work flow in the tourism industry starting from business planning, marketing, implementation, and evaluation of the products produced. For this reason, it is necessary to develop teaching materials for MPDW subjects with a Model Production Based Learning so that students can be motivated and practice in producing travel service products that are in accordance with market demands.

Based on the explanation above, this research becomes very important by seeing the increasing number of graduates, the development of the travel industry, the rapid desire of people to travel, and the increasingly developing information technology and social media. Such conditions are expected to foster self-confidence and motivate students to become entrepreneurs who enter the tourism business, especially travel, so as to reduce unemployment for college graduates and create new jobs in the community.
The development of the tourism industry including the travel industry can increase job opportunities for many people, including for college graduates who choose to become entrepreneurs. An increase in job opportunities in the community both direct and indirect [1]. Direct job opportunities are those directly involved in the tourism sector, while those who are indirect are suppliers for all needs. For this reason, the preparation of college graduates to enter the workforce is very much determined by the exploration of their abilities during the teaching and learning process on campus.

The implementation of the 2018 KKNI now allows students to explore all of their abilities and market needs oriented. Students can explore, assess, interpret, synthesize, and information to produce various forms of learning outcomes. KKNI is a set of documents that combines the scientific ontology of study programs (deductive mindset) with business and industry competencies (inductive mindset) [2]. The focus of KKNI development lies in the attitudes, knowledge and skills of students in learning experiences in the form of instructional effects and natural effects. The product-based learning model is highly expected in the implementation of KKNI, which in the learning process students are active and collaborative in groups to produce a joint product that is ready to be entered into the industrial world in society. By giving assignments to produce products in groups, students will be trained to design products, carry out production, evaluate the products produced, and plan marketing, besides that students must also work together in completing assignments.

To support the ability to produce the product as a whole, it has implications for what each student must learn, how to teach it, and what teaching materials are needed to support the achievement of these competencies. MPDW subjects are subjects that are building the concepts and skills of students to be able to design travel services and tourist attractions that will be presented during the trip. In accordance with the characteristics of practical materials, learning by lecturing and training methods is not appropriate, production-based learning is one of the best alternatives. Production-based learning model is a process of education and training that is integrated into the production process, where students are given learning experience in contextual situations following the industrial workflow starting from planning based on order [3]. The main objective of this learning model is that graduates can play a role in increasing the empowerment of the region's potential to spur economic growth.

The learning activities carried out so far for MPDW subjects have entered into participatory learning with the project learning model. But student assignments are still not directed to be able to enter the world of the travel industry. The services designed by students are still only oriented to the internal needs of students' own travel practices. Students have designed a travel package complete with tourist objects visited with tourist attractions displayed, but only equipped with one type of travel cost calculation that is tailored to the needs of the student. Students have not arranged travel services according to the needs of the industry that are tailored to the desires of tourists who will travel. Students have not designed a travel service with various budget combinations that are tailored to the types of tourists visiting. Students also have not entered services designed into the market either through networks or outside the network. They have not yet planned the marketing of the service products they produce.

Learning activities require teaching materials that are designed in the form of teaching materials. Based on constructivist learning theory, learning is an active activity. Learning must enable students to learn actively at their own pace and accommodate learning by doing. Based on the characteristics of lecture material that is full of practice, production-based teaching materials become very important, MPDW teaching materials based on production that are designed according to the needs of practical subjects where teaching materials will include:
Material covering the basic concepts of tourism and travel consisting of basic concepts of tourism, travel history and management, tourist motivation, tourism systems, tourism resources, forms of travel, tourism industry, relations and cooperation, travel route design, preparation of an travel itinerary, calculation of travel costs, product marketing, travel preparation, tourism area development, and ecotourism [4].

The results of a meeting with the Head of Tourism Object Management and Tourism Marketing Sub-Division of Dairi District stated that the tourism sector requires very many entrepreneurs engaged in tourism and requires direct and indirect labor. However, due to the lack of willingness of scholars to become entrepreneurs, what has happened to the tourism sector has not been able to become a leading sector in North Sumatra Province in general and especially in Dairi District, although it has the main resources and supporting in tourism with beautiful natural resources, the culture of the people and the uniqueness of life and the products produced.

Furthermore, the dialogue conducted during the student tourism study in Karo District, Head of Tourism Marketing in Tanah Karo conveyed the lack of entrepreneurs willing to invest in the tourism sector making attractions presented to tourists tend to be monotonous, innovation in attractions and natural tourism objects and artificial very limited in number. This results in the desire of tourists to repeat the visit to be a small chance. If there are many entrepreneurs who are willing to innovate in attractions, tourism objects and local, national and international cuisine, it will certainly bring even more tourists.

In line with the discussion with the Head of Mangrove Coast Management Sei Nagalawan Perbaungan, said that it was difficult to invite scholar graduates to become entrepreneurs in the tourism business. Many scholars have pinned their hopes to just being civil servants or working in companies or going abroad as workers. Very few scholars are immediately ready to jump into an entrepreneur, including in tourism [5]. It is hoped that the campus can prepare many scholars who are motivated to become job creators in the tourism sector with a lot of links.

The above view is supported by the results of the pre-survey conducted to see how much the motivation of organizational students from 102 students of the Office Administration Education Study Program at Universitas Negeri Medan found that only 42.53% of students had the motivation to become entrepreneurs. To answer all of these problems, students should be prepared to become an entrepreneur according to the profile of the graduate study program that has been established, namely in addition to being a teacher and secretary, also becoming an entrepreneur in tourism. To support that, teaching materials are needed that can equip students in the form of cognitive abilities with the concept of tourism and travel, and must also be given space to practice designing travel service products that are ready to be launched to the community. So students besides being rich in concept skills also have the courage to enter the industrial world to become one of the actors. For this reason, there is a need for standardization: learning indicators, content of teaching materials, learning models, evaluation instruments as outlined in the production-based MPDW teaching materials so that each student of the Office Administration Study Program of Universitas Negeri Medan has competencies in accordance with the needs of the industrial world.

Production-based MPDW teaching materials are developed based on learning design theory. There are four conditions for the fulfillment of a good teaching material, namely (1). The scope of the material or content is in accordance with the curriculum, (2). The presentation of the material meets the principles of learning, (3). The language and good readability, (4). The format of the book with interesting graphics [4]. Teaching material as learning content is written by instructors that contain material that aims to facilitate the
learning process of students. Teaching material is a good criterion if the teaching material is written in good language and is easy to understand, is presented in an interesting manner accompanied by pictures and explanations, the contents of the book also illustrate something based on the author's idea [6]. Teaching materials developed based on production-based learning have the characteristics of solving problems in the real world [7]. The core components in production-based learning include: 1) communicative content description, 2) using examples, illustrations or analogies, 3) using exercises, tests and corrective feedback, 4) selection of relevant media, 5) relevance and consistency between exercises or test and learning objectives materials and 6) interactive activities [5,8].

2 Research Methods

This research uses a research and development approach (R&D). The development model that will be used is the Dick & Carey Model. The method used is descriptive-exploratory method to identify various symptoms and root problems that occur in MPDW learning and the design of the development of MPDW Teaching Materials. The research subjects in this research were one expert in the contents of travel tourism materials, a tourism marketing expert, a book design expert and students of the Office Administration Education Study Program of 2016 generation.

The location of this research took place in the Office Administration Education Study Program, Faculty of Economics, Universitas Negeri Medan. The instrument used was a questionnaire and interview guidelines. Data collected through the implementation of formative evaluation will be grouped into four parts, namely 1) The first stage evaluation data in the form of the results of an expert test of the contents of travel tourism material; 2) Second stage evaluation data of expert test results on tourism marketing material; 3) Third stage evaluation data of expert test results on book design and 4) The fourth stage of evaluation data in the form of data from one by one trial results, small group trials and field trials, in the form of the results of a review of students and business actors. Descriptive and qualitative analysis techniques are used to process data on the results of reviews from content experts in travel tourism material, tourism marketing experts, learning media experts, and students in individual trials, students and lecturers during field trials. This data technique is done by grouping information from qualitative data in the form of input, responses, criticisms, and suggestions for improvements contained in the questionnaire and the results of the interview. The results of this data analysis are then used to revise tourism business teaching material products. Descriptive and quantitative statistical analysis will be used to analyze quantitative data on assessment responses made by students during field trials on teaching materials that are tested.

3 Results and Discussion

The draft of MPDW teaching materials based on production that have been prepared at the time of data collection and Forum Group Discussion will be formative tested with the following stages:
a. Evaluation one by one with experts

The results of the validation of tourism material experts are known that the material contained in the MPDW teaching materials based on production is very good, because it has accommodated the basic concepts of tourism and travel needed including history and travel management, tourist motivation, tourism systems, tourism resources, forms of travel, tourism industry, relationships and cooperation, travel route design, travel itinerary preparation, travel cost calculation, product marketing, travel preparation, tourism area development, and ecotourism. The emphasis of the production model is clearly visible from the exercise presented, and the material stages to be carried out.

The results of the validation of marketing experts can be seen that the teaching material developed is generally good. Inputs are given to marketing materials so that links are made with tourism sites and other tourist objects. The exercises should not only focus on group exercises but still provide individual training spaces from designing to marketing to foster courage and interest in entrepreneurship in the tourism business, especially travel to all students.

The development of material based on the validation of the book design expert has been considered very good for the appearance of clearly visible letters, where there is a separation between titles, subtitles and contents, interesting visual quality with layout, font style, distance, and blank fields are good. Input is given in order to better provide clarity of color, especially for words that are keywords and basic concepts.

b. Revision 1

Based on expert input, the following improvements were made: 1) adding individualized exercises, especially for travel package design training materials and marketing of travel products and 2) marking key words and basic concepts in thicker writing.

c. Evaluation One by One with 3 students

Formative evaluations for MPDW teaching materials are carried out by the One by One Test by three students in the category of students with medium abilities, above medium and below medium. This sample is representative for the representation of students' abilities. The results are as follows:

<table>
<thead>
<tr>
<th>No</th>
<th>Aspect</th>
<th>Average</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Display</td>
<td>3.13</td>
<td>Good</td>
</tr>
<tr>
<td>2.</td>
<td>Presentation of Material</td>
<td>3.16</td>
<td>Good</td>
</tr>
<tr>
<td>3.</td>
<td>Benefit</td>
<td>3.51</td>
<td>Very Good</td>
</tr>
</tbody>
</table>

The data in table 1 shows the assessment of students for the three aspects evaluated can be said to have been good, the whole is above the number 3 which means good even for the benefits of achieving 3.51 which is very good. In the results of this test students suggest that sentences should not be too long, it should be equipped with an explanation for words that are not too familiar with colloquial, and there are still some typos.
d. **Revision 2**

The results of student assessments in the one by one test will be used to revise the draft teaching materials that have been prepared. The second revision is done by improving the way to use shorter and simpler sentences. Foreign words that are not yet familiar with common language are replaced with other words that are in accordance with the rules of the Indonesian language and familial in the academic, and improvements are made for word writing.

e. **Small Group Trial with 20 students**

This test is carried out after a revised module draft after obtaining input from one by one tests. These 20 students were given a questionnaire related to the evaluation of the MPDW teaching material draft after revision 2. The results are as follows:

<table>
<thead>
<tr>
<th>No</th>
<th>Aspect</th>
<th>Average</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
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<td>3.5</td>
<td>Very Good</td>
</tr>
<tr>
<td>2.</td>
<td>Presentation of Material</td>
<td>3.53</td>
<td>Very Good</td>
</tr>
<tr>
<td>3.</td>
<td>Benefit</td>
<td>3.6</td>
<td>Very Good</td>
</tr>
</tbody>
</table>

Data in table 2 shows the assessment of students for the three aspects evaluated can be said to be getting better, where there is an increase in the average of each aspect and all of them in the very good category. The results of this test, students suggest that examples especially for the calculation of travel costs are given in detail so that it is easier for students to understand and apply. For the preparation of the itinerary, it is expected to present an itinerary example in the form of a description and table.

f. **Revision 3**

The results of student assessments in the small group test form the basis for revising the three draft MPDW teaching materials that have been prepared. This third revision was made by adding examples of calculations to the material for calculating travel costs. The draft module is also equipped with examples of a complete itinerary in the form of descriptions and tables.

g. **Large Group Trial with 38 students**

After the third revision, it means that the draft MPDW teaching materials based on production are ready to be used for field testing. Field test uses one real class, namely students of the Office Administration Education Study Program of 2016 generation from Regular Class which consist of 38 students. In this test students learn by using a draft module that has been arranged by directing students to design a product in the form of a city tour package, calculate travel costs, determine selling prices, create marketing media in the form of pictures and videos, students make publications and marketing through social media. The appraisers of product assessment produced by students are lecturers who are able to see aspects of the theory, but the main appraisal is on market appraisal, namely how the market responds to travel packages prepared by students. Travel package promos uploaded to student social media within 2 weeks of the sale period. After two weeks of sales, students can sell their products with the market's willingness to respond and buy the package.
In this group trial, students provide input so that the cover of teaching materials is made more attractive by displaying images and designs that can be increasing enthusiasm and interesting to look at.

h. Revision 4

The results of student assessments in the large group test form the basis for the fourth revision which is the last revision of the draft of teaching material that has been prepared. The fourth revision is done by replacing the cover design of MPDW teaching materials.

i. Field Test

Different from other tests, a field test for a larger group of researchers is conducted to see how the overall student response to the contents of this production-based teaching material. For this reason, all students currently taking the 110 MPDW course are included in this field test. Students in each class are divided into groups to design products in the form of a broader travel package for the Province of North Sumatra, calculate travel costs, determine the expected level of profit, determine selling prices, create marketing media in the form of images and videos, students make publications and marketing through social media for 2 weeks. Appraisers assessing the products produced by students still involve supporting lecturers to see aspects of their theory. Assessment for the attractiveness and rationality of packages is left to the market, namely how the market responds to travel packages prepared by students. From the travel packages uploaded to students' social media, they have been able to sell products with market will to respond and buy packages. Data packages that are compiled and sold are as follows:

<table>
<thead>
<tr>
<th>No</th>
<th>Class</th>
<th>Travel Name</th>
<th>Package Name</th>
<th>%Profit</th>
<th>Selling price</th>
<th>Interested</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A</td>
<td>Mpdw2019cau</td>
<td>2D1N Get Paradise love OurHistory</td>
<td>25%</td>
<td>Rp 600,000,-</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>A</td>
<td>Pesona travel</td>
<td>3D2N Medan Parapat Berastagi</td>
<td>20%</td>
<td>Rp.600,000,-</td>
<td>20</td>
</tr>
<tr>
<td>3</td>
<td>A</td>
<td>SKYDEe Travel Medan</td>
<td>2D2N explore Salah namo and Pulau Pandang</td>
<td>30%</td>
<td>Rp 640,000,-</td>
<td>15</td>
</tr>
<tr>
<td>4</td>
<td>A</td>
<td>Vendora Tour And Travel</td>
<td>2D1N Out</td>
<td>30%</td>
<td>Rp700,000,-</td>
<td>14</td>
</tr>
<tr>
<td>5</td>
<td>B</td>
<td>One Trip Travel</td>
<td>2D1N Danau Toba trip</td>
<td>30%</td>
<td>Rp 630,000,-</td>
<td>16</td>
</tr>
<tr>
<td>6</td>
<td>B</td>
<td>Sedap Travel</td>
<td>2D1N explore Salah namo and Pulau Pandang</td>
<td>50%</td>
<td>Rp650,000,-</td>
<td>22</td>
</tr>
<tr>
<td>7</td>
<td>B</td>
<td>Refan travel</td>
<td>Outbound Tour</td>
<td>10%</td>
<td>Rp315,000,-</td>
<td>19</td>
</tr>
<tr>
<td>8</td>
<td>B</td>
<td>Fan travel Tour</td>
<td>2D1N The Most Epic Travel destination Arum Jeram Ancol</td>
<td>10%</td>
<td>Rp 550,000,-</td>
<td>25</td>
</tr>
<tr>
<td>9</td>
<td>C</td>
<td>Santuy Tour</td>
<td>3D2N Explore 3 District</td>
<td>20%</td>
<td>Rp.629,000,-</td>
<td>23</td>
</tr>
<tr>
<td>10</td>
<td>C</td>
<td>Kedan Travel Medan</td>
<td>2D1N Trip to Pandang and Salahnamo Island</td>
<td>25%</td>
<td>Rp 600,000,-</td>
<td>31</td>
</tr>
<tr>
<td>11</td>
<td>C</td>
<td>Skuuy Travel</td>
<td>3D2N Explore Samosir Island</td>
<td>20%</td>
<td>Rp.600,000,-</td>
<td>15</td>
</tr>
</tbody>
</table>
From table 3 it can be seen that students in the overall field test have been able to design travel packages according to market needs, determine the percentage of profit and the selling price of the packages. The package that was designed was attractive to the market and in a short time a group of students with their travel agency was able to get guests for the package being sold.

j. **Teaching Material Model Developed**

The final result of this research is a prototype of a production-based MPDW Teaching Material that will be implemented in the student learning activities in the Office Administration Education Study Program.

### 4 Conclusion

a. The Production-based MPDW teaching materials developed can attract students to enter the travel business this can be seen from the ability of students to open travel agents in groups.

b. The Production-based MPDW Teaching Materials developed can be used to facilitate students to learn to design travel tour packages, be able to set product sales prices, be able to market products and are expected to be able to become tour leaders and tour guides for packages that have been sold.

c. The MPDW Teaching Materials developed are comprehensive teaching materials and easy to use, consisting of 14 chapters including: 1) the basic concept of tourism; 2) history and travel management; 3) tourist motivation; 4) tourism system; 5) tourism resources; 6) travel forms; 7) the tourism industry; 8) relationships and cooperation; 9) travel route design; 10) preparation of the itinerary and calculation of travel costs; 11) product marketing; 12) travel preparations; 13) tourism area development, and 14) ecotourism.

d. To facilitate students in the Office Administration Education Study Program to master the competency of the MPDW subjects, it is recommended to continue the travel business activities that have begun to be pioneered so that their entrepreneurial competencies can still be developed.

e. To be able to maximize in the use of production-based MPDW teaching materials that have been designed, it is better for lecturers who can understand the basic concepts of developing a production-based learning model and its syntax.

### 5 References


The Effect of Blended Learning based on Edmodo Application to the College Students’ Learning Outcome (Case Study: The Development of Macroeconomics Teaching Material of Small Group Test Phase)

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Abstract. This research was purposed to find out the effect of Blended Learning based on Edmodo Application to the college students’ learning outcome. It was done as a part of small group test phase on the research and development of macroeconomics teaching material at Economics Faculty of Universitas Negeri Medan. This research was applied in experimental research design. The populations of this research are the third semester students of Macroeconomics Theory subject at Economics Education Study Program that consisted of three classes. The samples of this research are the students of C class as many as thirty students. The technique of the data analysis was statistic parametric paired sample t-test approach by testing the normality assumption and homogeneity of the previous data. Validation instrument is using expert judgment. Based on the result of this research, it can be concluded that there was significant different of students’ learning outcome before and after the treatment of Blended Learning based on Edmodo Application at Macroeconomics Theory subject at significant level alpha 5%. The mean score of the post test was (75,5) higher compared to the mean score of the pre-test (35,5). Generally, the treatment of Blended Learning based on Edmodo Application to the students’ learning outcome at Macroeconomics Theory subject gave effect at the middle category with N-gain score 0,62 (0,3 ≤ g ≤ 0,7). In order to improve the efficiency of Blended Learning, it was suggested to previously observe the students’ learning aid, the ability of the teachers in designing content and the Blended Learning system mastery, and also in observing the students’ satisfactory aspects.

Keywords: Blended learning, teaching material and learning outcome.

1 Introduction

The means of the improvement of the learning outcome quality had been done continuously to achieve alumnus quality which relevant with the development and challenge of the era. It had been done at all levels of education, start from the elementary up to higher education.

The challenge of education nowadays is more complex by the development of the role and technology. Information and technology affect the education activities massively. The role of lecturers has been rubbed down by the simplicity of getting information from the internet. In the upcoming era, the role and the presence of lecturers in the class will give more challenge and need higher creativity. New information and knowledge spread easily and can
be easily accessed for anyone in need. Education is facing great disruption. All development of technology must focus on the better learning outcome.

There are factors which can affect learning outcome. The success of learning must have two factors which are the internal and the external factor like (1) emotional intelligence; (2) interest and talent; (3) learning strategy; (4) means and infrastructures; (5) motivation and prestige; (6) learning ways; (7) curriculum; and (8) intellectual intelligence [1].

One way to improve learning outcomes is by adjusting of relevant learning strategy. In improving learning effectiveness by choosing suitable learning strategy which based on the learning condition which predicted can affect learning outcome to be easy for students [2]. In the effort of the students’ learning is the problem of the presentation of learning aids with the learning strategy in use [3].

One of the means of adaptive learning strategy with the role of technology is blended learning. The term blended learning has been used by experts in term of hybrid course, blended e-learning, and hybrid learning. In this research, the effort of improving students’ learning outcomes specially at Macroeconomics Theory Subject which has been done by the improvement of learning aids of the subject through a series of research and development of learning aids based on Borg & Gall [4]. Learning aids which have been revised based on the suggestion of validators to be tested to students by using relevant learning strategy with technology development which is blended learning.

Blended Learning refers to the combination of learning strategies between face to face learning strategy and computer learning strategy whether online or offline which conducted through e-learning [5]. Historically, tertiary education has used the term hybrid program to illustrate the learning combination of face to face and long distance learning [6].

Blended Learning in this research is considered as a face to face learning interaction and learning with online approach. Online learning in this research will be done by Edmodo Application. Edmodo is a social media based on learning management system (LMS). Edmodo facilitates teachers, students, provides save place to communicate, collaborate, share contents and learning applications, home work for students, discussion in virtual class, online test, providing scores, etc. Edmodo is very comprehensive as a course management system like Moodle, the different is that the faster access and handy usage [7]. Edmodo has three functions in the learning process which are the replacement function, accompaniment, and complement [8].

The previous research showed that there was significant academic ability improvement to the students who treated by using face to face learning combined with learning technology online and offline compared to the conventional learning [9].

The learning planner needs to find out the elements and the perfect blend in the blended learning environment, so that it can utilize benefits of asynchronous by keeping the quality of interaction in the class through face to face [10,11,12]. For that reason, further challenge is how to construct good blended learning strategy, easy, interesting learning contents which give real advantage to the institution, lecturers, and students, because the main purpose of technology improvement is to facilitate humans with easier access.

2 Research Method

This research had been conducted for students of Economics Education Study Program in 2019/2020 academic year. The populations of the research are the third semester students of
Macroeconomics Theory subject that consisted of three classes. The samples of this research are the students of C class as many as thirty students.

This research used the learning outcome instrument of Macroeconomics subject with the subject matter of Macroeconomics, Money, Inflation, and Jobless which had been validated by Macroeconomics experts Dr. Arwansyah, M.Si (Lecturer of Macroeconomics Theory Subject FE Unimed) and Dr. Eko Wahyu Nugrahadi (Lecturer of Introduction to Macroeconomics Subject FE Unimed).

This research was applied in experimental research design with one group sample with the design of pretest – action – post-test. In the beginning, a problem discourse based on empirical data was given then continued by the blended learning based Edmodo by giving learning material, video, related journal, and relevant hot news. At the end of the second meeting, online post-test was given in CBT concept (computer based test).

The technique of data analysis of this research was paired sample t-test with the following hypotheses:

Ho: There is no difference of learning outcome before and after the treatment of the blended learning strategy based Edmodo at Macroeconomics Theory subject.

Ha: There is difference of learning outcome before and after the treatment of the blended learning strategy based Edmodo at Macroeconomics Theory subject.

The primary data that was used to improve the learning outcome was the pretest and posttest data. The data was then analyzed to see the result of the test, statistic descriptive, assumption test, hypotheses test, and also N-gain score. N-gain score was analyzed to see the effect of blended learning strategy based Edmodo to the students’ learning outcome. N-gain was calculated by applying Hake’s formula [13]:

\[
N - Gain = \frac{\text{Post test Score} - \text{Pretest Score}}{\text{Maks. Ideal Score} - \text{Pretest Score}}
\]

The category of the N-gain score is as follow:

Table 1. Division of Gain Score

<table>
<thead>
<tr>
<th>No</th>
<th>N – Gain Score</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>( g &gt; 0.7 )</td>
<td>High</td>
</tr>
<tr>
<td>2</td>
<td>( 0.3 \leq g \leq 0.7 )</td>
<td>Middle</td>
</tr>
<tr>
<td>3</td>
<td>( g &lt; 0.3 )</td>
<td>Low</td>
</tr>
</tbody>
</table>

3 Result and Discussion

Research data were collected using instruments as stated in the research methodology section. The results of data collection are continued with the analysis as described in the following section. The result of the pretest and posttest in this research was as follow:

Table 2. Descriptive Data Research

<table>
<thead>
<tr>
<th>Paired Samples Statistics</th>
<th>Mean</th>
<th>N</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Pretest</td>
<td>35.5000</td>
<td>30</td>
<td>6.86696</td>
<td>1.25373</td>
</tr>
<tr>
<td>Data Posttest</td>
<td>75.5000</td>
<td>30</td>
<td>7.35199</td>
<td>1.34228</td>
</tr>
</tbody>
</table>
Based on the above table, the mean result of the students’ pretest was 35.5, after the treatment of the blended learning strategy based Edmodo, the posttest was 75.5. Based on the result, there was significant improvement of 40 point or 113%. Before testing the hypotheses, it was a need to do the normality and homogeneity assumption test with the result as follow:

### Table 3. Normality Test

<table>
<thead>
<tr>
<th></th>
<th>Kolmogorov-Smirnov&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Shapiro-Wilk</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Statistic df Sig.</td>
<td>Statistic df Sig.</td>
</tr>
<tr>
<td>Data Pretest</td>
<td>.155 30 .064</td>
<td>.936 30 .073</td>
</tr>
<tr>
<td>Data Postest</td>
<td>.139 30 .141</td>
<td>.955 30 .229</td>
</tr>
</tbody>
</table>

<sup>a</sup> Lilliefors Significance Correction

Based on the normality test table, it was found out that both groups pretest and posttest had significant score >0.05, then it was concluded that both groups distributed normally.

### Table 4. Homogeneity Test

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Levene Statistic df1 df2 Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.103 1 58 .749</td>
</tr>
</tbody>
</table>

Based on the homogeneity test table, it was found out that pretest group and posttest group had significant score 0.749 > 0.05, then it was concluded that both groups were homogenous.

After finishing the assumption test, then the hypotheses test was tested with the result as follow:

### Table 5. Hypotheses Test

<table>
<thead>
<tr>
<th>Paired Samples Test</th>
<th>Paired Differences</th>
<th>T df Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Std. Dev Std. Error Mean</td>
<td>Pre - Post -40 10.2 1.87</td>
<td>-21.36 29 .000</td>
</tr>
</tbody>
</table>

Based on the hypotheses test table above, it was found out that the t<sub>count</sub> was 21.36 with the significant score 0.000 < 0.05, then Ho was rejected. It means that there was significant different of learning outcome before and after the treatment of blended learning strategy based Edmodo at Macroeconomics Theory at alpha level 5%.

To see the impact of the blended learning strategy to the students’ learning outcome, the N-gain score was applied with the result 0.62. Based on the N-gain score criterion, it was concluded that the impact of blended learning strategy to the students’ learning outcome in this research was effected at the middle level between 0.3 ≤ g ≤ 0.7.

### Discussion

Based on the result of this research, the mean score of the posttest in this research is 75.5 higher than the mean score of the pretest 35.5. Then based on the hypotheses testing it could be concluded that there was significant different of learning outcome before and after the treatment of blended learning strategy based Edmodo at Macroeconomics Theory at alpha level 5%.
The result of this research was compatible with the previous research, who took the research subject of grade seven F MTs Negeri Magelang in 2015/2016 school year that consisted of 29 students [14]. The research was done by using classroom action research methodology by applying blended learning with Edmodo application based PDEODE learning strategy. The result of this research was that the treatment of blended learning with Edmodo application based on PDEODE learning strategy improved the students’ learning achievement. It was proven by the students’ learning completeness percentage as in the pre-cycle into cycle one improved 31%, cycle one into cycle two improved 62%, and pre-cycle into cycle two improved 93%.

The result of this research had strengthen the previous research showed that there was significant academic ability improvement to the students who treated by using face to face learning combined with learning technology online and offline compared to the conventional learning (face to face) [9].

The development of blended learning model could improve students’ learning outcome and easier to understand the material whether through traditional learning or e-learning [15].

In line with above research, there is a research where the research subjects were the second semester of Economics Development at Universitas Negeri Malang consisted of 104 participants [16]. All of the participants were then divided into two groups which were experiment group (blended learning) and control group (face to face). Based on the data analysis, it was concluded that the application of blended learning strategy was significantly better that the face to face learning strategy.

At higher education, blended learning usually constructed from face to face meeting once a week where students do online learning to finish group project and another tasks [17]. Blended learning becomes one of the new learning strategies that provides many benefits to students and also as a form of informational technology support for new learning model as well [18].

It was proven from the result of a research that shows the benefits of blended learning strategy which include the success of (a) accomplishing the learning purpose, (b) changing learning habit that usually lecturer centered into students centered, (c) balancing the students’ independency in learning and also to motivate the students to discipline themselves in learning [6,19,20,21,22]. Blended learning was a creative and innovative learning strategy that could improve students’ learning independency [23].

Many researchers deal with the application of blended learning. Generally, the research focused on the students’ performance, students’ attitude, and the satisfaction of learning of face to face, online, or blended learning [6]. Various opinions from the result of the research can be classified into five main tendencies including learning effectiveness, students’ satisfactory, faculty’s satisfactory, financial efficiency and learning access, and also students’ ability improvement [24].

Based on the N-gain score that obtained from this research which was 0.62, it means that the impact of blended learning strategy to the students’ learning outcome was at the middle level. However, not all students like the application of blended learning model, it means that the level of satisfaction among the students may be different. The result of the observation of this research described that around one third participants had less satisfactory by the application of blended learning. This was likely happened because of the lack of learning facilities such as laptop or smartphone with sufficient internet quality. This is a classic problem considering the application of this learning strategy in developing countries where people’s income is dominated from middle to low range. That is why, it is undeniable that not all of the students’ learning facilities supported well.
This thing is convinced by the previous research that the satisfactory level of students with blended learning has an important role [25]. That is why the focus of the research must be at the main factors that affect the students’ satisfactory level in blended learning environment. There are six dimensions that includes (1) students, (2) teacher, (3) institution, (4) technology, (5) design, (6) environment that becomes the indicator of the students’ satisfactory specially at the component of e-learning in blended learning environment. That is why, it might be more strategic to stress at the design of implementation of e-learning in the blended learning environment, especially for the younger students.

This is different with the previous research, which took the empirical view learning area of three comparisons which were (1) face to face, (2) online, (3) blended learning at the material of Introduction to Managerial Accounting [26]. The research compared the mid-term test result, final test result, and the sum of the final score of the students at the course which was taught by the same instructor by using blended learning, face to face, and the use of online media. The research used variance test analysis to determine whether there was significant different to the students’ performance result at the course. The result of this research showed that there was no significant different among the three different learnings environment.

Various result of the previous research clarified the important role of technology in education. However, technology is only a tool where the learning quality in the class and the interaction between lecturers and students are the essence. For that reason, lecturers must master the main point of applying blended learning strategy well.

Based on above analysis to improve the optimization result of the application of blended learning strategy, then firstly need to pay attention to the learning facilities support that the students have, the ability of teacher in designing content and blended learning system mastery, and specifically to pay attention to the satisfactory level of students in applying this learning strategy.

4 Conclusion

Based on the result of the research, it was concluded that there was significant different of students learning outcome before and after the treatment of blended learning strategy based Edmodo of Macroeconomics Theory at Alpha level 5% with the post-test mean score of 75.5 higher compared to the pre-test mean score of 35.5. The impact of the application of the blended learning strategy to the students’ learning outcome of Macroeconomics Theory subject was at the middle category with the N-gain score of 0.62 or between $0.3 \leq g \leq 0.7$.

Generally, the application of blended learning strategy based Edmodo was effective to improve the students’ learning outcome. In order to support the successful of this learning strategy was not all about technology mastery and good learning activeness, but also about the availability of learning. However, the problem was not all students had the facilities. That is why, based on the result of the observation to the sample of the research, there were some students who disagreed the application of blended learning strategy and preferred face to face concept conventionally. For this reason, it is necessary to consider the readiness of facilities and infrastructure, especially in terms of students to support the effectiveness of blended learning strategy.

In addition, it is necessary to increase the capacity of lecturers through various socialization and training to improve relevant IT-based learning technology, so that lecturers
would be able to provide relevant and interesting blended learning content to overcome the challenge of 4.0 industrial revolution era nowadays.

5 References

Chainsaw Operators Perception on Occupational Health and Safety (OHS) in Industrial Plantation Forest, North Sumatra, Indonesia

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Abstract. Logging activities in the industrial timber plantations uses mechanical equipment, namely chainsaw. The purpose of this study is to determine chainsaw operator’s perceptions of the application and occupational safety and health based on aspects of knowledge, skills and attitudes in logging activities with chainsaw in industrial forest areas, North Sumatra, Indonesia. This research was conducted at PT. Toba Pulp Lestari, North Sumatra, Indonesia. The methods used in data collection are: interviews and observations. The choice of answers in the questionnaire for each respondent is determined based on a Likert scale. The value set for the respondent choice includes: knowledge, skill, and attitude. The results of the analysis on the competency of the felling respondents in each aspect, namely knowledge, skills and attitude have values was 4.08, 4.17 and 4.1, respectively. This research indicates that there are significant differences between chainsaw operator’s perceptions.

Keywords: chainsaw operators, perception, occupational health and safety.

1 Introduction

Timber harvesting operations basically consist of the components of felling trees, bucking, skidding, loading and log transportation. Timber harvesting operations are very risky to the safety of workers. Errors caused by negligence and inappropriate actions of the operator with the applicable provisions can cause a problem called work accident [1]. It is necessary for the field supervisors to meet and discussions to release the workers stress and psychological workers [2]. Logging activities are mostly done using mechanical cutting tools, ranging from chainsaws to harvester [3]. Several studies have shown that timber harvesting causes environmental damage including to residual stands and forest biomass [4,5,6].

The work environment factors that influence work safety are the physical work environment and the provision of equipment that can be used as a means of prevention and protection [7]. Protection of employees or workers who serve working tools can cause accidents, by providing protection equipment appropriate and good. Protective equipment for
example: gas mask, glass welding eyes, gloves, safety helmets, fire retardant clothing and shoes.

An understanding of occupational safety and health is very important. This is related to productivity. The demand to continually show commitment to occupational safety and health is actually intense in Indonesia. In the current era, every company that produces products must meet one of the requirements, namely Environment Health and Safety. These evaluations play a role in improving the existing OSH management system. The purpose of this study was to determine loggers perceptions of the application of occupational safety and health (OSH) based on aspects of knowledge, skills and attitude in logging activities in the industrial timber plantations areas, North Sumatra, Indonesia.

2 Research Method

The materials used in research are stationery writing, questionnaire, camera and calculator. Observations in the field are carried out with interviews against related parties such as companies, workers and operators. This assessment is carried out using a qualitative questionnaire that is by descriptive analysis. The results of the interview are measured using a Likert scale obtained from the questionnaire. Data obtained from the interview questionnaire were processed using the Spearman rank test and the Wilcoxon test.

2.1 Data collection

This research was conducted at PT. Toba Pulp Lestari area, North Sumatra, Indonesia. Interview process was carried out through a question and answer session using a questionnaire. The questionnaire used was a questionnaire derived from previous OSH research using valid question variables and refined the question variables.

The choice of answers in the questionnaire for each respondent is determined based on a Likert scale. It has been given a certain weight according to the answer to the question. Likert scale which is an ordinal measurement scale that gives results in the form of ranking and serves to show respondents' responses (self-assessment) to the questions.

Observation activity is a method of collecting data obtained through direct observation of the real conditions in the work environment related to the competence in applying OHS in the fields of felling and bucking, skidding and logging transportation. The value set for the respondent's choice of answers includes: knowledge, skill, and attitude.

To support the data analysis activities, a set of computers is used in processing with Microsoft Excel software applications and SPSS (Statistics Program for Social Science) 19.0 for windows. The research data processed and analyzed are primary data obtained from the results of questionnaires and interviews with field supervisor and chainsaw operators.

3 Results and Discussion

3.1 Characteristics of respondents

Respondents are workers or employees as well as partners in the field of timber harvesting, consisting of field supervisors and operators of chainsaw in timber harvesting areas. Respondent characteristics can be seen in figure 1.
Based on Figure 1, it can be seen that the average the chainsaw operators was in age range 17-56 years old. The oldest age was 69 years old. Most of the working age are in the productive age, namely 17-26 years old with varied work experience ranging from the new 20 working days found in the skidding respondents to the longest that is 27 years found in the logging respondents. This is the same as research conducted by [8] which states that the highest percentage of workers at PT. Toba Pulp Lestari, Tbk Tele sector is at the age of <25 years was 53.06%, the age of 25-40 years was 38.77% and > 40 years was 8.16%, respectively.

Field supervisor is an employee who is directly bound to the company PT. Toba Pulp Lestari while chainsaw, skidding and truck driver operators as wood carriers are the partners of PT. Toba Pulp Lestari, in wood harvesting activities. The field supervisor work experience > 15 years has shown that the field supervisors are employees who have relatively good work experience. In terms of the level of education possessed by timber harvesting employees at PT. Toba Pulp Lestari areas was 66.67% field supervisors have a high school level education while for loggers and skidding, namely 77.78 % and 58.33 % have a junior high school level education and 45.45% of the transport employees only have an elementary level education.

3.2 Competency Analysis of OSH Application of Chainsaw Operators

Chainsaw operators and standard based assessments by Wilcoxon test. In determining the magnitude and direction of the relationship between standard based assessments by assessment according to respondents, then an analysis of the value is carried out the average of respondents' answers is based on questions that are already valid and reliable. The amount of the difference in the average value of the competency aspects of the faller and judgments based on standards can be seen in Table 1.
Table 1. Competency aspects in the application of OSH between standard based assessments.

<table>
<thead>
<tr>
<th></th>
<th>Knowledge</th>
<th>Skill</th>
<th>Attitude</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SA</td>
<td>CBA</td>
<td>Difference</td>
</tr>
<tr>
<td>Total of value</td>
<td>44.88</td>
<td>36.54</td>
<td>-8.34</td>
</tr>
<tr>
<td>Average</td>
<td>4.08</td>
<td>3.23</td>
<td>-0.85</td>
</tr>
</tbody>
</table>

Note: SA = self-assessment (subjective assessment/perception of respondents); CBA = control based assessment (objective assessment/evaluation based on standards).

Table 1 showed that the knowledge aspect of chainsaw operators has a difference. It is a significant difference which is shows that aspects of knowledge owned by chainsaw operators are different by standard based assessment. Skill aspect and attitude there is a difference of -0.86 and -1.02, respectively.

Results of the analysis on the competency of each chainsaw operators i.e. knowledge, skill and attitude have values of 4.08, 4.17 and 4.1, respectively. Compared with the average Likert scale the value is at level of knowing, can and sometimes. To find out there is significant differences between respondent’s perceptions and standard based assessment, it can be seen in Table 2.

Table 2. Chainsaw operator’s perceptions and based assessments standard by Wilcoxon test.

<table>
<thead>
<tr>
<th>Value</th>
<th>Knowledge</th>
<th>Skill</th>
<th>Attitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asymp. Sig. (2-tailed)</td>
<td>0.003</td>
<td>0.003</td>
<td>0.003</td>
</tr>
<tr>
<td>A</td>
<td>0.05</td>
<td>0.05</td>
<td>0.05</td>
</tr>
</tbody>
</table>

Note: H0 is accepted if Asymp. Sig) > α value; H0 is rejected if Asymp. Sig) < α value

Based on Table 2, it can be seen that the competency aspect (knowledge, skill and attitude) have a probability value of 0.003. It indicates that there are significant differences between chainsaw operator’s perceptions with a standard based assessment (H0 rejected).

3.3 Relationship between competency aspects of chainsaw operators

The closeness of the relationship between aspects of the competence of chainsaw operators as strategies to improve competency aspects can be seen in Table 3.

Table 3. Spearman correlation test results among competence aspects of chainsaw operators.

<table>
<thead>
<tr>
<th>Spearman’s rho</th>
<th>Knowledge</th>
<th>Skill</th>
<th>Attitude</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Correlation coefficient</td>
<td>1.000</td>
<td>0.252</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skill</td>
<td>Correlation coefficient</td>
<td>0.252</td>
<td>1.000</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>0.454</td>
<td>.</td>
<td>0.757</td>
</tr>
<tr>
<td>Attitude</td>
<td>Correlation coefficient</td>
<td>0.273</td>
<td>-0.106</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>0.416</td>
<td>0.757</td>
<td>.</td>
</tr>
</tbody>
</table>

Note: H0 is accepted if Asymp. Sig) > α value; H0 is rejected if Asymp. Sig) < α value
Based on the calculation of Spearman's rank correlation in Table 3, there is a significant correlation between aspects of skill with attitude, aspects knowledge with skills and knowledge with attitudes with each value was 0.252, 0.273 and 0.106, respectively. Probability value Sig. (2-tailed) each namely was 0.454, 0.416 and 0.757, respectively. Results of the analysis note that no there is a real relationship between the aspects tested.

Knowledge aspect and attitude aspect are related to each other because it has a significant correlation. The skill aspect has a relationship with attitude aspect, so to improve aspects one will improve the other aspects as well. For chainsaw operators, there is a lot of risk that accidents will occur, and the need for guaranteed protection by the provision of personal protective equipment. Employees who serving work tools that can cause accidents, by the way provide appropriate and good protection tools [7]. Protective gear for example: gas masks, welding goggles, gloves, safety helmets, anti-wear fire, shoes and earmuffs.

Based on the objective assessment carried out the application of OHS is not can be fully implemented by workers despite personal protective equipment (PPE) has been provided by the company. This is the same thing with [9] states that deficiencies found in the use of PPE that is because employees are lacking feel comfortable using PPE, this can be seen from the number of accidents happened not yet reached Zero Accident. However based on real conditions in the field no workers were found use PPE complete with the reason not familiar with the PPE and feel disturbed when using these types of PPE. That matter in accordance with research [10] work accidents in industrial areas Pulo Gadung Jakarta workers who are already obedient use the PPE (tools personal protection).

4 Conclusions

This research indicates that there are significant differences between chainsaw operator’s perceptions with a standard based assessment. Training, counseling and setting strict rules can improve aspects of competence in the application of occupational health and safety (OHS). Based on the objective assessment carried out the application of OHS is not can be fully implemented by workers despite personal protective equipment (PPE) has been provided by the company.

5 Acknowledgments

Thanks to the Rector of Universitas Sumatera Utara for funding this research through TALENTA USU 2019 research scheme. Thanks also to PT Toba Pulp Lestari for facilitating this research.

6 References


Google Classroom in Blended Learning on Teaching Research Method

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Abstract. The development of information and communication technology provides many conveniences in several fields, including education, specifically web-based learning concepts and models. The main purpose of using this technology is to increase the efficiency and effectiveness, accountability and transparency in learning. The implementation of e-learning in learning can be done with the LMS (Learning Management System) application. LMS is an application that contains features needed in the learning process. LMS can make students and lecturers enter forums to discuss with each other, work on online quizzes and access learning material anywhere and anytime while connected to the internet. Google Classroom is the right LSM to support learning activities in the teaching of research method. Then Google Classroom also integrates Google documents, drive and Gmail to help lecturers create virtual classes that are faster, more efficient and an easy communication tool.

Keywords: Google Classroom, e-learning, research method

1 Introduction

The world is now entering the era of the industrial revolution 4.0, where human life is based on information. Therefore, preparing graduates who are qualified and able to compete globally and master the development of technology is important for everyone and for the future of a country. The development of information technology and the internet today is very rapid, so it doesn't only affect electronic products, but also in the education world, especially in learning methods. One of the online learning methods that is currently being developed and put into use is Google Classroom.

Google classroom is an application made specifically for online learning media that can facilitate the lecturer in making, distributing and grouping each assignment without using paper anymore. The use of Google classroom will make learning more effective, because lecturers and students can meet any time through it. The students can remotely study, listen, read, and send assignments as well. Google Classroom has a role as a medium that can be used by lecturers and students to create online classes or virtual classes. So lecturers can provide teaching materials, announcements and assignments to students which could be received directly (real time) by students. Meanwhile internet-based learning has not been implemented frequently, especially in teaching research methods. Internet-based learning may create a more interactive learning atmosphere because in it one-way or two-way learning interactions occur. Internet-based learning can motivate students to be more active in classroom learning activities or outside learning activities (online).
The Google Classroom has not been widely used in learning, especially in teaching courses on research methods. Google Classroom is easy to use, so the students are more interested and curious to know about it. One alternative effort that lecturers could do to improve the learning process is to become a planner and organizer, so students can get the opportunity to understand and explore teaching material from the learning activities. Therefore, researchers want to develop teaching materials based on Google Classroom research methods.

Teaching materials are all forms of materials arranged systematically which are used to help the teacher or instructor in carrying out teaching and learning activities to create an environment that allows students to learn [1]. This shows that teaching materials have a strategic function for the learning process that can help teachers or lecturers and students in learning activities, so the lecturer does not need to present too many materials in class. Beside handouts and modules, the printed teaching materials could be a textbook as well. Textbooks are the most widely used teaching material among all other teaching materials. Textbook still is the main teaching material used by teachers or lecturers in almost various educational institutions, from the most basic to the highest levels. This proves that the existence of textbooks is still an important part of the learning process in various educational institutions today.

The use of e-learning in the learning process is closely related to the use of computers. With computers the learning process can become more dynamic because computers have a variety of features thus the learning process becomes more fun.

The development of e-learning is inseparable from the internet technology that is experiencing rapid development. Thus the internet is a very important medium in e-learning. Electronic Learning is essentially learning through the use of computer and internet technology [2]. It could be called Web Based Instruction as well. E-learning is all learning activities that use electronic technology assistance [3]. E-learning can also be applied in conventional education and distance education.

Based on some of the explanation above, e-learning is an internet application that can connect between lecturers and students in class online. E-learning and a class have the same position as conventional classes in Higher Education. The same position means that the electronic classes can replace the classes at the Higher Education Institution so far. E-learning is a form of learning that integrates the learning process of traditional learning, online learning, and the integration of various other learning models, one of which is blended learning. This blended learning model is a combination of online technology and face-to-face learning by combining face-to-face activities and e-learning.

The combination of direct learning and internet-based learning that is assisted by technology to achieve the expected learning objectives can be done with blended learning. Blended learning is a combination of online technology and face-to-face learning by combining face-to-face and e-learning activities. Blended learning can increase the independence of students' learning skills [4]. It is believed that meaningful differences are made by blended learning in terms of learning independence growing from a better planning and comprehensive and effective use of the internet. The equation of face-to-face learning activities and web-based learning activities can change the students' learning skills in blended learning groups. Blended learning combines multiple delivery media that are designed to complement each other and promote learning and application-learned behavior [5].

The blended learning model is basically a combination of learning excellence that is done face-to-face (face to face learning) and virtually (e-Learning) [6]. Blended learning is a combination of learning face to face and online to optimize learning activities. Through
blended learning, the learning process will be more effective because the normal teaching and learning process will be assisted with e-learning that can be done anytime and anywhere.

Google Classroom is an application that can create classrooms in cyberspace. Google Classroom can be a media of distributing tasks, submitting assignments and even assessing collected tasks. It can also be downloaded for free by registering with the Google Application for Education account. This Google Classroom application is very useful for online learning and can be used for any device (laptop, computer, smartphone). One of the sophistication of this application is that it can be used together in groups collaboratively.

Google Classroom is an internet-based application created by Google as an E-Learning system [7]. This application is designed to help teacher in making materials and sharing to students in a paperless manner. Users of this application must have an account on Google. Google Classroom is a new tool introduced in Google Apps for Education in 2014, this classroom facilitates the teachers to create and organize assignments quickly, provide feedback efficiently, and communicate with their classes with ease [8].

Based on the explanation above, Google Classroom is an internet-based application that is part of the Google application in facilitating online learning to help lecturers make online classes, share assignments, and facilitate communication to students in the class.

Fig 1. Google Classroom Home View
(Source: www.classroom.hsk.sch.id/src/panduan_classroom_siswa)

There are several advantages obtained from Google Classroom in its use as a Learning Management System (LMS): The setting process easy and convenient, saves time, improves collaboration and communication, data storage is centralized to Google Classroom, and fast resource sharing [9].

This of could be a consideration that Google Classroom is appropriate to be used in education, especially in schools and universities.

Although it has advantages, Google Classroom also has weaknesses. Google Classroom has weaknesses such as the absence of external services such as automatic question banks and private chats between lecturers for feedback [10].

The features possessed by Google Classroom are as follows:

1) Reuse post
   This feature functions to repost the exist post. Lecturers can add questions and edit them, also can share directly to the class group.
2) Create question
Create question is a feature that can be used to provide questions to students so that they can more easily access questions and upload answers according to the due date determined in the subject matter in a very effective and efficient way.

3) Create assignment
Create assignment is a feature that is used to give assignments and to attach files. With this feature, lecturers can more easily access and upload assignments that will be given to students. In this feature lecturers must set due dates, so students can collect assignments in accordance with the specified time.

4) Grading
Grading feature is input comments, enter grades, or do both in assignments after they are submitted.

5) Create announcement
Create announcement is a feature to make announcements.

6) Class Stream
This feature allows students to conduct debates, discussions, and QnA (Question Ask) with other fellow students or with lecturers. Lecturers can send questions to class and then students can discuss to answer the questions and not only by text students’ can submit questions by videos or articles as well.

7) Archive Course
This feature allows lecturers to archive courses at the end of their tenure or years.

8) Mobile Application
The Google Classroom mobile application was introduced in January 2015. It is available for iOS and Android devices. This feature allows students and lecturers to download the Google Classroom application on Smartphone.

9) Privacy
Unlike Google's consumer service, Google Classroom, as part of Google Apps for Education, it does not display any ads in the interface for students and lecturers, and User data is not used for advertising purposes.

2 Research Method

This research uses the Research and Development method of the ADDIE model (Analysis, Design, Development, Implementation and Evaluation). The ADDIE model is used to design learning systems. The steps taken in the development model consist of 5 main steps, they are 1) analysis, analysis is a process of defining what will be learned by students, identifying problems, and needs assessment, 2) Design, the design stage includes the preparation of program structures, storyboarding, interface design, systematic preparation of material presentation, illustration, visualization, tool design, and evaluation, 3) Development, researchers conduct material collection, manufacture, testing and distribution, development of product evaluation instruments, evaluation of material experts and learning design, product revision based on advice from experts, product trials to students, 4) The implementation is to carry out field trials on the use of teaching material based media, Google Classroom on the teaching of research methods, 5) Evaluation, researchers make product improvements based on field trials and final product manufacture, upload revisions to the material and exercises, researchers conduct formative evaluations / assessments to determine student learning.
outcomes after using Google classroom media. Furthermore, the design expert and material validation tests were conducted to determine the feasibility of the research method teaching materials. Product revision is done after going through the design validation step. After being validated, data or information will be obtained in the form of parts of the product that need to be repaired and completed.

3 Results and Discussion

Based on the results of the research questionnaire answers needs analysis, 100% of students state that research methods courses need to be studied, 100% of students state the reason for being able to make a research proposal and final task, 100% of students state the reason that e-learning media is more practical and easier to use, and 92.86% of students stated that the research method course using Google Classroom could motivate students to improve their ability to learn it.

They are intending to use innovative and creative web-based learning media such as Google Classroom in the teaching of research methods. The development of Google Classroom learning media is more interesting and more effective. It makes the students easier to learn, because it can be accessed anytime and anywhere. The design of the Google Classroom learning media application is available on the internet. Researchers can upload teaching materials and assignments / exercises that must be done and uploaded by students

Fig 2. Subject name “Metode Penelitian” (Source: www.google.com)
This learning media product must be validated and tested to get a suitable product for learning. The appropriateness of teaching materials is validated by material experts and design experts. Based on the results of the appropriateness assessment of the contents material was declared "Very Good" with total percentage of 89.84%. The appropriateness assessment of the presentation aspect according to the experts is considered "Very Good", with total percentage 91.66%. The material experts consider that the teaching methods of research are 87.5% appropriate, with the criteria "Very Good". Material experts consider that the teaching materials are 87.50% appropriate, with criteria "Very Good". Based on the results of the average percentage of sub-component assessment of the teaching material size is 100%, the cover design of teaching material is 97.22% appropriate, design content of teaching material is 90.78% appropriate. The average percentage results from all sub-components of the appropriateness assessment of teaching material is 96.00%, “Very Good”. This means that the teaching material of the research method is appropriate to use.
4 Conclusion

The Process of Developing Teaching Materials of Research Methods Media using Google Classroom is carried out according to the ADDIE development model (Analysis, Design, Development, Implementation and Evaluation). This model is developed systematically referring to the theoretical foundation of the developed learning design. The development model is programmed in a systematic sequence of activities in an effort to solve learning problems related to learning media that are appropriate to the needs and students characteristics. Based on the results of the validation from the material and design experts, this teaching material is feasible to be used as teaching materials of research methods subject.

5 Acknowledgements

Thanks to the Rector of Unimed, Dr. Kustoro Budiarta, M.E as Chair of LPPM Universitas Negeri Medan, Mr. Dr. Abdurahman Adisaputra, M.Hum as the Dean of FBS Universitas Negeri Medan who has motivated lecturers and approved the KDBK research and all Regular B 2017 French Section students.

6 References

Morphological Characteristics and Phylogenetic Relationship of Pineapple \[Ananas comosus\ (L.) Merr.\] in Several District in Tapanuli Utara Regency

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Abstract. One of the pineapple cultivation areas in Sumatera Utara is Tapanuli Utara. Pineapple is a tropical fruit that can high economical value if it has good fruit quality. Pineapple fruit development needs to done related to the demands of the market. One way to obtain superior varieties is through exploration and selection. The research aims to identify the qualitative characteristic and phylogenetic relationship of pineapple in several districts of Tapanuli Utara Regency, North Sumatra. This research uses survey method based on UPOV (International Union for the Protection of New Varieties of Plants) based on dissimilarity matrix. This research showed that accession of pineapple in Tapanuli Utara still have a far level relationship. The nearest phylogenetic relationship is AN2 and AN3 with coefficient Euclidean 1.773 and farthest phylogenetic relationship is AN26 and AN9 with coefficient Euclidean 71.773 based on the difference qualitative characteristics.

Keywords: pineapple, morphological characteristic, phylogenetic relationship, Tapanuli Utara Regency.

1 Introduction

Pineapple \[Ananas comosus\ (L.) Merr\] is a very important fruit plant because besides being consumed in fresh form, pineapple can be processed into various kinds of products. Pineapple also contains all the vitamins and minerals in small amounts that can be useful for health. But the potential for pineapple is not optimal both in terms of quality and quantity [1].

Indonesia is the third country that producer pineapple in the world. In 2016 national pineapple production reached 1,396,153 tons while in 2017 pineapple production reached 1,795,986 tons. Pineapple production in 2017 increased by 399,833 tons, while pineapple production in North Sumatra Province reached 160,552 tons (8.94%) which is the second largest pineapple producer after Lampung province which reached 633,095 tons (35.25%) [2].

The potential of Indonesian pineapple fruit is quite good but it has not yet been pursued optimally because of the high level of competition with other horticultural products, still low quality and quantity of local pineapple supply and price information and market information is still not transparently to the farmer level. In general, some characteristics inherent in the development of pineapple are the unplanned development. The farmers know the price information based on previous seasons, while the balance of the amount of supply and demand can still not well anticipated [3].

Plant breeding activities need to be done to increase the potential of pineapple. One of the plant breeding activities is exploration or characterization activities, which are identifying
important traits that are of economic value or which are the characteristics that the relevant genotype. Plant characterization activities are one of the methods used to see the characteristics of plants, both qualitative and quantitative characters [4].

In 2015 Tapanuli Utara Regency had a pineapple plant area of 1,927.80 ha with a total production is 34,477.57 tons. The area which is the center of pineapple plants in North Tapanuli Regency is in Sipahutar District. The aims of characterization activities to local pineapple in the district of North Tapanuli is as a source of germ plasm to support of plant breeding programs [5].

2 Materials and Methods

This research was conducted in Tapanuli Utara Regency, namely in Sipahutar District, Pangaribuan District, and Garoga District. The study starts from May to August 2019. The material used in this research was 27 accessions of pineapples in three districts in North Tapanuli District including is Sipahutar District, Pangaribuan District and Garoga District. The tool used in this research is camera, GPS, ruler, labels, questionnaire form and stationery.

The method used in this study is a survey method that is to identification characteristics of pineapple plants in several districts in Tapanuli Utara Regency. Sampling was taken in 3 districts in Tapanuli Utara regency, then choose 3 villages were randomly selected in each of the districts, in each villages take 3 samples were taken randomly (accidental sampling) to obtain 27 accessions of pineapples. Each plant is given the symbol AN (Akses Nenas). Pineapple accessions were taken at Sipahutar District (AN1-AN9), Pangaribuan District (AN10-AN18) and Garoga District (AN18-AN27). Observations data was carried out through the morphological characteristics of pineapple plants both qualitative and quantitative based on UPOV (International Union For the Protection of New Varieties Of Plants) [6] namely immature fruit color, fruit shape, fruit dominant color, evenness of color of eyes, color of flesh, size of fruit eye, flesh density, flesh fibrousness, flesh aroma, flesh juiciness dan flesh sweetness.

Data of qualitative characteristics then analyzed using phylogenic relationship using the IBM SPSS (Statistical Program for Social Science) with euclidian distance cluster analysis as follows.

\[
d_{ij} = \sqrt{\sum_{k=1}^{p} (x_{ik} - x_{jk})^2}
\]

With:
- \(d_{ij}\) = the distance between object \(i\) and \(j\)
- \(x_{ik}\) = value of object \(i\) on variable to \(k\)
- \(x_{jk}\) = value of object \(j\) on variable to \(k\)
- \(p\) = number of cluster variables

[7].
3 Results and Discussion

Based on observations from 3 districts namely Sipahutar district, Pangaribuan district and Garoga district qualitative characteristics were obtained for each accession. Observation of the morphological characteristics of immature fruit color there are 4 variations namely gray found in AN10, dark green found in AN6, AN11, AN12, AN13, AN15, AN16, AN17, AN18, AN21 and AN25, purple are found in AN8, AN9, AN19, AN22, AN23 and AN24 and light green are found in the other accessions.

Observations on the fruit shape there are 4 variations, namely fruit shape of narrow ovate found on AN4, AN8, AN9, AN16, AN18, AN21, AN22, AN23, AN24 and AN25, fruit shape of medium ovate found on AN3, AN7, AN10, AN14, AN15, AN20, AN26 and AN27, fruit shape of circular found in AN17, and fruit shape of elliptic fruit is found in AN1, AN2, AN5, AN6, AN11, AN12, AN13, and AN19.

Observations of fruit dominant color there are 7 variations, namely the fruit dominant color of yellow green found in AN14, AN15, AN20, and AN26, fruit dominant color of green found in AN4, AN5, AN6, AN8, and AN17, fruit dominant color of grey green found in AN10, AN11, AN12, AN13, AN16, AN18, AN19, AN22, AN23 and AN25, fruit dominant color of light yellow found in AN7, fruit dominant color of medium yellow found in AN1, AN2, AN3, AN21, and AN27, fruit dominant color of orange found in AN9, fruit dominant color of red is in AN24. Observations for evenness of color of eyes there are 2 variations, namely uniform of eye color is even or slightly uneven found in AN1, AN2, AN3, AN4, AN5, AN6, AN7, AN8, and AN9. And other accessions uniform of eye color is slightly uneven.

Observations of morphological characteristic of flesh include color of flesh, flesh density, flesh fibrousness, flesh aroma, flesh juiciness and flesh sweetness. In observing of flesh color evenness there is only 1 variation, even or slightly uneven that found in 27 identified pineapple accessions. flesh density parameters there are 3 variations namely flesh density of dense found in AN1, AN14, AN21, AN24 and AN27, flesh density of medium found in AN2, AN3, AN4, AN5, AN13, AN15, AN17, AN19, AN20, AN23 and AN26 and flesh density of loose found in other accessions. In the flesh fibrousness parameters there are 2 variations namely medium fruit fibrousness found in AN19 and AN20 and other accessions have low fruit fibrousness.

Observation of the parameters of flesh aroma there are 3 variations, namely the strong flesh aroma found in AN1, the medium flesh aroma found in AN2, AN3, AN4, AN5, AN6, AN10, AN11, AN13, AN14, AN20, AN21 and AN27 and other accession is the weak flesh aroma. In the flesh juiciness parameters there are 3 variations, namely high flesh juiciness in AN1, AN13, AN14 and AN27, low flesh juiciness in AN9, AN16, AN17, AN18, AN19, AN22, AN23, AN24, AN25 and other accessions have moderate flesh juiciness. In the parameters of flesh sweetness there are 3 variations namely low flesh sweetness found in AN12, AN16, AN19, AN20, AN22, AN23, AN24, and AN25, medium flesh sweetness found in AN9, AN10, AN11, AN14, AN15, AN18, AN21, and AN26, and other accessions have high flesh sweetness.
Fig 1. Dendrogram of several pineapple accessions
<table>
<thead>
<tr>
<th>No</th>
<th>Genotype code</th>
<th>Immature fruit color</th>
<th>Fruit shape</th>
<th>Fruit dominant color</th>
<th>Evenness of color of eyes</th>
<th>Color of flesh</th>
<th>Flesh density</th>
<th>Flesh firmness</th>
<th>Flesh aroma</th>
<th>Flesh juiciness</th>
<th>Flesh sweetness</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>AN1</td>
<td>Medium green</td>
<td>Elliptic</td>
<td>Medium yellow</td>
<td>even or slightly uneven</td>
<td>Light yellow</td>
<td>Dense</td>
<td>Low</td>
<td>Strong</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>2</td>
<td>AN2</td>
<td>Medium green</td>
<td>Elliptic</td>
<td>Medium yellow</td>
<td>even or slightly uneven</td>
<td>Light yellow</td>
<td>Medium</td>
<td>Low</td>
<td>Medium</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td>3</td>
<td>AN3</td>
<td>Medium green</td>
<td>Medium ovoate</td>
<td>Medium yellow</td>
<td>even or slightly uneven</td>
<td>Bright yellow</td>
<td>Dense</td>
<td>Low</td>
<td>Medium</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td>4</td>
<td>AN4</td>
<td>Medium green</td>
<td>Narrow ovoate</td>
<td>Green</td>
<td>even or slightly uneven</td>
<td>Bright yellow</td>
<td>Medium</td>
<td>Low</td>
<td>Medium</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td>5</td>
<td>AN5</td>
<td>Medium green</td>
<td>Elliptic</td>
<td>Green</td>
<td>even or slightly uneven</td>
<td>Medium yellow</td>
<td>Medium</td>
<td>Low</td>
<td>Medium</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td>6</td>
<td>AN6</td>
<td>Dark green</td>
<td>Elliptic</td>
<td>Green</td>
<td>even or slightly uneven</td>
<td>Bright yellow</td>
<td>Loose</td>
<td>Low</td>
<td>Medium</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td>7</td>
<td>AN7</td>
<td>Medium green</td>
<td>Medium ovoate</td>
<td>Light yellow</td>
<td>even or slightly uneven</td>
<td>Bright yellow</td>
<td>Loose</td>
<td>Low</td>
<td>Weak</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td>8</td>
<td>AN8</td>
<td>Purple</td>
<td>Narrow ovoate</td>
<td>Green</td>
<td>even or slightly uneven</td>
<td>Bright yellow</td>
<td>Loose</td>
<td>Low</td>
<td>Weak</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td>9</td>
<td>AN9</td>
<td>Purple</td>
<td>Narrow ovoate</td>
<td>Orange</td>
<td>even or slightly uneven</td>
<td>Bright yellow</td>
<td>Loose</td>
<td>Low</td>
<td>Weak</td>
<td>Medium</td>
<td>Low</td>
</tr>
<tr>
<td>10</td>
<td>AN10</td>
<td>Grey</td>
<td>Elliptic</td>
<td>Grey green</td>
<td>slightly uneven</td>
<td>Medium yellow</td>
<td>Loose</td>
<td>Low</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>11</td>
<td>AN11</td>
<td>Dark green</td>
<td>Elliptic</td>
<td>Grey green</td>
<td>slightly uneven</td>
<td>Medium yellow</td>
<td>Loose</td>
<td>Low</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>12</td>
<td>AN12</td>
<td>Dark green</td>
<td>Elliptic</td>
<td>Grey green</td>
<td>slightly uneven</td>
<td>Medium yellow</td>
<td>Loose</td>
<td>Low</td>
<td>Weak</td>
<td>Medium</td>
<td>Low</td>
</tr>
<tr>
<td>13</td>
<td>AN13</td>
<td>Dark green</td>
<td>Elliptic</td>
<td>Grey green</td>
<td>slightly uneven</td>
<td>Medium yellow</td>
<td>Medium</td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>14</td>
<td>AN14</td>
<td>Medium green</td>
<td>Medium ovoate</td>
<td>Yellow green</td>
<td>slightly uneven</td>
<td>Medium yellow</td>
<td>Dense</td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
<td>Medium</td>
</tr>
<tr>
<td>15</td>
<td>AN15</td>
<td>Dark green</td>
<td>Medium ovoate</td>
<td>Yellow green</td>
<td>slightly uneven</td>
<td>Bright yellow</td>
<td>Medium</td>
<td>Low</td>
<td>Weak</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>16</td>
<td>AN16</td>
<td>Dark green</td>
<td>Narrow ovoate</td>
<td>Grey green</td>
<td>slightly uneven</td>
<td>Bright yellow</td>
<td>Loose</td>
<td>Low</td>
<td>Weak</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>17</td>
<td>AN17</td>
<td>Dark green</td>
<td>Circular</td>
<td>Dark green</td>
<td>slightly uneven</td>
<td>Bright yellow</td>
<td>Medium</td>
<td>Low</td>
<td>Weak</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td>18</td>
<td>AN18</td>
<td>Dark green</td>
<td>Narrow ovoate</td>
<td>Grey green</td>
<td>slightly uneven</td>
<td>Bright yellow</td>
<td>Loose</td>
<td>Low</td>
<td>Weak</td>
<td>Medium</td>
<td>Low</td>
</tr>
</tbody>
</table>
The problem of pineapple development in Tapanuli Utara Regency is the problem of cultivation techniques and the still not development superior varieties seen from interviews with the farmers. The interview results obtained that in cultivation techniques in general farmers do not fertilize of pineapple plants, both chemical fertilizers and organic fertilizers. Farmers also still use local varieties of pineapple seedlings from each region. Pineapple seedlings that are widely used are seedlings from pineapple plants, both of slips, aerial suckers on stem, and from fruit crowns. Pineapple development in Indonesia has not received serious attention as reflected in fluctuating harvested area and productivity [8]. This is caused by various things including is still not development of superior varieties and cultivation techniques have not been optimal.

The results of this research are generally different. The average level of flesh sweetness in Sipahutar district is high, in Pangaribuan district the flesh sweetness is medium or sweet, but Garoga district have the average level of flesh sweetness is low. Morphological characteristics maybe influenced of factors environment. Diversity in phenotypic appearance is represented by qualitative and quantitative characters. Required by many genes or environmental factors in each accession [9]

The lowest coefficient euclidean or the nearest phylogenetic relationship AN2 and AN3 obtained from Sipahutar district is 1.773 only has 1 qualitative character difference from 12 related qualitative characters, namely the fruit shape character. Morphological characters can determine differences and similarities in the appearance of morphology of external species that can be used to find distant kinship relationships [10].

The highest coefficient value or the farthest phylogenetic relationship AN26 obtained from Garoga District and AN9 obtained from Sipahutar District is 71.773 with 7 different characters from 12 characters displayed such as immature fruit color, fruit shape, color of flesh, evenness of color of eyes, fruit dominant color, flesh density and flesh juiciness. This shows that the level of morphological similarity in the 27 identified pineapple accessions is
far. The similarity distance is far if it is less than 0.6 or 60%. So from the grouping it can be said that twenty-seven accessions of pineapple that observed have a high or large phylogenetic relationship [11].

4 Conclusion

The results of pineapple exploration conducted in North Tapanuli Regency are Sipahutar District (accession 1-9), Pangaribuan District (accession 10-18) and Garoga District (accession 19-27). The results of Morphological characterization for fruit shape (narrow ovate, medium ovate, Elliptic, and circular) and fruit flesh (whitish yellow, medium yellow, light yellow). The nearest phylogenetic relationship AN2 and AN3 with a dissimilarity matrix of 1.773 while the farthest phylogenetic relationship AN26 and AN9 with a dissimilarity matrix of 71.773 based on qualitative characters.

5 Acknowledgments

Thanks to the farmers in Sipahutar District, Pangaribuan District, and Garoga District of Tapanuli Utara Regency who have contributed in providing information for this research.

6 References


Textbook Development of Bank and Nonbank Financial Institution

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Abstract. The purpose of this study is to find out (1) Design of bank textbook and non-bank financial institutions (2) Develop textbook of bank and non-bank financial institutions. The method used is the R & D. The development procedure consists of 4-D (Four D Models) consist of define, design, develop and disseminate. Based on the results of expert validation on the developed textbooks obtained results for the content feasibility aspect of 4.0, the feasibility aspect of presentation amounted to 4.27 and the linguistic aspect of 4.37 with a feasible category.

Keywords: Textbook development, Bank and nonbank financial institution

1 Introduction

The subject of banks and non-bank financial institutions is one of the subjects that must be taken by students at the Faculty of Economics, State University of Medan. Other problems that are urgent in this course are: the occurrence of various policy changes related to bank financial institutions and non-bank financial institutions in Indonesia that cause the adjustment of teaching material in accordance with changes in regulations made by the government. The content of the material in textbooks of banks and financial institutions is also still a little that has made adjustments to changes in policy currently in force.

In accordance with Law Number 11 of 2011 concerning the Financial Services Authority (OJK) as of December 31, 2013 the bank's regulation and supervision is carried out by OJK. Thus BI will focus on controlling inflation and monetary stability. The transfer of BI's tasks to OJK has made major changes to the regulations relating to bank financial institutions and non-bank financial institutions, ranging from licensing, regulation of operational activities to the closure of financial institutions in Indonesia. So this will also have an impact on the content of the textbooks of bank courses and non-bank financial institutions. But in reality, there are only a few bank books and non-bank financial institutions whose contents have adjusted to these changes so that the teaching material becomes irrelevant to the actual conditions that actually occur. For example: material concerning Bank Indonesia, where one of its sub-materials is discussing the functions of Bank Indonesia. According to the old policy, the tasks of Bank Indonesia consisted of 3 (three), namely: 1) Determining and implementing monetary policy; 2) Arranging and Maintaining Smooth Payment Systems; 3) Manage and supervise banks. BI's third area of duty underwent a change after the transfer of the bank supervision function from Bank Indonesia to OJK. BI's third area of duty has also undergone a change, namely maintaining financial system stability in which in this case Bank Indonesia oversees banks macro prudential while OJK supervises banks micro prudential.
The purpose of this study is to: determine the design of bank course books and non-bank financial institutions and develop bank course books and non-bank financial institutions.

Theoretical Framework

Textbooks are books that are used as textbooks in certain fields of study, which are standard books prepared by experts in their fields for instructional purposes and objectives, which are equipped with teaching facilities that are harmonious and easily understood by the users in schools and colleges so that they can support a teaching program [1]. Teaching book is one of the means of the success of the teaching and learning process [2]. Textbooks are a learning unit that contains information, discussion and evaluation. Textbooks arranged systematically will facilitate students in the material so that it supports the achievement of learning objectives. Therefore, textbooks must be arranged in a systematic, interesting, high readability aspect, easy to digest, and comply with applicable writing rules.

Important elements in the understanding of textbooks are as follows (1) textbooks are textbooks that are shown to students at certain levels. (2) Textbooks are always related to certain subjects. (3) Textbooks are standard books. (4) Textbooks are written for certain instructional purposes. (5) Textbooks are written to support a particular teaching program [3].

Function Textbooks provide facilities for independent learning activities, both about their substance and about their presenting. The use of textbooks is part of the book culture, which is a sign of advanced society. Viewed from the learning process, textbooks have an important role. If the purpose of learning is to make students have various competencies, the design of textbooks must include a number of principles that can be used to achieve this. The design of a number of questions is based on multiple representations.

Writing a textbook can be done with several techniques, in general there are 3 textbook writing techniques, namely: 1) Self-writing, the authors compile textbooks based on their own ideas and experiences. 2) Repacking information, the author does not compile textbooks themselves from scratch but rather utilizes books, textbooks, papers and other information that already exists. 3) Compile writings from various sources that are related and relevant to the theme [4]. Textbook authors can use one of the three textbook writing techniques above by prioritizing originality.

2 Research Method

This research is development type of research, the method of research and development (R&D) is a research method used to research to produce certain products, and then test the effectiveness of these products [5]. This research develops new products in the form of developing learning devices based on blended learning in Bank Subjects and Non-Bank Financial Institutions. This research was conducted at the Economic Education Study Program, Medan State University, located at Jl. Willem Iskandar, Pasar V Medan.

Research subjects in this study were students of economic education study programs enrolled in the 2019/2020 school year. The class researcher chose was Class B Semester V.

The walkthrough technique is data validation which involves several experts to evaluate the product as a basis for revising the initial product. Data collection tools used in the form of
validation sheets provided to experts. Validation sheets are given to experts in the form of a Likert scale.

The feasibility analysis of the textbook was obtained from the validation questionnaire by the experts of the research methodology. The data obtained is then tabulated for each aspect of the assessment and calculated using the formula as follows:

\[
\bar{x} = \frac{\sum x}{N}
\]

\(\bar{x}\) = average total score
\(\sum x\) = Amount of Score
\(N\) = Amount of indicator

Then the data is tabulated, the data obtained is then calculated the average total score of the assessment of each aspect of the assessment. The mean total score is then interpreted into a qualitative value based on the following criteria:

<table>
<thead>
<tr>
<th>Value</th>
<th>Score Interval</th>
<th>Range</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>(x \geq X + 1.8 S)</td>
<td>4.21-5.00</td>
<td>Very Feasible</td>
</tr>
<tr>
<td>4</td>
<td>(X + 0.6S &lt; x \leq X + 1.8S)</td>
<td>3.41-4.20</td>
<td>Feasible</td>
</tr>
<tr>
<td>3</td>
<td>(X - 0.6S &lt; x \leq X + 0.6S)</td>
<td>2.61-3.40</td>
<td>Rather feasible</td>
</tr>
<tr>
<td>2</td>
<td>(X - 1.8S &lt; x \leq X + 0.6S)</td>
<td>1.81-2.60</td>
<td>Not feasible</td>
</tr>
<tr>
<td>1</td>
<td>(x \leq X - 1.8S)</td>
<td>0-1.80</td>
<td>Very not feasible</td>
</tr>
</tbody>
</table>

Information:
\(X = \frac{1}{2} (\text{ideal maximum score} + \text{ideal minimum score})\)
\(S = \frac{1}{6} (\text{ideal maximum score} - \text{minimum ideal score})\)
\(x\) = The average value obtained

The assessment analysis for students of bank textbooks and non-bank financial institutions can be showed at this below table:

<table>
<thead>
<tr>
<th>Value</th>
<th>Interval Score</th>
<th>Range</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>(x \geq X + 1.8 S)</td>
<td>4.21-5.00</td>
<td>Very good</td>
</tr>
<tr>
<td>4</td>
<td>(X + 0.6S &lt; x \leq X + 1.8S)</td>
<td>3.41-4.20</td>
<td>Good</td>
</tr>
<tr>
<td>3</td>
<td>(X - 0.6S &lt; x \leq X + 0.6S)</td>
<td>2.61-3.40</td>
<td>Rather Good</td>
</tr>
<tr>
<td>2</td>
<td>(X - 1.8S &lt; x \leq X + 0.6S)</td>
<td>1.81-2.60</td>
<td>Not good</td>
</tr>
<tr>
<td>1</td>
<td>(x \leq X - 1.8S)</td>
<td>0-1.80</td>
<td>Very not good</td>
</tr>
</tbody>
</table>
3 Results and Discussion

In developing this learning tool, the 4D development model consists of 4 stages, namely (1) define, (2) design, (3) develop, and (4) disseminate. Following is a description of each stage carried out:

a. Define
Define (definition) is the first stage conducted by researchers in the process of research and development of 4-D models. At this stage the researcher conducted the initial analysis, student Initial to Final Analysis [6,7,8]

1) From this identification, several problems were found, namely the content of textbooks that are not relevant to changes in government policies in force.

2) From the initial stages of the final problem was found, namely about students who were less eager to follow the learning. Then further observations were made on students about the reasons students were less interested in lecturing banks and non-bank financial institutions and what conditions they wanted in the lecture process. From the observation process it was found that students were less interested because conventional learning methods were boring for students and learning activities were less varied because they only used a face-to-face system (offline).

b. Task Analysis
There are 4 KKNI-based curriculum assignments at Universitas Negeri Medan, starting from the study material, subject matter, sub-topics and an outline of the contents of the subject. The curriculum used is KKNI, with the implementation of the KKNI-based curriculum at the Faculty of Economics, Universitas Negeri Medan there are six tasks that must be done by students including: Routine Tasks, Critical Book Report (CBR), Research Review / Journal Review, Mini Research, Engineering Ideas, Projects. In this Semester Learning Plan (RPS), guidelines for the six tasks are listed.

3) Material Analysis
Based on the analysis of the material in the syllabus of bank courses and non-bank financial institutions, 12 learning activities were developed as follows:

a) Learning Activity-1 (KB-1) discusses the definition and classification of Financial Institutions
b) Learning Activities-2 (KB-2) discusses Bank Indonesia
c) Learning Activity-3 (KB-3) discusses Commercial Banks
d) Learning Activities-4 (KB-4) discusses Bank Services
e) Learning Activity-5 (KB-5) discusses the Rural Credit Bank
f) Learning Activity-6 (KB-6) discusses Sharia Banks
g) Learning Activities-7 (KB-7) discusses Insurance
h) Learning Activity-8 (KB-8) discusses Leasing
i) Learning Activity-9 (KB-9) discusses the Pension Fund
j) Learning Activity-10 (KB-10) discusses Pawnshop
Learning Activities-11 (KB-11) discusses the Money Market and Capital Market
k) Learning Activities-12 (KB-12) discusses the Financial Services Authority

Based on the learning activities above the learning device is developed in accordance with the order of learning activities.
b. Formulate learning experiences
   Formulation of learning objectives based on the results of the initial initial analysis, student analysis and material analysis. The expected learning experience is students are able to explain the definition and classification of financial institutions, the objectives and tasks of Bank Indonesia, the basic concepts of commercial banks, types of bank services, basic concepts of Rural Credit Banks, Islamic Banks, insurance, leasing, pension funds, pawnshops, financial markets and capital markets and financial services authorities.

c. Design
   The preparation of tests instruments in accordance with the preparation of lecture objectives that serve as a benchmark for the ability of students who refer to Bloom's taxonomy. The next step is to choose the format of the device and the initial design of the learning device. The format of the Semester Learning Plan (RPS) is guided by the format in force at the UNIMED Faculty of Economics. The format of the textbook is designed to consist of: learning outcomes, content material, questions (questions)

d. Develop
   This phase aims to produce a revised set of learning tools based on expert input. The steps in this stage include a) expert validation, b) trials

**Expert Validation**
   Expert validity of the textbooks was assessed based on 3 (three) aspects, namely: the content aspect, the musty presentation and linguistic aspects, the feasibility aspect consisted of 5 statements, the feasibility aspect of the presentation consisted of 11 statements, and the feasibility aspect of the language consisted of 12 statements. The average score for eligibility in the content aspect is 4.0, the mean score for the presentation aspect is 4.27, and the average score for the linguistic aspect is 4.37. This means that of the three aspects, the textbooks developed are included in the appropriate category for use

**Product Trial**
   Limited product trials are conducted to see students' responses to the developed textbooks. Based on the results of the questionnaire responses that have been distributed to students, the average score of 4.04 is obtained in either category. The average score of the total score of the textbook is 4.03, which means that the validity assessment results from the validator team are in the proper criteria. Some suggestions from the Validator team for the textbooks that were developed are: 1) Every beginning of the chapter should begin with an explanation of learning achievements; 2) The material must be up to date, meaning that it must be in accordance with government policies that apply to bank financial institutions and non-bank financial institutions because government regulations on these institutions have experienced many changes since the transfer of the bank's supervisory function from BI to the Financial Services Authority (OJK); 3) At the end of each chapter there should be practice questions related to the material discussed in that chapter.

4 Conclusion
   Based on the feasibility assessment of the validator team, the textbooks of bank courses and non-bank financial institutions are categorized as feasible with a mean score of 4.03.
Likewise, the assessment of student questionnaire responses was categorized well with the average total score of the response questionnaire of 4.04.

Based on the results and discussion of development research, learning tools for banks and non-bank financial institutions still have shortcomings and need to be corrected. For this reason, researchers give advice for conducting further research experimental research needs to be done to test the effectiveness of textbooks using the experimental class and the control class.

5 References

A Study of Style: Stylistics in Two Poems of Seribu Sajak Tao Toba as Teaching Material on Poetry Appreciation Course

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Abstract. This research aims to reveal how the style description of the text structure in the two poems of North Sumatera Poet compiled in the Anthology of Poetry book Seribu Sajak Tao Toba. The research indicators used were guided by four aspects of style based on literary stylistics study including a) diction, b) rhyme, c) imagery, and d) figurative language. The achievement of this research analysis applied the descriptive qualitative method. The results of the study were concluded as follows, 1) In the poem Seribu Sajak Tao Toba was found denotation and connotation diction, clerihew rhyme and alliteration rhyme, visual imagery, feeling, auditory, olfactory, and motion imagery, whereas in figurative language was found hyperbole, personification, sarcasm, allegory, and antanaclasis. 2) In Berita dari Kaldera Toba Purba poem was discovered connotation and denotation diction, monorhyme, feeling, olfactory, visual and motion imagery, while in the figurative language, hyperbole, allegory, personification, sarcasm, satire, rhetoric, cynicism, and association were found. The external target achieved is textbooks with ISBN, scientific publications in the national journal, international seminar proceedings, and the integration of the research result in the semester learning plan (RPS) of Poetry Appreciation course.

Keywords: Literary Stylistics, two poems of North Sumatera Poet.

1 Introduction

A literary work especially poetry is inseparable from the presence of a poet as the center of feelings, thoughts, and meanings. Every poet has different feelings, thoughts, and meaning, this is one of the characteristics of the poetic style of a writer. Various efforts can be made to approach and find out the peculiarities of these poetic styles. An effort that can be done is through a comprehensive assessment of the literary text. The analytical study that can be used is the Literary Stylistic approach. The literary perspective sees Stylistics as a study that investigates the linguistic style of writers through their work. Poetry has a limited medium that only consists of a few lines of sentences, but must be able to convey a message, as well as short stories and even novels that consist of several pages [1]. Some of North Sumatra writers whose poetry will be analyzed are Perahu Kecil di Atas Danau by Nestor Rico Tambunan and Berita dari Kaldera Toba Purba by Tri Budhi Sastrio. The two poems written by several poets above are included in the Anthology of Poetry book Seribu Sajak Tao Toba.

Based on the description above, the problem of this study is how the style of the poet in the text structure of the two poems, in terms of Stylistics aspects of poetry literature, namely: a) diction; b) rhyme; c) imagery; and d) figurative language. The objectives of this research
are to describe the diction, rhyme, imagery, and figurative language. Theoretically, this study can enrich literary theories, especially in the fields of teaching literary theory, literary criticism, and literary analysis. The practical benefit of this study can become a library in further research by researchers, especially the researchers themselves and students of analytical study using Literary Stylistics study.

2 Literature Review

Poetry as an aesthetic work is a form of written expression that contains the ideas, thoughts, feelings, experiences, and observations of poets in the unity of form and creation that is complete and free. The unity of forms in poetry can be in the form of sense, feeling, imagination, tone, and intention.

The study of stylistics as one of poetry analysis has several aspects of the study, aspects of the study aimed to find out the characteristics of a poet in his work. There are seven indicators in studying poetry based on a stylistics perspective, namely a) diction, b) tone, c) rhyme, d) rhythm, e) intonation, f) imagery and g) figurative language [2]. However, the indicators used in this study are only in a) diction, b) rhyme, c) imagery, and d) figurative language. Stylistics has broad benefits including, a) Identifying and finding facts from each aesthetic literary work, b) Identifying broad characteristics of each writer that can be seen clearly on differences in their works, c) Being a source of knowledge of language differences, style dynamics, and imaginary explosion of a writer, d) In the study process, it becomes a separate value from reviewers about the wild activities of writers which include psychosis fluctuations and forms of taste, e) Expressing to mass in the form of literary papers about well-arranged correlations between the use of language in literary works, f) Helping the literature field to immediately fix the problematics of the work by improving the better quality, g) Making a harmonious relationship between reviewers with further study activities [2].

3 Research Method

The method used in this research was a descriptive method by describing the data through the analysis of the poetry style of seven North Sumatra poets in the study of Literary Stylistics. Through the descriptive method, the research results obtained through the process of identifying and analyzing data were objectively described. The data of the research were taken from the anthology of poetry book Seribu Sajak Toba. The two poems as the source of data, namely Perahu Kecil di Atas Danau by Nestor Rico Tambunan and Berita dari Kaldera Toba Purba by Tri Budhi Sastrio, were taken from the Anthology of Poetry book Seribu Sajak Toba.

The method of data collection chosen was the listening method. The listening method is a method used in language research by listening to the use of language on the object under study [3]. The steps of the listening method used were 1) listening intensively and repeatedly; 2) selecting data; 3) recording the relevant data; 4) conducting data analysis based on the theory used; 5) compiling a research report.
4 Result and Discussion

4.1 Result of the Study

4.1.1 A poem *Perahu Kecil di Atas Danau* by Nestor Rico Tambunan

Table 1. Diction

<table>
<thead>
<tr>
<th>No</th>
<th>Denotation Diction</th>
<th>Connotation Diction</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>aku menatapmu pagi itu, terayun ayun</td>
<td>cahayanya bagai perak yang beriak-riak</td>
</tr>
<tr>
<td></td>
<td>di atas perahu kecil.</td>
<td>bagai riak gelora gadis cantik</td>
</tr>
<tr>
<td>2</td>
<td>menjala pora pora</td>
<td>tubir kaldera berdiri penuh misteri</td>
</tr>
<tr>
<td>3</td>
<td>Anak-anak muda telah pergi</td>
<td>banyak yang telah berubah</td>
</tr>
<tr>
<td></td>
<td>Menuju rantau yang penuh mimpi</td>
<td>Air danau tak lagi jernih dan mewangi</td>
</tr>
<tr>
<td></td>
<td>Karena danau tak lagi bisamemberi</td>
<td>Karena keramba dan limbah mencemari</td>
</tr>
<tr>
<td></td>
<td>Mereka pergi jauh, dan jarang mau kembali</td>
<td>Penuh tumpukkan sampah yang menari-nari</td>
</tr>
<tr>
<td></td>
<td>Kalaupun kembali pasti lama sekali</td>
<td>Di atas sana, gunung kehilangan pohon-</td>
</tr>
<tr>
<td></td>
<td>Itupun sekali-sekali</td>
<td>pohon</td>
</tr>
<tr>
<td></td>
<td>Mungkin karena orang tuanya mati</td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Rhyme

<table>
<thead>
<tr>
<th>No</th>
<th>Clerihew Rhyme</th>
<th>Alliteration Rhyme</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Di usiamu yang makin renta</td>
<td>Menjalara-porar</td>
</tr>
<tr>
<td></td>
<td>mungkin teman, tanpa kekasih tercinta</td>
<td>di antara riak dan kaldera</td>
</tr>
<tr>
<td></td>
<td>kau tetap setia menjala pora-pora</td>
<td></td>
</tr>
<tr>
<td></td>
<td>karena kau tak mau berjudi</td>
<td></td>
</tr>
<tr>
<td></td>
<td>mencari hidup yang tak kau pahami</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bahwa hidup tak melulu soal materi</td>
<td></td>
</tr>
</tbody>
</table>

Table 3. Imagery

<table>
<thead>
<tr>
<th>No</th>
<th>Visual Imagery</th>
<th>Feeling Imagery</th>
<th>Auditory Imagery</th>
<th>Olfactory Imagery</th>
<th>Motion Imagery</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Aku menatapmu pagi itu</td>
<td>Bagai benteng purba menahan luka</td>
<td>di antara riak dan kaldera</td>
<td>air danau tak lagi jernih dan mewangi</td>
<td>Penuh tumpukan sampah yang menari-nari</td>
</tr>
<tr>
<td>2</td>
<td>Air danau tak lagi jernih</td>
<td>Tapi, among, kau tetap setia di sana</td>
<td>-</td>
<td>-</td>
<td>Anak-anak muda telah pergi</td>
</tr>
<tr>
<td>3</td>
<td>-</td>
<td>Bagai gelora gadis cantik</td>
<td>-</td>
<td>-</td>
<td>Berkejaran menghantam pinggir kaldera</td>
</tr>
</tbody>
</table>
Table 4. Figurative Language

<table>
<thead>
<tr>
<th>No</th>
<th>Hyperbole</th>
<th>Personification</th>
<th>Sarcasm</th>
<th>Allegory</th>
<th>Antanaclasis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cahayanya bagai perak yang beriak-riak</td>
<td>Penuh tumpukan sampah yang menari-nari</td>
<td>Di atas sana, gunung kehilangan pohon-pohon habis tercuri atas nama otonomi dan investasi</td>
<td>Di usiamu yang makin renta</td>
<td>Kalaupun kembali pasti lama sekali Itupun sekali-sekali</td>
</tr>
<tr>
<td>2</td>
<td>Cahayanya bagai perak berkejaran menghantam pinggir kaldera</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

4.1.2 A poem *Berita dari Kaldera Toba Purba* by Tri Budhi Sastrio

Table 5. Diction

<table>
<thead>
<tr>
<th>No</th>
<th>Denotation Diction</th>
<th>Connotation Diction</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ribuan tahun tentu waktu yang amat sangat lambat bagi manusia</td>
<td>konon dulu, kala kau masih di rahim bunda, tidak banyak cerita</td>
</tr>
<tr>
<td>2</td>
<td>nikmati saja hidup yang ada, tidak perlu cakar-cakaran segala</td>
<td>kau diam tak pernah bicara, membiarkan semua mata terpesona</td>
</tr>
<tr>
<td>3</td>
<td>masih banyak pesan ingin disampaikan dari kami kaldera toba purba</td>
<td>Lalu, tiba masanya engkau bersabda, lalu sedikit marah murka</td>
</tr>
<tr>
<td></td>
<td>Tetapi untuk sementara mungkin disudahi saja, yang penting intinya</td>
<td>lalu seperti disulap saja, gunung purba, berubah menjadi kaldera</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dan akhimya satu danau indah mempesona, tetap toba namanya</td>
</tr>
</tbody>
</table>
Table 6. Rhyme

<table>
<thead>
<tr>
<th>No</th>
<th>Mono Rhyme</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Entah sejak kapan engkau membuka mata dan tertawa gembira, Yang jelas kau punya tawa serta kerlingan mata memikat sukma, Konon dulu, kala kau masih di rahim bunda, tidak banyak cerita, Yang ada hanya arga raksasa tegak menantang penuh wibawa.</td>
</tr>
</tbody>
</table>

Table 7. Imagery

<table>
<thead>
<tr>
<th>No</th>
<th>Visual Imagery</th>
<th>Feeling Imagery</th>
<th>Motion Imagery</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Entah sejak kapan engkau membuka mata dan tertawa gembira</td>
<td>Tertawa gembira</td>
<td>Jika tiba masanya kami harus keluar</td>
</tr>
<tr>
<td>2</td>
<td>Yang jelas kau punya tawa serta kerlingan mata memikat sukma</td>
<td>Sedikit marah murka</td>
<td>Jika tiba masanya dan kami ini mulai bergerak, apa yang kalian bisa?</td>
</tr>
<tr>
<td>3</td>
<td>di depan mata</td>
<td>Hadir berseri-seri di tingkah kerling</td>
<td>Jika kami bergerak maka semua harus mengikuti alunan nada irama</td>
</tr>
<tr>
<td>4</td>
<td>Agar kembali sedap di pandang mata</td>
<td>Amaran serta murka terus saja bergejolak panas merah membura</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>Dan akhirnya satu danai indah mempesona, tetap Toba namanya</td>
<td>Betapa aku gelisah, resah, dan sebenarnya juga marah dan murka</td>
<td>-</td>
</tr>
<tr>
<td>6</td>
<td>Hadir berseri-seri di tingkah kerling mata pesona laksana putri jelita</td>
<td>Sementara aku yang berjasa ya dibiarkan sengsara berlama-lama</td>
<td>-</td>
</tr>
<tr>
<td>7</td>
<td>-</td>
<td>Kalian bias berbangga ria</td>
<td>-</td>
</tr>
<tr>
<td>8</td>
<td>-</td>
<td>Muntahkan semua amaran dan murka</td>
<td>-</td>
</tr>
</tbody>
</table>
Table 8. Figurative Language

<table>
<thead>
<tr>
<th>No</th>
<th>Hyperbole</th>
<th>Allegory</th>
<th>Personification</th>
<th>Sarcasm</th>
<th>Satire</th>
<th>Rhetorical</th>
<th>Cynicism</th>
<th>Association</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Manusia dari seluruh dunia kala itu harus menanggung akibatnya</td>
<td>Yang jelas kau punya tawa serta kerlingan mata memikat sukma</td>
<td>Konon dulu, kala kau masih di rahim bunda, tidak banyak cerita</td>
<td>Kalian semua enak-enak saja nikmati indahnya pesona panorama, Sementara aku yang berjasa ya dibiarkan sengsara berlama-lama</td>
<td>Bah, ini aku punya kerja, aku yang bekerja kalian yang ambil nama</td>
<td>Siapa yang memperdulikannya? Tidak ada bahkan kalian semua</td>
<td>Karenanya, jangan pengah anak-anak manusia, kalian bukan apa-apa</td>
<td>Tetapi harus kami akui juga, kalian berbaik-baik atau tidak sama saja.</td>
</tr>
<tr>
<td>2</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Langit gelap berlama-lama</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Kau tutupi juga lubung ubun-ubun kepala yang seram tidak terkira</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
4.2 Discussion

4.2.1 Perahu Kecil di Atas Danau Poem by Nestor Rico Tambunan

1) Diction

The use of the right, careful, and correct diction can help give value to a word. The diction expressed in Perahu Kecil di Atas Danau poem has two meanings, those are denotation and connotation. At the beginning of the poem, the poet uses words that contain the true meaning occurred in the array _aku menatapmu pagi itu, terayun-ayun di atas perahu kecil_. The array is included in the meaning of the denotational word, because there are no words that contain figurative meaning. Furthermore, there is the connotation that adorns this poem. Connotation contains meaning that is not the actual meaning, but the figurative meaning or additional meanings. As seen in the second verse below,

\[
\text{cahayanya bagai perak yang beriak-riak, l}\\ 
\text{bagai riak gelora gadis cantik}
\]

The array above is categorized in the connotation meaning because it uses the figurative word, thus producing meaning that illustrates the beauty of Lake Toba, sparkling like a beautiful girl.

2) Rhyme

The rhyme expressed in this poem created by Nestor Rico Tambunan using the a-a-b-b pattern or often called the clerihew rhyme that can be seen in the sixth stanza of the poetry, the excerpt is as follows,

\[
\text{Di usiamu yang makin renta} \\
\text{mungkin teman, tanpa kekasih tercinta} \\
\text{kau tetap setia menjala pora-pora} \\
\text{karena kau tak mau berjudi} \\
\text{mencari hidup yang tak kau pahami} \\
\text{bahwa hidup tak melulu soal materi}
\]

The quote above has repeated vowels (a) and (i) on each line, indicating if the patterned rhyme is a-a-b-b which is commonly called clerihew rhyme. Next, in Perahu Kecil di Atas Danau poem there is also an alliteration rhyme which is the sound equation found in the initial sound of words on the same line, this rhyme is seen in the fourth line of the first verse of the poem.

3) Imagery

In the poem Perahu Kecil di Atas Danau by Nestor Rico Tambunan, the imagery contained in the poem can be seen here,

\[
\text{Among, l}\\ 
\text{aku menatapmu pagi itu} \\
\text{terayun-ayun di atas perahu kecil} \\
\text{menjala pora-pora} \\
\text{di antara riak dan kaldera}
\]

The first stanza on the second array, _aku menatapmu pagi itu_ entered into the visual imagery. The poet creates a clear impression of sight by including the word _menatapmu_ (staring at you). The visual condition that a child did to his father was in a boat on Lake Toba. Furthermore the visual imagery appears in the excerpt _Banyak yang telah berubah air danau tak lagi jernih_. The impression of observation is presented by the poet in his poem, the lake
water that is no longer clear describes the condition of Lake Toba's water which is no longer clean and pure, many piles of garbage and waste water discharges at the tourist site.

Furthermore, in the array di antara riak dan kaledra included into the auditory imagery. This is evidenced by the impression of the sound of the water ripples created by the poet, so that the reader or connoisseur of the poem seems to see and hear the same thing. Other imageries occurred in the Perahu Kecil di Atas Danau are feeling imagery, olfactory imagery, and motion imagery.

4) Figurative Language

In the Perahu Kecil di Atas Danau poem found several styles of language that adorn the poem. The language styles found are hyperbole, personification, sarcasm, allegory, and antanaclasis. The following are the excerpt of Perahu Kecil di Atas Danau which categorized as hyperbole,

cahayanya bagai perak yang beriak-riak
bagai riak gelora gadis cantik

The sentence is said to be excessive because it already uses the word riak and then uses the word gelora and likens its beauty using two sentences namely perak and gadis cantik.

It was also found that personification was a style of language that seemed to replace the function of inanimate objects that could behave like humans. Found in the array “penuh tumpukan sampah yang menari-nari” in the array the author describes if the garbage in Lake Toba can dance like humans. In the array of poems “di usiamu yang makin renta” in the array there is the figurative word which is the word “renta” which means aged or elderly, which can be categorized into allegory for comparing an object with the figure of speech. In addition to the figure of speech above, it is also found Sarcasm that can be seen in the fifth line of third stanza “di atas sana, gunung kehilangan pohon-pohon habis tercuri atas nama otonomi dan investasi” on the array illustrates how the natural conditions that have experienced illegal logging due to the interests of a party. Antanaclasis is also found in this poem, it occurs in the fourth stanza, fifth and sixth lines. Two words are the same, “sekali” but with different meanings. If on the fifth line means "membutuhkan waktu yang lama" on the sixth line means "jarang".

4.2.2 Poetry Berita dari Kaldera Toba Purba by Tri Budhi Sastrio

1) Diction

“Ribuan tahun tentu waktu yang amat sangat lambat bagi manusia,”

In the first line of the second stanza, the author uses denotative meaning that is the actual meaning or meaning that is following the understanding contained by the word and is also called general meaning. In this verse the poet illustrates that “Ribuan tahun” is a long time for humans, not only for humans but also for Kaldera Toba Purba. Hereafter, connotation meaning is also found in the poetry Berita dari Kaldera Toba Purba by Tri Budhi Sastrio, in the excerpt below,

“Konon dulu, kala kau masih di rahim bunda, tidak banyak cerita,”

The excerpt of the poem explains the phase of Lake Toba, which used to be a volcano that erupted and became a lake, on the poetry piece the writer explained that the mountain turned into a lake that seemed if humans are seen from the word "rahim". The word bunda means the mountain in the poem piece above.
2) Rhyme
Rhyme contained in the poem above "Monorhyme" is the same vocal repetition found at the end of the rows of a poem. Seen from the whole array of poetry below:

```
Entah sejak kapan engkau membuka mata dan tertawa gembira,
Yang jelas kau punya tawa serta kerlingan mata memikat sukma.
Konon dulu, kala kau masih di rahim bunda, tidak banyak cerita,
Yang ada hanya arga raksasa tegak menantang penuh wibawa.
```

In the stanza above there is the same vowel repetition seen in the vowels (a-a-a-a) which recur on each line that indicates the monorhyme. The monorhyme presented by the poet makes it easy for the reader to understand the overall meaning that the poet describes the condition of Mount Toba which turns into an enchanting Kaldera.

3) Imagery
Poetry Berita dari Kaldera Toba Purba by Tri Budhi Sastrio tells the story of the news where the poet wants to convey from Lake Toba, there are three types of imagery found here. Firstly, visual imagery was found in the array “Entah sejak kapan engkau membuka mata dan tertawa gembira” sentence membuka mata is visual imagery that is described by poets using the eyes as imaginary poetry creation.

Then, in this poem some imagery found, one of them is the array of tertawa gembira can also be called "happy", but in the wholeness of the verse actually the poet conveying the eruption of Mount Toba which is now a beautiful and charming Kaldera Toba so Lake Toba became a tourist destination in North Sumatra. The last one is motion imagery, which found in the fifth stanza of this poem. Motion imagery is a depiction of objects that can abstractly move and concretely not move. In the temple imagery array found in the sentence "Jika tiba masanya dan kami ini mulai bergerak, apa yang kalian bisa" this array shows the action of Lake Toba as if it is threatening ad described by the poet of the word bergerak.

Motion imagery is also a depiction of objects that can abstractly move and concretely not move. In this seventh stanza, the motion imagery is found in the array "Jika kami bergerak maka semua harus mengikuti alunan nada irama” the word bergerak in the array indicates a movement that will occur. This illustrates the transfer from one place to another.

4) Figurative Language
Allegory found in the array “Yang jelas kau punya tawa serta kerlingan mata memikat sukma”. The author, in this case, wants to say kedipan mata but decorate it with the figure of speech, which is kerlingan. Furthermore, the excerpt “Konon dulu, kala kau masih di rahim bunda, tidak banyak cerita” in the poetry, it is categorized as personification which is the style of language that seems to replace the function of inanimate objects that can behave like humans.

Furthermore, hyperbole occurs in the array “Manusia dari seluruh dunia kala itu harus menanggung akibatnya.” In the sentence before, it can be seen that the author uses the word seluruh dunia, which could have been seluruh negara, but the author overestimates in explaining so it uses the word seluruh dunia. Sarcasm found in the array “Kalian semua enak-enak saja nikmati indahnya pesona panorama, Sementara aku yang berjasa ya dibiarkan sengsara berlama-lama”. The array is an expression of self-determination that is conveyed directly without imagery and stated strictly.

Another figure of speech found in the poem Berita dari Kaledra Toba Purba is satire, rhetoric, cynicism, and association. Satire found in the fourth line of the fifth stanza, meanwhile, rhetoric occurs in the array “Siapa yang memperdulikannya? Tidak ada bahkan
kalian semua”. Cynicism can be seen in the ninth line of the fifth stanza. The last one is association which can be found in the array “Tetapi harus kami akui juga, kalian berbaik-baik atau tidak sama saja”.

4.3 External Achievement

The output achieved from the results of this study is the making of textbooks on Poetry Appreciation Courses which contains the concrete relationship between stylistics theories. Textbook entitled *Stylistics of Poetry of North Sumatra Poetry* will subsequently be used as material for researchers and students in conducting lectures in the Poetry Appreciation Course. In addition to making textbook-based teaching materials, the results of this study are also directed towards the creation of multimedia-based teaching materials especially audio-video integrated into the e-learning system of Universitas Negeri Medan FBS. The learning system in the *blended learning* form that has been implemented in FBS since the past two years makes it easier for researchers to publish the results of this multimedia-based research to students.

5 Conclusion and Suggestions

Based on the results of the research and analysis of the discussion, the five poems in the Anthology of *Seribu Sajak Tuo Toba* Poems will be summarized in the following description. First, *Perahu Kecil di Atas Danau* poem by Nestor Rico Tambunan, based on the study of stylistics there are two types of dictions in the poem, they are the connotation and denotation diction. The style of rhymes found in this poem is the clerihew rhymes and alliterative rhymes, imagery found are visual, feelings, auditory, olfactory, and motion imagery, while the figurative language in the poem found in several types, there are hyperbole, personification, sarcasm, allegory, and antanaclasis. Secondly, *Berita dari Kaldera Toba Purba* poem by Tri Budhi Sastro, based on a Stylistic study, there are two types of diction styles, namely connotation and denotation diction. The style of rhymes found in this poem is monorhyme. The imagery found in this poem is feeling, olfactory, visual, and motion imagery. The figurative language found in poetry is hyperbole, allegory, personification, sarcasm, satire, rhetoric, cynicism, and association.

The most common errors found in writing poetry that may be caused by editors are spelling mistakes, which involve punctuation, capital letters, italics, bold letters, etc. According to their function, the role of an editor is very huge for an author. On this good opportunity, the researcher advises on all types of writings / literary works to be published, the content should be repeatedly edited by several editors, so that the aesthetic impression on poetry can be conveyed and can be enjoyed by readers.

6 References


Seemingly Unrelated Regression Model of Economic Stability through a Combined Monetary Fiscal Policy in Indonesia

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Abstract. The research aims to analyze the influence of Seemingly Unrelated Regression (SUR), GOV, SBK to GDP in Indonesia, analyzing the influence in SUR, GOV, INF on GDP in Indonesia, analyzing the influence of the SUR GOV on the INF in Indonesia, analyzing the influence in the SUR SBK, JUB to GDP in Indonesia, analyzing the influence by SUR SBK towards JUB in this study uses quantitative material with the SUR approach. The quantitative material in this study was related to variable data that was observed that was GOV, SBK, INF, JUB and GDP in Indonesia year 2010 S/d 2018. The results of the analysis of SUR from the fiscal side to economic stability showed that Government Expenditure was positively influential but not significant to INF. Government Expenditure was positively influential but not significant to GDP, while inflation hurt economic growth. The monetary side shows that the interest rate of credit is positive but not significant to the amount of money supply. The interest rate of credit is negative but not significant to economic growth, while the amount of money supply has a positive effect on economic growth. The combined policy shows that Government Expenditure has a positive influence but is not significant to GDP as negative credit interest rate but is not significant to economic growth. It is not significant that the interaction of fiscal and monetary to economic growth shows the combined policy has not been effective in achieving economic stability in Indonesia. Thus, it is input for the Government and BI in coordinating the relevant combined policy to achieve economic stability.

Keywords: Government Expenditure, interest rate, inflation, money, GDP

1 Introduction

The importance of policy in a country to achieve economic stability as a benchmark is the fiscal policy and monetary policy on the economic fundamentals that are achieving stability of economic stability. The final goal of monetary policy is to maintain and maintain stability of the rupiah value, which is reflected in the low and stable rate of inflation. Bank Indonesia has an important role in maintaining long term stability [1]. The most common problem in developing countries is maintaining economic stability. A series of policies that governments do in economic stability are fiscal and monetary policies. Ideally, all policy endpoint goals can be achieved simultaneously and sustainably. However, in many countries including Indonesia, it is hard to achieve stabilization, even tend to mutually debilitating
(contradictory) between one purpose and another [2]. Inflation can also be interpreted as rising prices of goods and services in general and continuously [3].

In emerging economies such as Indonesia, there is always a lack of balance between demand and bidding from the real sector. With the increase of the purchasing power injection into the economy, demand is increased, but the supply is relatively fixed due to structural rigidity, market imperfections. This leads to an inflationary price increase. In addition to the impact of government spending on output, another important aspect is the synchronization of fiscal policy with the economic business cycle. Ideally fiscal policy has the properties of an automatic economic stabilizer where the economic condition is undergoing expansion, then government expenditure should be reduced or the acceptance of increasing taxes.

Conversely if the economy is contraction, the fiscal policy should be expansive through increased spending or declining tax revenues, thereby automatic stabilizer of fiscal policy in the presence of the countercyclical function of fiscal policy [4]. According to the opinion above, it can be concluded that obtaining an efficient policy is to coordinate the policy (including international coordination) and to combine or combined the policies to achieve the objectives that have been established. The maturity of strategy and risk management is also needed to mitigate risk of unrest and so on in the economic maze. Therefore, this study will break down in such a way as to fiscal and monetary policy on economic fundamentals, as well as to explain the theoretical dynamics of both domestic and global macro-level security [5].

The rapidly developing countries (Emerging Market) nowadays generally have an economic structure that still patterned agriculture, which tends to be still very vulnerable by the shaking of economic activity. In countries such as Indonesia often occurs volatility in maintaining the balance of economic activity, always the most important concern because when the economy is unstable, conditions will arise economic problems such as low economic growth, investment, high exchange rate, and high rate of inflation. The size of the hub stability is where economic growth occurs; low currency rates tend to have a low rate of inflation [6].

The phenomenon of economic stability problems is more concrete by looking at the variable response of monetary, fiscal policy combined so that the empirical analysis has been titled "Seemingly Unrelated Model Regression economic stability through the Combined monetary fiscal Policy in Indonesia" in the research period 2000 S/d 2018), as follows:

![Fig 1. GDP in Indonesia 2001 - 2018](image-url)
Data shows the economic growth of Indonesia tends to rise in the last twenty years, but during the economic crisis that occurred in the United States in 2008, it has affected inflation and slowdown Indonesia's economic growth in these periods, not achieving economic growth targets due to changes in fiscal and monetary policy, such as government spending changes, interest rate changes in the inflation stability efforts, but strongly affected investment and greatly impacted the establishment of gross domestic product. From 2012 to 2015 even this year, Indonesia's economic growth also experienced slowdown or economic instability. The disruption of Indonesia's economic stability is the impact of the global economic crisis and the free-trade era, which causes fiscal and monetary policy changes such as government expenditure changes, changes in credit interest rates impact investments, the amount of money supply, and inflation. Based on the phenomena, it is important to empirically analyze economic stability through the combined monetary policy in Indonesia by using the Seemingly Unrelated Model Regression

**Literature Review**

Economic stability is an economic condition in which there is no major change or fluctuations in macroeconomics, where the growth of its output remains, inflation is not more than 10% and often has a recession. Monetary policy is used to perform economic stability in the short term whereas fiscal policy is directed toward achieving the medium and long term economic targets [7]. The fiscal and monetary policies of each other are influential in economic activities.

The main variables of fiscal policy are TAX and GOV, while the monetary policy is JUB and SBI. This policy will affect economic stability, namely inflation, GDP, exchange rate, investment, and BP. Full disciplinary monetary and fiscal policies are recognized to play an important role in the highest level of inflation in the various economies of East and Southeast Asia. Coordination of monetary and fiscal policy becomes increasingly important when there is high uncertainty over the influence of each policy.

In practice we often encountered fiscal policy and also have monetary consequences or monetary policy with fiscal consequences.
Money market balance and goods market (IS *-LM *), Mundell-Fleming concept.

A country's macroeconomic stability is capable of being controlled through fiscal and monetary policy. Control can be done if the government can predict the economic turmoil of the established monetary fiscal policy. In studying and analyzing and predicting economic phenomena a model or theory is required. The function of the model or theory is to help explain the economic phenomena. The macroeconomic models are often used to analyze how fiscal and monetary policies in the open economy are the Mundell – Fleming model. This model is described as a domain policy model for the study of monetary and fiscal policies on an open economy [7]. Decision-makers who ignore this influence will face danger [7]. The Mundell – Fleming model is the IS-LM model for the small open economy. This Model considers the price level to be certain (given) and then shows what causes fluctuations in revenues and exchange rates [7].

The item and Curve market IS * Mundell-Flaming describes the goods and services market as the IS-LM model, but this model adds new symbols for Net exports, so the IS * curve is a curve that shows the relationship of various levels of income and exchange rate that puts the market of goods and services in a balanced state, i.e. income equals to demand of goods and services. The higher the exchange rate than the lower the income level, assuming the capital mobility is perfect, so \( R = R^* \), obtained the following equation:

\[
Y = C + I + G + NX \]

The equation is the equation of the intensity, which is the equation that must be properly seen from how the equation variables are spelled out [7]. To be more clearly seen: consumption depends positively on disposable income, which has the function of:

\[
C = f (Y - T) \]

Investment is the purchase of goods that will be used to produce more goods and services. Investments are the sum of the purchase of capital equipment, supplies, and buildings. Investments relate negatively to the interest rate, which has the function of:

\[
I = f (r) \]

Government expenditure is the purchase of goods and services by local governments, centers that include wages of government work and spending for the public interest, denoted by \( G \). Export Net is referring to the import value minus from the export value and related negatively with the exchange rate, which has the function of:

\[
NX = f (e) \]

So that the results of the \( C, I, G \) and \( NX \) substituting on acquired model IS *:

\[
IS^* : Y = C (Y - T) + I (r) + G + NX (e) \]

This equation states revenue is the amount of consumption, investment, government expenditure, and net export. The consumption of positive our relations on the disposable income, the investment relates negatively to the interest rate, and export of net is negatively related to the exchange rate. This equation is an IS * equation, which illustrates the balance of income and exchange rate on the market of goods and services.

The money market and the LM * curve on Mundell-Flaming IS explaining the money market as the IS-LM model. The LM curve * is a curve that shows the income level relationship on the various possible interest rates that put the money in a balanced state, i.e. money demand equals money supply, with the equation:

\[
M/P = L (R, Y) \]

This equation states that the offer of real money balance, \( M/P \), equals the demand, \( L (R, Y) \). Demand for real money balance is negatively dependent on the interest rate, and positively on \( Y \) revenues. By adding the assumption that the domestic interest rate is equal to the world interest rate, the LM equation * becomes:
LM*: \( \frac{M}{P} = L(R^*, Y) \) [2.7]

This equation shows a vertical LM* curve, as the exchange rate does not fit into the LM* equation. Based on the world interest rate, the LM equation* determines aggregate revenue, regardless of the exchange rate. The LM* Curve Associates an interest rate that follows the world interest rate and income [7]. From the equation, the interest rate is the domestic real interest rate that follows the world interest rate (R*), the real interest rate is a reduction in the nominal interest rate with inflation, illustrated in the equation:

\[ R^* = (i - \pi)' \] [2.8]

The equation of equality [2.13] and [2.15] generates the IS*-LM* Balance Model:

**IS*: \( Y = C(Y - T) + I(i - \pi) + G + NX(e) \) [2.9. A]

**LM*: \( \frac{M}{P} = L((i - \pi), Y) \) [2.9. b]

Equation IS* Explains the balance in the goods market, and the LM equation* explains the balance in the money market. The balance for the economy where the IS curve* and LM curves* intersect. This intersection shows the exchange rate as well as the level of income in which the goods and money market in balance.

![Diagram showing IS* and LM* curves](image)

**Fig 3.** The IS curve balance* and the LM curve* (Model Mundell-Fleming) [7]

The equilibrium market of goods IS* and the equilibrium condition of the money market LM*. Both curves maintain a constant interest rate at the world interest rate. The second intersection of this curve indicates the level of income and exchange rate that meets the equilibrium both in the goods market and in the money market [7]. By using the model Mundell-Fleming to present how the aggregate revenue Y and E exchange rates respond to changes in fiscal policy and monetary policy.
2 Research Method

This study uses quantitative material with the Seemingly Unrelated Regression (SUR) approach. The quantitative material in this study was related to the variable data that was observed, namely GOV, SBK, INF, JUB and GDP in Indonesia year 2000 - 2018.

The following is a description of the economic stability response through fiscal and monetary combined policy, while the shock occurring in economic growth became a benchmark for fiscal and monetary policy taking place. Based on theoretical foundations and previous research results, the conceptual framework in this study can be described as follows:

![Diagram showing the relationship between Government Expenditure, Inflation (Y2), Interest Rate, Money Supply, and GDP]

Fig 4. Research Method Seemingly Unrelated Regression

The analysis of data is adjusted to the economic stability through a combined policy of fiscal and monetary that is accommodated by the Seemingly Unrelated Regression approach. The scope of this research is focused on economic stability through the combined policy of fiscal and monetary with economic growth as the final target. The observed Data includes GOV, SBK, INF, JUB, and GDP. Data used in Indonesia data year 2001 - 2018.

The method of data analysis used in this research is the Seemingly Unrelated Regression method. Based on the conceptual framework that has been built, there are 5 similarities in this model as follows:

Model Safety:
- Equation 1 \( PDB = f(GOV, INF) \)
- Equation 2 \( PDB = f(SBK, JUB) \)
- Equation 3 \( PDB = f(GOV, SBK) \)
- Equation 4 \( INF = f(GOV) \)
- Equation 5 \( JUB = f(SBK) \)

The five equations are transformed into the following forms of Econometric equations:

Econometric equations:
- Equation 1 \( \log PDB = a_0 + a_1 \log (GOV) + a_2 \log (INF) \)
- Equation 2 \( \log PDB = a_0 + a_1 \log (SBK) + a_2 \log (JUB) \)
- Equation 3 \( \log PDB = a_0 + a_1 \log (GOV) + a_2 \log (SBK) \)
- Equation 4 \( \log INF = a_0 + a_1 \log (GOV) \)
- Equation 5 \( \log JUB = a_0 + a_1 \log (SBK) \)

Then the analysis model used is Seemingly Unrelated Regression system with EVIEWS 7 program as follows:

Seemingly Unrelated Regression equations:
- \( GDP = C_{(10)} + C_{(11)} \times GOV + C_{(12)} \times INF \)
- \( GDP = C_{(20)} + C_{(21)} \times SBK + C_{(22)} \times JUB \)
- \( GDP = C_{(30)} + C_{(31)} \times GOV + C_{(32)} \times SBK \)
- \( INF = C_{(40)} + C_{(41)} \times GOV \)
- \( JUB = C_{(50)} + C_{(51)} \times SBK \)
3 Results and Discussion

Estimation to find out the influence of variables in 5 Seemingly Unrelated Regression equations is shown in the table below. From a known table 5 (five) equation model Seemingly Unrelated Regression as follows:

\[
\begin{align*}
\text{GDP} &= C(10) + C(11) \times \text{GOV} + C(12) \times \text{INF} \\
\text{GDP} &= C(20) + C(21) \times \text{SBK} + C(22) \times \text{JUB} \\
\text{INF} &= C(40) + C(41) \times \text{GOV} \\
\text{JUB} &= C(50) + C(51) \times \text{SBK}
\end{align*}
\]

Table 1: Seemingly Unrelated Regression:

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C(10)</td>
<td>1065.010</td>
<td>84.47553</td>
<td>12.60732</td>
</tr>
<tr>
<td>C(11)</td>
<td>0.005738</td>
<td>0.022503</td>
<td>0.255001</td>
</tr>
<tr>
<td>C(12)</td>
<td>-64.00487</td>
<td>9.604461</td>
<td>-6.664077</td>
</tr>
<tr>
<td>C(20)</td>
<td>56.43275</td>
<td>209.5698</td>
<td>0.269279</td>
</tr>
<tr>
<td>C(21)</td>
<td>-0.366011</td>
<td>0.835929</td>
<td>-0.437850</td>
</tr>
<tr>
<td>C(22)</td>
<td>182.2896</td>
<td>61.21500</td>
<td>2.977857</td>
</tr>
<tr>
<td>C(30)</td>
<td>640.2539</td>
<td>76.40517</td>
<td>8.379720</td>
</tr>
<tr>
<td>C(31)</td>
<td>0.003930</td>
<td>0.010114</td>
<td>0.388537</td>
</tr>
<tr>
<td>C(32)</td>
<td>-0.380857</td>
<td>0.785778</td>
<td>-0.484687</td>
</tr>
<tr>
<td>C(40)</td>
<td>6.935622</td>
<td>0.705458</td>
<td>9.831369</td>
</tr>
<tr>
<td>C(41)</td>
<td>4.89E-05</td>
<td>0.000344</td>
<td>0.142100</td>
</tr>
<tr>
<td>C(50)</td>
<td>3.172784</td>
<td>0.093199</td>
<td>34.04326</td>
</tr>
<tr>
<td>C(51)</td>
<td>0.000676</td>
<td>0.001384</td>
<td>0.488210</td>
</tr>
</tbody>
</table>

Determinant residual covariance 77774895

Equation: PDB=C(10)+C(11)*GOV+C(12)*INF
Observations: 18
R-squared 0.541731 Mean dependent var 622.2211
Adjusted R-squared 0.480628 S.D. dependent var 319.2407
S.E. of regression 230.0687 Sum squared resid 793974.1
Durbin-Watson stat 0.834769

Equation: PDB=C(20)+C(21)*SBK+C(22)*JUB
Observations: 18
R-squared 0.026618 Mean dependent var 622.2211
Adjusted R-squared -0.103167 S.D. dependent var 319.2407
S.E. of regression 335.3041 Sum squared resid 1686433.
Equation: PDB=C(30)+C(31)*GOV+C(32)*SBK
Observations: 18
R-squared 0.042858 Mean dependent var 622.2211
Adjusted R-squared -0.084761 S.D. dependent var 319.2407
S.E. of regression 332.4951 Sum squared resid 1658295.
Durbin-Watson stat 0.071114

Equation: INF=C(40)+C(41)*GOV
Observations: 18
R-squared -0.008993 Mean dependent var 6.956666
Adjusted R-squared -0.072055 S.D. dependent var 3.052436
S.E. of regression 3.160495 Sum squared resid 159.8197
Durbin-Watson stat 0.929012

Equation: JUB=C(50)+C(51)*SBK
Observations: 18
R-squared 0.004786 Mean dependent var 3.207778
Adjusted R-squared -0.057415 S.D. dependent var 0.260803
S.E. of regression 0.268186 Sum squared resid 1.150777
Durbin-Watson stat 1.430679

Based on the results of the output equation, Seemingly Unrelated Regression can be known five equations, following each of the alignment in 5 equations:

**Equation Test result 1:**
The first equation is the equation used to know in Seemingly Unrelated Regression GOV, INF against GDP with the following equation as follows:
\[ \text{GDP} = C(1) + C(11) \times \text{GOV} + C(12) \times \text{INF} \]

Based on the equation, the output results in EViews with the Seemingly Unrelated Regression model as follows:
\[ \text{PDB} = 1065.01 + 0.0057 \times \text{GOV} - 64.0048 \times \text{INF} \]

**GOV coefficient**
It is known that the positive GOV coefficient is 0.0057. Meaning that each GOV increase of 1 billion US $, then GDP will increase by 0.0057 billion US $. The probability value of 0.79 > 0.05 implies that GOV does not significantly affect GDP. It can then be noted that Government Expenditure has a positive effect but is not significant to GDP.

**INF coefficient**
Known that the coefficient of INF negative 64.004. It means that any increase in INF by 1%, then GDP will have decreased by 64.004 billion US $. A probability value of 0.00 < 0.05 contains the meaning that INF significantly affects GDP. It can be stated that inflation hurts economic growth.

The estimated result indicates that R^2 = 0.5417 that the GOV and INF were able to explain the GDP by 54.17%, and the remainder of 45.83% PBD were influenced by other variables beyond the estimation in the model.

**Equation Test Result 2:**
The second equation is the equation used to know Seemingly Unrelated Regression SBK, JUB against GDP with the following equation as follows:
GDP = C (20) + C (21) * SBK + C (22) * JUB

Based on the equation the output results in EViews with the Seemingly Unrelated Regression model as follows:
GDP = 56,432-0.366 * SBK + 182,2898 * JUB

**SBK coefficient**
It is known that the SBK coefficient is 0.366 negative. Meaning that each SBK increase by 1 percent, GDP will decrease by 0.366 billion US $. The prob value of 0.66 > 0.05 implies that the SBK does not significantly affect GDP. It can be stated that the credit interest rate is negative but not significant to GDP.

**JUB coefficient**
It is revealed that the positive JUB coefficient is 182.28. It means that any JUB enhancement of 1% of GDP, then GDP would have increased by 182.28 billion US $. A prob value of 0.005 < 0.05 implies that JUB significantly affects GDP. It can be stated that the money supply has a positive effect on economic growth. The estimated results showed that R^2 = 0.0266 that the SBK and JUB were able to explain the GDP by 2.66%, and the remainder of 97.34% PBD were influenced by other variables beyond the estimation in the model.

**Equation 3 test Result:**
The third equation is the equation used to know Seemingly Unrelated Regression GOV, SBK against GDP with the following equation as follows:
GDP = C(30) + C(31) * GOV + C(32) * SBK
Based on the equation the output results in EViews with the Seemingly Unrelated Regression model as follows:
GDP = 640.253 + 0.003 * GOV - 0.380 * SBK

**GOV coefficient**
It is known that the positive GOV coefficient is 0.003. Meaning that each GOV increase of 1 billion US $, then GDP will have an increase of 0.003 billion US $. The probability value of 0.69 > 0.05 implies that GOV does not significantly affect GDP. It can then be noted that Government Expenditure has a positive effect but is not significant to GDP.

**SBK coefficient**
It is known that the SBK coefficient is 0.380 negative. Meaning that each SBK increase is 1%, GDP will have decreased by 0.380 billion US $. The probability value of 0.62 > 0.05 implies that the SBK does not significantly affect GDP. It can be stated that the credit interest rate is negative but not significant to economic growth. The estimated results showed that R^2 = 0.0428 that the GOV and SBK were able to explain the GDP by 4.28%, and the remainder of 95.72% PBD were influenced by other variables beyond the estimation in the model.

**Equation 4 test Result:**
The fourth equation is the equation used to know in Seemingly Unrelated Regression GOV against inflation with the following equation as follows: INF = C(40) + C(41) * GOV
Based on the equation the output results in reviews with a Seemingly Unrelated Regression model as follows:
INF = 6,935 + 4.89 * GOV.
It is known that the positive GOV coefficient is 4.89. It means that any increase in GOV of 1 billion US $, then INF will experience an increase of 4.89%. The value of prob 0.88 > 0.05 implies that the GOV does not significantly affect the INF. It can be stated that Government Expenditure has a positive effect but is not significant to inflation. The estimated results showed that $R^2 = 0.0089$ that the GOV was able to explain inflation was only 0.89%, and the remainder of 99.11% INF was influenced by other variables beyond the estimation in the model.

**Equation Test Result 5:**

The fifth equation is the equation used to know Seemingly Unrelated Regression SBK against JUB with the following equation as follows:

$$JUB = C (50) + C (51) \times SBK.$$ 

Based on the equation, the output results in EViews with the Seemingly Unrelated Regression model as follows:

$$JUB = 3.172 + 0.006 \times SBK.$$ 

Note that SBK coefficient is 0.00069 positive, meaning that each SBK increase by 1 percent then the money supply will increase by 0.0006% of GDP. The probability value of 0.62 > 0.05 means that the interest of not significantly affects JUB. It can be stated that the credit interest rate is positive but not significant towards JUB. The estimated result shows that $R^2 = 0.0047$ that SBK is capable of explaining the money supply is only 0.47%, and the remaining 99.53% JUB is influenced by other variables beyond the estimate in the model.

Seemingly Unrelated Regression Analysis considers the influence of fiscal and monetary policy on economic stability with the final target of economic growth, described as follows: seen from the fiscal side to economic stability On the Seemingly Unrelated Regression Model, by looking at expenditure Government influence on inflation and the Government influence of Expenditure, inflation on economic growth. The results of the study stated that Government Expenditure was positively influential but not significant to inflation. Government Expenditure has positive influence but is not significant to GDP, while inflation hurts economic growth.

While judging from the monetary side of economic stability on the Seemingly Unrelated Regression Model at the influence of credit interest rates on the amount of money supply and the influence of interest rate credit, the amount of money supply to economic growth. Monetary policy with a monetary pricing approach can have an effective effect on controlling the inflation rate through interest rate channels and exchange rates [10].

The results of the study stated that the credit interest rate was positive but not significant to the amount of money supply. The interest rate of credit is negative but not significant to economic growth, while the amount of money supply has a positive effect on economic growth. Money has been affected by the economic growth and inflation movements, interest rates are negative and significant to inflation that can be seen from the fiscal and monetary side to economic stability on the Seemingly Unrelated Regression Model, by looking at the Government influence of exhaled, interest rate credit against economic growth. The results of the study stated that Government Expenditure was positively influential but not significant to GDP, a negative interest rate of credit, but not significant to economic growth.
4 Conclusion

Based on the results of the research and the discussion can be concluded Seemingly Unrelated Regression from the fiscal side to economic stability by looking at the influence of expenditure Government to inflation and the influence of the Government Expenditure, inflation To economic growth, showed that Government Expenditure was positively influential but not significant to INF. Government Expenditure was positively influential but not significant to GDP, while inflation negatively affected economic growth. Results of the analysis of Seemingly Unrelated Regression from the monetary side to economic stability by looking at the influence of credit interest rates on the amount of money supply and the influence of credit interest rate, the amount of money supply to economic growth, indicating That the credit interest rate is positive but not significant to the amount of money supply. The interest rate of credit is negative but not significant to economic growth, while the amount of money supply has a positive effect on economic growth. Results of the analysis of Seemingly Unrelated Regression from the fiscal and monetary side to economic stability by looking at the Government influence of Excalibur, interest rate credit on economic growth, showed that the influential Government Expenditure Positive but not significant to GDP, the rate of credit is negative, but not significant to economic growth. It is not significant that the interaction of fiscal and monetary to economic growth shows the combined policy has not been effective in achieving economic stability in Indonesia. Thus, it is input for the Government and BI in coordinating the relevant combined policy to achieve economic stability.

5 Reference

Characterization of Soybean [*Glycine max* (L.) Merr.] Mutant Lines

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**Abstract.** One way to increase soybean production is to develop superior varieties. Development of superior varieties can be done through mutation techniques. Identification of superior varieties is a technique to determine whether what is being faced is the intended variety and characterization aims to produce plant descriptions. This research was conducted by descriptive analysis using the International Union for the Protection of New Varieties of Plants (UPOV). The line numbers used are M100A25 (2/7), M100A25 (3/4), M100A25 (3/7), M200A17 (18/5), M200A12 (6/5), M200A11 (32/3), M100A17 (18/5), M200A17 (13/7), M200A12 (6/5), and Anjasmoro comparison varieties. Morphological characterization is an observation of physical appearance that can be seen and measured such as hypocotyl color, feather color and flowering time. Morphological characterization has a disadvantage that is not necessarily showing the actual genetic diversity, due to environmental factors that affect plant morphology.

**Keywords:** characterization, morphology, soybean

**1 Introduction**

Soybean is the most important strategic food crop after rice and corn. Consumption of soy by the Indonesian people will certainly continue to increase annually considering some considerations such as population growth, increased per capita income, and public awareness of food nutrition [1]. This was strengthened by the analysis of soybean consumption 2016-2020 by Bapennas [2] stating the demand for soybeans every capita in 2016-2020 was expected to continue to increase, the average every year increased by 14.79%

The widespread projection of soybean crop harvest up to five years (2016-2020) is expected to decrease, on average down 2.90% every year [2]. According to the data of the Central Statistics agency [3], soybean production is decreasing in 2015-2017 that in 2015 soybean production reaches 963.183 tons, in 2016 the soybean production reaches 859.653 tons and continues to decline until the year 2017 which is only Reaches 538.728. Soybean production is not yet able to meet national needs. Fulfillment of national soybean needs is filled with imports that tend to increase annually [3].

One of the ways in increasing soybean production is by developing soybean-superior varieties. The development of varieties aims to obtain new varieties that have superior properties in accordance with the wishes of farmers. These superior properties include high productivity, short-term, pest-proof, adaptive to specific, and or have the advantages of certain compounds [4].
The assembly of soybean’s superior varieties is a dynamic activity and the syndicate, breeding procedure starts from increasing the diversity of plants through various means such as crosses, gene transformation, and mutation. After that proceed with selection That use a variety of methods (such as bulk methods, pedigrees, SSDS), output power tests, and multi-location tests [5,6].

The introduction of varieties, to maintain the purity so that the uniform and excellence remain, need to study the morphological properties of plants such as growing type, color hypocotyl, color of flowers, fur color, flowering age, and quantitative properties such as crop height, seed size, and leaf size. Introduction or identification of superior varieties is a technique to determine whether the faced is true and the superior varieties are intended [7]. Characterization studies will make it possible to show out patterns of observable variability of the characters, such as quantitative characterization of fruit form also reveals a clear association between the fruit and seed forms. Characterization or identification is a condition of being able to release a new variety [8]. Characterization aims to produce a description of the plant that is important to mean as a guideline in genetic empowerment in breeding programs [9]. The characterization is also used to release varieties, the importance of characterization done to see the unique nature, and other characters of a new variety. Candidate varieties as intended in paragraph (1) can be removed if eligible: B. A complete and clear description is available, for accurate identification and recognition of varieties [10]. Therefore, this research aims to describe varieties from selected lines to be released into new superior varieties.

2 Research Methods

The research was conducted in October 2019 until December 2019 in the Pasar 1 Setia Budi Medan. The materials used in this study were the seeds of soybean seed selection results of Pedigri previous research and Anjasmor as a comparative varietal, NPK fertilizer, insecticide-maade of profenos 500g/L, bamboo, water and labels. The tools used in this research are metered, Polybag size 10 Kg, watering can, cameras, and stationery.

Land preparation, measuring 9 m x 10 m, filling Polybag, thinning which is performed by leaving one plant per Polybag, fertilization done a week after planting and crop pest control using insecticide-active Profenofos (2g/Liter of water) is given from the age of 2 weeks. and adjust to the state of the crop. Weeding is done manually and using hoe according to weed conditions in the field. And watering is done according to conditions of soil conditions in the Polybag.

The methods used in this study are roomy observation techniques and direct observation with morphological diversity based on UPOV guidelines parameters: Color hypocotyl, central leaf shape, lateral leaf shape, flowering time (HST), flower color, color Hair and plant growth type [11].
Results and Discussion

Table 1. Description of observation

<table>
<thead>
<tr>
<th>No.</th>
<th>Name lines / varieties</th>
<th>color</th>
<th>hypocotyl</th>
<th>central leaf shape</th>
<th>lateral leaf shape</th>
<th>flowering time (DAP)</th>
<th>flower color</th>
<th>hair color</th>
<th>type of growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>M100A25 (2/7)</td>
<td>Purple</td>
<td>Ovate</td>
<td>Rounded ovate</td>
<td>34-35</td>
<td>Purple</td>
<td>White</td>
<td>Determinate</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>M100A25 (3/4)</td>
<td>Purple</td>
<td>Elliptical</td>
<td>Rounded ovate</td>
<td>34</td>
<td>Purple</td>
<td>White</td>
<td>Determinate</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>M100A25 (3/7)</td>
<td>Purple</td>
<td>Elliptical</td>
<td>Rounded ovate</td>
<td>34</td>
<td>Purple</td>
<td>White</td>
<td>Determinate</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>M200A17 (18/5)</td>
<td>Purple</td>
<td>Ovate</td>
<td>Pointed ovate</td>
<td>33-34</td>
<td>Purple</td>
<td>White</td>
<td>Determinate</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>M200A12 (6/5)</td>
<td>Purple</td>
<td>Elliptical</td>
<td>Trullate</td>
<td>31-32</td>
<td>Purple</td>
<td>White</td>
<td>Determinate</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>M200A11 (32/3)</td>
<td>Purple</td>
<td>Ovate</td>
<td>Pointed ovate</td>
<td>34-35</td>
<td>Purple</td>
<td>White</td>
<td>Determinate</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>M100A17 (18/5)</td>
<td>Purple</td>
<td>Elliptical</td>
<td>Pointed ovate</td>
<td>35</td>
<td>Purple</td>
<td>White</td>
<td>Determinate</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>M200A17 (13/7)</td>
<td>Purple</td>
<td>Elliptical</td>
<td>Rounded ovate</td>
<td>35</td>
<td>Purple</td>
<td>White</td>
<td>Determinate</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>M200A12 (6/5)</td>
<td>Purple</td>
<td>Ovate</td>
<td>Pointed ovate</td>
<td>34-35</td>
<td>Purple</td>
<td>White</td>
<td>Determinate</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Anjasmoro</td>
<td>Purple</td>
<td>Elliptical</td>
<td>Oval</td>
<td>35.7-39.4</td>
<td>Purple</td>
<td>White</td>
<td>Determinate</td>
<td></td>
</tr>
</tbody>
</table>

Note: DAP = days after planting

Fig 1. Leaf shape of soybean plants
Plant breeding with gamma-ray mutation is already done in many plants, mutations can occur naturally, but the frequency is very low, also can be done in artificial ways. The planted soybean lines are the result from the induction of gamma-ray radiation of Anjasmoro varieties with a dose of 100 and 200 Gray radiation, the need for characterization or identification of soybean line to find the characteristic and kinship of properties. The morphology of the line with its elder. Characterization can be used as a basis in grouping plants this grouping aims to determine the relationship between the plant genotypes and can be taken into consideration in the selection process. Selection through grouping will be effective when the properties of the group can be known [12]. Soybean has two colors hypocotyl that is green and purple, observation color Hypocotyl was can done at age 7 HST-14 HST color Hypocotyl closely related to the color of flowers, can be seen from the research shows the color of purple Hypocotyl will Purple flowers. All varieties of purple hypocotyl are exhibited purple flowers, while green hypocotyl exhibited white flowers [13]. In the treatment of 100 and 200 Gray produces the same hypocotyl color as the older one.

The leaves are the main organ in plants that play directly in photosynthesis and determine optimum photosynthetic capacity through various forms of adaptation mechanisms [14]. The observational character morphology of the leaves is important to know the soybean plant that has certain characteristics for the purpose of improving the character of the leaves of a plant [15]. Observations carried out on primary leaves and lateral leaves, observations of primary leaves were performed at the age of 14 HST and lateral leaves were carried out on the third leaf. The results obtained at line M200A12 (6/5) have a change in the shape of the leaves are Trullate leaves whereas in no line M100A25 (2/7), M100A25 (3/4), M100A25 (13/7) has leaf shape rounded ovate and line M200A17 (18/5), M200A11 (32/3), M200A12 (6/5) and M100A17 (18/5) did not appear to be real different with his elder, Pointed ovate, which refers to his old leaf shape.

Soybean flowers are in perfect flower, pollination occurs when the flower crown is still closed which causes a slight cross-marriage percentage. The flowering time on no line M200A12 (6/5) is categorized as a medium but faster than its old 31-32 HST, line M200A17 (18/5) 33-34 HST, line M100A25 (3/4) and M100A25 (3/7) 34 HST, and on other lines have the same flowering time with the old-35 HST. Factors that affect the age of flower discharge are temperature, duration of illumination and planting time, not all flowers will be pods even though there has been a perfect pollination of about 60% of the flowers fall before forming pods [16].

In soybean plants can be found a variety of morphological characters such as Trichome scattered throughout the surface of leaves, stems, and pods that vary according to varieties or types of soybeans [17]. Observations include white fur, light brown and dark brown. From the results of the observation of hair color all the lines are similar to the old is white.

Observation of growth type includes growth and indeterminate. The growth type of soybean plant can be determinate and or indeterminate. The pattern of growth between the two types is called semi-determinate, on the type determinate, the vegetative growth stops after the flowering phase [18]. The observation shows that the growth of all lines is the same the as the Elder.
3 Conclusion

Based on the results of the Polymerization it can be seen that the radiation results of 100 Gy and 200 Gy do not significantly affect the character color hypocotyl, flower color, fur color, and the type of growth. For the leaf shape there is a slight difference rounded ovate line M100A25 (2/7), M100A25 (3/4), M100A25 (13/7) and Pointed line M200A17 (18/5), M200A11 (32/64), M200A12 (6/5) and M100A17 (18/5). Line M200A12 (6/5) occur a change in the form of a triangular leaf. For the flowering age there are some lines that are experiencing a quicker change than the elder. The flowering age on the line of M200A12 (6/5) is categorized as a medium but faster than its old-31-32 HST, M200A17 (18/5) 33-34 HST and M100A25 (3/4) and M100A25 (3/7) 34 HST. For further studies it is advisable to identify through molecular genetics.

4 Acknowledgements

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5. References


Development Of Teacher Handbooks And Realistic Mathematics Students Basic Schools

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Abstract. The research aims to develop teacher and student handbooks for realistic mathematics lessons for elementary schools. This research uses development research. The subjects of this study were grade V students of SD Negeri 163085, H.A Bilal Tebingtinggi City and SD Negeri 106162, Medan Estate District, Deliserdang Regency. In the initial stage, observations were made during the learning process at the two schools and continued with interviews with students and teachers. From the results of these observations and interviews a primary school realistic mathematics teacher and student handbook was prepared. Furthermore, the realistic elementary school mathematics teacher and student handbook is validated by a team that aims to see and assess the quality of the realistic elementary school teacher and student mathematics handbook in order to arrange an effective handbook that will be used by teachers and students in learning. The trial results show that the elementary school teacher and student mathematics handbook is effective and can help facilitate understanding of mathematical concepts at the elementary school level. This can be seen from the number of students who can reach the KKM from the two schools is increasing. For SD Negeri 163085 HA Bilal, Tebingtinggi City, if at the time of the pre-test only 1 student (3%) was able to reach the KKM, then after being given the learning process using a teacher and student handbook developed the number of students who could reach the KKM increased to 24 students (82.7%) while those under the KKM were only (17.3%) or 5 students. The same thing was seen in SD Negeri 106162. If at the time of the Pre-test only 2 students (6.6%) had scored above the KKM, after the post-test there was an increase in students who achieved the KKM score of 25 students (83.3%). An increase of 76.7% when compared to the pre test.

Keywords: Handbook, teacher, student, PMR

1 Introduction

In the 2013 curriculum, subjects must be attended by all students in one education unit at each unit or level of education. While for the elective subjects participated by students, chosen according to their choice. Based on Permendikbud no 24 of 2016 it was emphasized that the implementation of learning in Elementary Schools / Madrasah Ibtidaiyah (SD / MI) was carried out with a thematic-integrated learning approach. According to Sri Muryaningsih [1] that
Thematic learning is learning that utilizes themes in the delivery of material. The theme acts as a unifying learning activity that brings together several subjects at the same time by choosing a theme that can unite indicators of several elementary school subjects. Elementary school subjects that can be taught using thematic learning are: Religious Education, Civic Education (PKn), Indonesian Language Education (BI), Mathematics, Natural Sciences (IPA), Social Sciences (IPS), Cultural Arts and Crafts (SBDP), and Physical Education Sport and Health (PJOK). However, for Mathematics and Physical Education Sports and Health (PJOK) subjects as stand-alone subjects for classes IV, V, and VI.

According to Ngurah Laba Laksana Dek [2] "in the 2013 curriculum framework it also states that in compiling and developing learning activities must pay attention to the principles of preparation and development in accordance with the conditions in the education unit both the initial ability of students, interests, motivation to learn, talent, potential, social abilities, emotions, learning styles, special needs, learning speed, cultural background, norms, values, and/or the environment of students."

According to Hengkang Bara [3] "it is known that there are still some obstacles encountered in the preparation and implementation of the 2013 Curriculum. There is still a lack of understanding of teachers in implementing the new curriculum in classroom learning. This is because the training and outreach time are considered too short. The number of learning resources that will be changed and replaced with new learning resources. In addition, the distribution of teaching materials is not optimal and has not been evenly distributed to all schools designated by the government to implement the 2013 curriculum. Therefore, teachers as educators are required to be able to respond to the transition period of curriculum changes by innovating through the development of creativity in learning. One of the things teachers can do is to develop learning media that are effective, interesting, in accordance with the characteristics of students."

But in reality, based on the results of observations and observations in the field, most primary schools do not use teacher books and student books that are separate and independent of the binding theme. This situation was also seen in the two schools that were sampled in this research activity. SD Negeri 163085 Jalan H.A Bilal Tebingtinggi in the process of learning mathematics in class V, teachers and students still use mathematics books that are still integrated in themes with other subjects. When interviewed with students, students said it was difficult to understand various mathematical concepts because the explanations contained in the books they used were very few and not exhaustive. The same thing was also said by the teacher, because sometimes the teacher himself felt confused and overwhelmed when he had to explain certain concepts because their mastery of material concepts was still lacking and the handbook used to explain the concept of the material was very concise.

A similar situation was also found in SD Negeri 106162, Medan Estate District, Deliserdang Regency. Teachers and students feel the book they are using today does not provide much support for understanding the concept of material because of its very short description. Such conditions certainly cannot be tolerated and a solution must be immediately sought. The development of a handbook for elementary school students and realistic mathematics teachers is felt to be needed to assist teachers and students in providing easy understanding of the mathematics material being studied.

According to Hamdan Batubara [4] "understanding mathematical concepts and communication is a competency that must be developed in students so that they are ready to face
life's problems in the future. In addition, affective competence, such as the spirit of learning, independence and perseverance is also an important asset for students in developing their potential to the fullest.

According to Rusnandi [5] states that "learning mathematics is a process of building or constructing concepts and principles, not just teaching that seems passive and static, but learning must be active and dynamic". So, learning mathematics in addition to requiring concepts, teachers also need media that can help in an active and dynamic learning process. Teachers can develop simple media, for example by developing teacher handbooks.

"The role of books is very large because books can act as a source of information, but currently students also have a tendency to lack interest in reading if the book is thick and less attractive" [6]. Teacher handbooks are books that are used by teachers as a source of reference in implementing the learning process for their students [7,8]. There are three ways teachers can use in compiling handbooks, namely repackaging information, writing themselves, and restructuring. Teacher handbooks can also come from research results. Efforts that can be made to create a research-based teacher handbook is the way the writer must first conduct research and report the results of his research.

Generally teacher handbooks have several characteristics or characteristics such as: (1) using a systematic structure and sequence of contents, (2) explaining the instructional goals to be achieved, (3) motivating students to learn, (4) anticipating student learning difficulties, (5) provide sufficient training for students, (6) provide summaries, (7) teaching materials are independent [7]. The existence of basic competencies (KD) and learning objectives that must be achieved by students, has forced teachers to develop teacher handbooks in accordance with this [8]. Teacher handbooks will be more meaningful if the material contains contextual content and is in the daily environment of students [9].

The student handbook is used as a guide to learning activities to facilitate students in mastering certain competencies. This book is also used to carry out activities in the learning process (activities based learning) where the contents are designed and supplemented with examples of activity sheets so that students can learn something relevant to the life they experience. The student handbook has the function: (a) A guide for students in carrying out learning activities, (b) Liaison between teachers, schools and parents, (c) student worksheets, (d) Assessments and portfolios, and (e) Communication media between teacher and students.

In learning realistic mathematics, students learn to mathematize contextual problems. In other words, students identify that contextual questions must be transferred into mathematical form problems to be further understood, through scheming, formulation and visualization. This is a horizontal mathematical process. While vertical mathematical, students complete mathematical forms of contextual questions by using mathematical concepts, operations and procedures that are applicable and understood by students [10].

According to Freudenthal [11], the main activities carried out in Realistic Mathematics Education include: finding contextual problems (looking for problems), solving problems (solving problems), and organizing teaching materials (organizing a subject matter). According to Maghfirah Maharani [12] "In order for mathematics learning to be well conveyed and accepted by students, it requires the latest innovations in learning mathematics, namely by utilizing learning media in order to arouse students' desire to learn mathematics and reduce student anxiety in learning mathematics". So, one alternative is to use realistic mathematics...
teaching material. It is expected that the learning process in class can be carried out well and accepted by students.

2 Research Method

The development of realistic elementary school mathematics teacher and student handbooks uses the development research method Richey and Nelson. Development research (Developmental research) is oriented towards product development in which the development process is described as thoroughly as possible and the final product is evaluated. Van den Akker [13] calls it formative research where his research activities are carried out in a cyclic process and are aimed at optimizing the quality of product implementation in certain situations. In mathematics learning, this developmental research is applied in the iterative activities of designing and testing mathematics learning material products [13]. The results of this study are quality products theoretically, procedural methodologies, and empirical.

Researchers used six elements contained in the Van Den Akker development model, namely: (1) Preliminary Analysis, (2) Evaluation of experts and teachers, (3) initial book models, (4) book validation (5) empirical data, (6) reflection and revision. The sequence of development steps The diagnostic test book based on the Van Den Akker research and development model can be seen from the following figure:

![Diagram of the research and development model of Van den Akker (1999)](image)

**Fig 1. Diagram of the research and development model of Van den Akker (1999)**

**Trial of elementary school teacher and student mathematics handbook**

The trial of elementary school teacher and student mathematics handbook aims to see the use of elementary school teacher and student mathematics handbook in the teaching and learning process. Besides this trial also aims to see the constraints and weaknesses of teacher and student
handbooks developed in the school environment. The elementary school teacher and student mathematics handbook trials were conducted at two schools that were sampled in this teacher and student development activities. The results of this trial will be input and consideration in developing elementary and realistic mathematics teacher and student handbooks.

**Reflection and revision**

Reflection and revision of the realistic elementary school teacher and student handbooks aims to see the weaknesses and shortcomings of the teacher and student handbooks based on trials that have been conducted at two sample schools. Weaknesses and shortcomings of the draft based on the results of the trial will be corrected to produce good quality teacher and student handbooks.

**Validation**

The second elementary and realistic mathematics teacher handbook validation was carried out after all the tools developed were tested, reflected and revised by the researcher. Validation activities are intended to produce elementary and realistic mathematics teacher and student handbooks that are effective and can improve the competency of elementary school students. Validation is done using a validation sheet that has been prepared previously. Validation was carried out by one expert and 3 teachers who were competent in the fields of mathematics, education, and learning media.

**Development of elementary and realistic mathematics teacher and student handbooks**

The development of elementary school teachers and students 'realistic mathematics handbooks was carried out after the validation of elementary school teachers and students' realistic mathematics handbooks was conducted. Elementary teacher and student mathematics handbooks that were developed later will be used in elementary schools as a teacher and students' grade handbook especially in mathematics. This is because the mathematics book that has been used for fifth grade elementary school students still uses a thematic approach, while the candy demand for 24 of 2016 that mathematics is already independent.

### 3 Results and Discussion

This realistic elementary school teacher and student mathematics handbook is validated by a team of validators consisting of experts and experts from the tertiary level and educators at the elementary level. Validation is done using a predetermined validation sheet. Based on the results of the validation team, the teacher's handbook and realistic elementary school mathematics students are included in the good category and deserve to be tested and developed.

The realistic elementary school teacher and student handbook trial was conducted in two elementary schools in Tebingtinggi City and Deliserdang Regency. SD Negeri 163085 Tebingtinggi City, North Sumatra Province is the first school as a testing ground, while SD Negeri 106162 Medan Estate District Deliserdang Regency is the second school. The trial was conducted on the fifth grade students of odd semester 2019/2020 learning year. The average age of students
who are subjected to trials in the development of this elementary and realistic mathematics student handbook is 10-11 Years. The number of grade V students of SD Negeri 163085 Tebingtinggi City who were the subjects of this trial were 29 participants, while the number of grade V students of SD Negeri 106162, Medan Estate Subdistrict, Deliserdang Regency, were 30 students. The trial was conducted in two stages, namely the pre test and post test stages. The implementation of pre-test and post-test in the activities of developing elementary and realistic mathematics teacher's handbook can be seen in the following table:

<table>
<thead>
<tr>
<th>No</th>
<th>School</th>
<th>Trial</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Pre Test</td>
</tr>
<tr>
<td>1</td>
<td>SD Negeri 163085</td>
<td>16 July 2019</td>
</tr>
<tr>
<td>2</td>
<td>SD Negeri 106162</td>
<td>15 July 2019</td>
</tr>
</tbody>
</table>

The results of the pre-test conducted in the two schools that became the study sample, showed that the ability of Grade V students of SD Negeri 163085 Tebingtinggi City and SD 106162 in Deliserdang Regency in answering questions related to fraction material was still very low. This can be seen from the percentage of classical completeness obtained at the two elementary schools is still far from the KKM that has been determined. Of the twenty questions given to students to work on average only% of students can answer in accordance with the KKM that has been determined, while the remaining% is still not fulfilling the KKM that has been determined. The description of the pre-test results of the two schools that were sampled in this research activity, as in the following graph:

![Fig 2. Student Pre Test Result Graph](image-url)
Based on the graph above, it can be seen the number of students who can work on questions and get grades above the KKM from SD Negeri 163085 Tebingtinggi City, only as many as 1 student (3%) while as many as 28 students (97%) pre-test results are still below the KKM which predetermined. The same thing can also be seen from the results of the pre-test conducted in 106162 SD Negeri Medan Deliserdang District, out of 30 students in class V who were sampled in the trial, only 2 students (6.6%) who scored above the KKM has been determined, the rest as many as 28 students (93.4%) have grades below the KKM.

Seeing the results of the trials conducted in the pre-test activities, it is believed that one of the causes of the low ability of students to work on problems related to fractions contained in the 2013 curriculum learning is because learning books are one of the sources of reference and learning materials for students. not in accordance with the demands of the material that must be mastered by students. Mathematics books that are used still use books that use a theme approach, while for grade IV to VI students, based on the Ministry of Education and Culture regulation, it is stated that mathematics is independent and is not included in the theme. Mathematics books that are still joining the theme, certainly do not help students in understanding abstract mathematical material, because the discussion of concepts contained in books based on themes is still very narrow and very limited.

Elementary teachers and students' realistic mathematics handbooks are felt to be very much needed by students. Based on this statement, a realistic elementary school mathematics teacher and student handbook was developed. The use of teacher's handbooks and student books, is expected to help teachers in providing understanding of the concepts of mathematical material, and for students themselves with this book is expected to easily understand the material and learning outcomes of mathematics can be much more improved.

Furthermore, for grade V students of SD Negeri 163085 Jalan H.A Bilal Tebingtinggi City and SD Negeri 106162 Medanestate Deliserdang Regency, action was given in the form of learning processes using student handbooks and realistic elementary mathematics teacher handbooks developed by researchers. The learning process using the teacher's handbook and realistic elementary student mathematics handbook is held a month and at the end of the activity a post-test is carried out with the aim to see how far the improvement of students' abilities after the learning process is carried out using the teacher's handbook and student handbook developed by researchers.

The results of the post-test conducted at the end of the activity showed an increase in the ability of students in terms of understanding mathematics material in class V. This can be seen from the number of students who can reach the KKM from the two schools is increasing. For SD Negeri 163085 HA Bilal, Tebingtinggi City, if at the time of the pre-test only 1 student (3%) was able to reach the KKM, then after being given the learning process using a teacher and student handbook developed the number of students who could reach the KKM increased to 24 students (82.7%) while those under the KKM were only (17.3%) or 5 students. The same thing was seen in SD Negeri 106162, Medan Estate District, Deliserdang Regency. If at the time of the Pre-test only 2 students (6.6%) had scored above the KKM, after the post-test there was an increase in students who achieved the KKM score of 25 students (83.3%). An increase of 76.7% when compared to the pre test. Likewise with students who scored below the KKM in both elementary schools there was a significant decrease. The description of the increase in the ability of fifth grade students after
using the teacher's handbook and realistic elementary student mathematics handbook can be seen in the following graph:

**Fig 3. Student Post Test Result Graph**

Based on the graph above, it appears that an increase in the ability and understanding of grade V students of SD Negeri 163085 Jalan H.A Bilal Tebingtinggi City and SD Negeri 106162 Medanestate Subdistrict Deliserdang District after the learning process was carried out using a teacher's handbook and realistic elementary mathematics students. The improvement of students' abilities in the two elementary schools can be seen in the following table:

**Table 2. Results of improving students' abilities**

<table>
<thead>
<tr>
<th>No</th>
<th>School</th>
<th>Pre Test</th>
<th></th>
<th>Post Test</th>
<th></th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Above KKM</td>
<td></td>
<td>Above KKM</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Under KKM</td>
<td></td>
<td>Under KKM</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3%</td>
<td>97%</td>
<td>83%</td>
<td>17%</td>
</tr>
<tr>
<td></td>
<td>SD Negeri 163085</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>SD Negeri 106162</td>
<td>7%</td>
<td>93%</td>
<td>83%</td>
<td>17%</td>
</tr>
<tr>
<td>2</td>
<td></td>
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</table>

**Fig 4. Results of improving student ability**
4 Conclusion And Suggestions

Conclusion
1) The development of realistic elementary school mathematics teacher and student handbooks, very useful for teachers and in particular improving students' understanding of elementary school level mathematics material.
2) Increasing students' understanding of elementary school mathematics material can be seen from the results of trials conducted at the two schools that were sampled in the activities of developing elementary school teacher and student realistic mathematics handbooks.
3) V grade students in elementary school feel very happy and are helped by the existence of this handbook because they are easier to understand various mathematical material and can explore the material independently.

Suggestions
1) Need to develop realistic elementary school teacher and student mathematics handbooks in other classes
2) The elementary school teacher and student mathematics handbook development test was conducted by more than two schools in order to get a better and more accurate picture and validity from the handbook developed.

5 References


Building Interest In Entrepreneurship Through The Expectations Of Income, Family Environment And Education

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Abstract. This study aims to determine: Effects of Income Expectations, Family Environment, and Entrepreneurship Education on Entrepreneurial Interest of Faculty of Economics, Universitas Negeri Medan. The sampling method was carried out by means of purposive sampling in which the study was not conducted in the entire population, but focused on the target of 105 students. The instrument testing was conducted on 50 students from the Faculty of Economics. Classic assumption tests include normality test, linearity test, multicollinearity test, and heteroscedasticity test. Hypothesis tests used are simple linear regression analysis and multiple linear regression. Data collection techniques using interviews, questionnaires and literature studies and analysis tools used are causality analysis. Based on the research results obtained (1) a significance level of 0.019 <0.05 hypothesis is accepted, this shows the interest of entrepreneurship in students of the Faculty of Economics, Universitas Negeri Medan. (2) significance level of 0.004 <0.05 hypothesis is accepted, this shows that the greater the support of the family will increase the interest of entrepreneurship in students of the Faculty of Economics, Universitas Negeri Medan. (3) the significance level of 0.000 <0.05 hypothesis is accepted, this shows that the higher the level of students' understanding of entrepreneurship will increase the interest in entrepreneurship. (4) significance level of 0.000 <0.05 hypothesis is accepted, this shows that if students have high expectations about entrepreneurial income, students have a good understanding of entrepreneurship and family support there will be an increase in entrepreneurship interest in students of the Faculty of Economics, State University Field.

Keywords: Income Expectations, Family Environment, Entrepreneurship Education, Entrepreneurial Interest.

1 Introduction

Nowadays people find it difficult to get jobs. This is because the number of jobs is not proportional to the addition of new workers. The number of new workers who have the desire to meet their daily needs is a factor for people to find work. Unfortunately, competition is so tight in job selection and the large number of people competing in jobs makes the number of new workers not accommodated and there are also intellectuals who get less decent jobs.
Unemployment is a problem that almost happens in every country, including Indonesia. In Indonesia, the highest unemployment rate is actually created by educated groups. The unemployed workforce consists of various educational backgrounds. This is due to the fact that these graduates focus on finding work rather than creating their own jobs.

Unemployment is not the result of a choice not to work, but a result of increasingly difficult to get a job, especially in big cities. Based on data from the Indonesian Central Statistics Agency in 2018, the number of labor force in February 2018 was 133.94 million people, up 2.39 million compared to February 2017. The labor force forming components are the working population and unemployed. In February 2018, 127.07 million people were employed while 6.87 million people were unemployed. This condition will be further exacerbated by global competition that will bring together Indonesian tertiary graduates to compete freely with graduates from foreign tertiary institutions.

Compared to other countries in Southeast Asia (ASEAN), the number of entrepreneurs or entrepreneurs in Indonesia is still very low at under 2%. As revealed by the Minister of Cooperatives and Small and Medium Enterprises, Anak Agung Gede Ngurah Puspayoga that the number of entrepreneurs in Singapore reached 7% (of the population), Malaysia 5%, Thailand 3%, while in Indonesia the large population is only 1.65% . So, the need for student nurseries to become entrepreneurs and create jobs so that the number of entrepreneurs in Indonesia increases and the unemployment rate can be reduced.

Entrepreneurship is an attempt by someone to create their own jobs either opening a business or creating something new to improve the economy for themselves and for others. Entrepreneurship requires a willingness to take risks with full calculation so that it can overcome obstacles to achieve the expected success.

Entrepreneurial interest can be seen from the willingness to work hard and diligently to achieve business progress, the willingness to bear various risks related to the actions taken, willing to take new paths and ways, willingness to live frugally, willingness to learn. In establishing a business or entrepreneurship, it requires business capital that is used in carrying out business activities.

Income expectation is a person's expectation of income earned from business or work activities. Being an entrepreneur expects high income rather than being a company employee. Someone with higher income expectations than working as an employee is an attraction to be an entrepreneur. Based on the results of preliminary observations, there are still many Office Administration Education students who think that the income from entrepreneurship is still low and uncertain, even though the high and low income derived from entrepreneurship depends on one's efforts in realizing high income.

Family environment is the first environment in a person's life. The family environment consists of parents, relatives and other closest relatives. In the family environment, one of them is parent who will influence their children in determining their future, for example, when it comes to job selection.

Faculty of Economics, Medan State University in its curriculum has included entrepreneurship courses. In addition to entrepreneurship lectures, the Faculty of Economics, Medan State University often holds entrepreneurship seminars. The aim is nothing else so that students have an entrepreneurial mentality and encourage to become real entrepreneurs after they graduate so that the number of entrepreneurs in Indonesia increases and can reduce
unemployment. Based on the preliminary observations of researchers, only a few Office Administration Education students chose the entrepreneurial profession because their knowledge of entrepreneurship was lacking. This study examines several factors that affect students' interest in entrepreneurship.

The formulation of the problem in scientific papers is intended so that writing is directed and does not extend to other subjects. Sugiyono states that the problem is interpreted as a deviation between what should be and what actually happened. Based on the background of the problems above, the main problems in this study are: How to increase entrepreneurial interest in Office Administration Education Students in Medan State University?

**Revenue Expectations**

According to Paulus "Expectation of income is an expectation of obtaining higher income so that with higher income expectations it will further increase interest in entrepreneurship in students". "Revenues are gross inflows of economic benefits arising from an entity's normal activities in a period if the inflows result in an increase in equity, which does not originate from investment contributions". "Revenue is all acceptance of a person in return for his services in the production process. The return of services can be in the form of wages, interest, rent or profit depending on the factors of production involved in the production process "[1]. Meanwhile, according to Wahyu Adji [2], "income is income received by someone from a company in the form of salary, wages, rent, interest and profits including various benefits, such as health benefits or pensions". "Income is income earned by someone in the form of money or goods".

According to Zimmerer, Scarborough and Wilson [3], "being an entrepreneur will get amazing benefits. Entrepreneurship can earn high and unlimited income according to his expectations in order to fulfill all his desires ". The size of the income received from entrepreneurship depends on the work or work done. It is the desire to earn unlimited income that can generate interest in entrepreneurship. "People who work for themselves have a four times greater chance to become rich than people who work for others" [4].

Based on the description, there is a difference in understanding income. In general, income is money received by someone during a certain period in the form of salary, wages, rent, profits, and so on. In accounting, income is income derived from the company's operational activities. Income expectation is someone's expectation of the income received in the form of money or goods to fulfill his life. Expectations or expectations for a better income is one of the factors that influence a person's desire for entrepreneurship. If someone hopes to generate a higher income by becoming an entrepreneur, then he will be increasingly motivated to become an entrepreneur. With entrepreneurship, a person will obtain income from his position as a business owner and income derived from his position as a manager. In this study, researchers used indicators of income expectations including high income and unlimited income. The size of the income received from entrepreneurship depends on the work or work done. It is the desire to earn unlimited income that can generate interest in entrepreneurship. People who work for themselves tend to have greater opportunities to get rich than people who work for others.

**Family Environment**

In general, income is money received by someone during a certain period in the form of salary, wages, rent, profits, and so on. Income expectation is someone's expectation of the income
received in the form of money or goods to fulfill his life. Expectations or expectations for a better income is one of the factors that influence a person's desire for entrepreneurship. If someone hopes to generate a higher income by becoming an entrepreneur, then he will be increasingly motivated to become an entrepreneur.

According to Conny Semiawan "the family environment is the first and foremost medium that influences behavior in child development". The family environment is the smallest group in the community consisting of fathers, mothers, children and other family members. The family environment, especially parents, plays an important role in the development and growth of children. Parents also play a role as directors for the future, meaning indirectly parents can also influence their children's interest in choosing work, including in terms of being an entrepreneur. This is in line with what was delivered by Wasty Soemanto [5] that "parents or family are laying the foundation for children's preparation so that in the future they can become effective workers".

Syamsu Yusuf [6], "the environment is the whole physical / natural or social phenomenon (event, situation, or condition) that influences or is influenced by individual development". "The family is where the main activities of an individual's life take place, so the family becomes the first and foremost institution in the development of human resources" [7]. "In the family social interaction will occur where a child first learns to pay attention to the desires of others, learn to work together, help each other, here children learn to play the role of social beings who have certain norms and skills in association with others" [6]. "In general, the characteristics of a family are the couple relationships in marriage ties, the recognition of the existence of children born, and the existence of economic life in married life".

Buchari [8] revealed that "there is an influence from parents who work alone, and have their own business and have a tendency for their children to become entrepreneurs too". This situation often inspires children from childhood. Children who have parents who are entrepreneurs or live in an entrepreneurial family environment will receive knowledge in the early days so as to form attitudes and perceptions about trust in entrepreneurial abilities.

Based on these descriptions it can be concluded that the family environment is the smallest group in society and is the first environment that influences the development and behavior of children. In the family environment, children get attention, affection, encouragement, guidance and example by parents to be able to develop their potential for future development. The family environment has a very big influence on the development and career / work choices of a child and the influence of parents can be through the parent model and interactions within the family.

Interest in being an entrepreneur is formed when the family provides positive support for their interests. Parents who become entrepreneurs can also arouse their children's interest to become entrepreneurs. For example, parents who have a certain business, then the child will be interested in opening the same business because they see the success of their parents and their parents' encouragement to open the same business. In addition, the mindset of parents influences the interest in entrepreneurship because if parents have embedded the spirit of entrepreneurship and know the importance of entrepreneurship, it will affect their children so that the child wishes to become entrepreneurs. Indicators used in the family environment are parental work and parental support.
Entrepreneurship Education

According to Redja Mudyaharjo [9]: Education is a conscious effort made by the family of the community, and the government, through guidance, teaching and training activities that take place in school and outside of lifelong school, to prepare students to be able to play a role in various environments precisely in the future. One's education has an influence on one's knowledge and expertise.

According to Soekidjo Notoatmojo [10], "education is any planned effort to influence other people, whether individuals, groups, or the community so that they do what is expected by education practitioners".

According to Sugihartono, "education is an effort made consciously to change human behavior both individually and in groups to mature humans through teaching and training efforts so that they have the ability to be responsible for all their actions". According to Retno and Trisnadi, "entrepreneurship education is a learning process to change the attitudes and mindsets of students towards choosing an entrepreneurial career". Students who have taken entrepreneurship courses will have intrinsic values and entrepreneurial characteristics that will increase their interest and love for the world of entrepreneurship.

According to Buchori [8], "entrepreneurship education and training is growing rapidly in Europe and the United States both at the level of courses or at the University". Entrepreneurship courses are given in the form of public lectures, or in the form of study program concentrations.

Some of the courses offered have the following objectives:

a. Understand what is the role of companies in the economic system.
b. The advantages and disadvantages of various forms of the company.
c. Know the characteristics and processes of entrepreneurship
d. Understand the product planning and product development process
e. Being able to identify business opportunities and create creativity and form cooperative organizations
f. Able to identify and look for sources
g. Understand the basics of marketing, financial, organization, production
h. Able to lead a business and face future challenges.

Zimmerer, Scarborough and Wilson [3], stated that one of the factors driving the growth of entrepreneurship in a country lies in the role of universities through organizing entrepreneurship education both in lecture activities as well as seminar activities and entrepreneurial practices. The university is responsible for educating and providing entrepreneurial skills to its graduates and providing motivation to dare to choose entrepreneurship as their career.

Based on the description it can be concluded that entrepreneurship education is guidance given by someone to change one's attitude and mindset so that they are interested in becoming entrepreneurs. In addition to entrepreneurship education, entrepreneurship training is needed such as entrepreneurial seminars and entrepreneurial practices because with the seminar inviting successful entrepreneurs will provide a separate motivation for someone to entrepreneurship while entrepreneurial practice will provide experience and can be a driving force for entrepreneurial interest. The high interest in entrepreneurship will increasingly give birth to young entrepreneurs who have creativity and innovation in various fields.
Entrepreneurial Interest

Entrepreneurial interest is a sense of interest to become an entrepreneur who is willing to work hard and diligently to achieve business progress. Entrepreneurial interest is not brought from birth but grows and develops according to the influencing factors. "Factors that influence the growth of decisions for entrepreneurship are the result of the interaction of several factors, namely the character of a person's personality and environment" [11].

Entrepreneurial interest consists of two words, namely interest and entrepreneurship. Interest is a feeling of preferability and a sense of attachment to a thing or activity, without anyone asking. Interest is basically the acceptance of a relationship between oneself and an outside self. Slameto [11] states that "interest is a feeling of preferability and a sense of interest in a thing or activity, without anyone asking". Syaiful Bahri Djamarah [12] defines that "interest as a settled tendency to pay attention and remember some activities".

Someone who is interested in the activity will pay attention to the activity consistently with pleasure. Interest is interpreted as the tendency of settled subjects to be interested in a particular field of study or subject and feel happy to study the material [7]. Moment interest is the feeling of being attracted to a topic being discussed or studied for that often the term "attention". Attention in the sense of "momentary interest" needs to be distinguished from attention in the sense of "concentration", as explained above. Between interest and feeling happy towards a reciprocal relationship, so it is not surprising that students who feel displeased, will be less interested, and vice versa.

While the Language Center of the Ministry of National Education [13] defines "interest as the tendency of a high heart for something, passion and desire". Agus Sujanto states that "Interest is a concentration of attention that is accidentally born with a full will and depends on talent and environment".

Interest will not be separated from someone's happy feelings about something, because if someone is interested in something, it will pour out all the feelings of pleasure towards something. "Interest in entrepreneurship arises because there is a feeling of pleasure towards entrepreneurial activities, students who have a sense of pleasure and are interested in entrepreneurship will be more passionate and diligent in participating in practical and theoretical activities, so there will be a sense of wanting to master it".

Interest in entrepreneurship can be seen from two main indicators namely how strong a person's efforts to try to do entrepreneurial activities and how much effort someone plans to carry out entrepreneurial activities (such as activities in managing time and finance for entrepreneurial purposes). Yuyus [14], defines "entrepreneur as someone who has the creativity of a new business with courage to bear risks and uncertainties that aim to seek profits and business growth based on identifying opportunities and being able to utilize resources and capitalize on these opportunities". Meanwhile, according to Hendro [15], "entrepreneurship is the ability that exists in a person so that it can be utilized optimally so that it can improve living standards".

According to Kasmir [16], "entrepreneurs are people who are brave in taking risks to open businesses in various opportunities". Having the courage to take risks means to be mentally independent and dare to start a business, without being overwhelmed by fear or anxiety even in uncertain conditions. Joseph Schhumper in Buchori [8], defines "entrepreneurship is a person who breaks down the existing economic system by introducing new goods or services, by creating new
forms of organization or processing new raw materials". In terms of characteristics, entrepreneurs are those who establish, manage, develop, and institutionalize their own companies. Entrepreneurship involves two main elements, namely opportunities and the ability to respond to opportunities. Thus "entrepreneurship is a response to business opportunities that are revealed in a set of actions and produce results in the form of business organizations that are institutionalized, productive, and innovative" [14].

Factors that encourage interest in entrepreneurship according to Bygrave [8]:

a. Personal factors, concerning aspects of personality, among others, the existence of dissatisfaction with one's work, the existence of termination of employment, no other work, encouragement due to the age factor, the courage to bear the risk, and high commitment / interest in the business

b. Environmental factors, concerning relationships with the physical environment include, the existence of competition in the living world, the existence of resources that can be utilized such as capital, savings, inheritance, buildings, and strategic locations, Following business training courses or business incubators, and government policy, the availability of facilities business location, credit facilities and business guidance.

c. Sociological factors, concerning relationships with family and so on: There are relationships or relationships for others, There is a team that can be invited to work together in trying, There is encouragement from parents to open a business, the existence of family assistance in a variety of ease and the existence of previous business experience

Based on this description, it can be concluded that the interest in entrepreneurship is not always carried from birth, but can be grown with education and training. Interest is a sense of interest in a thing or activity and feels happy doing it. The sense of attraction is not because of coercion but because of a high desire to achieve its goals. Interest is basically the acceptance of a relationship between oneself and something outside of itself. The stronger the relationship, the greater the interest.

Entrepreneurship is the process of creating a creative and innovative business by utilizing existing opportunities to improve living standards and be useful for the community. Entrepreneurial interest is a sense of interest in entrepreneurial activities that create a business that benefits themselves and the surrounding environment. Entrepreneurial interest is influenced by the existence of high soft skills because being an entrepreneur requires a variety of skills and strong personal character.

Entrepreneurship will make a person not dependent on others because being an entrepreneur has the freedom to achieve the goals of his dreams. This freedom can be in the form of freely determining the desired business, free to set operational schedules, and of course free to determine the desired profit. Freedom is what will make someone interested or interested in becoming an entrepreneur. In addition, being able to assist the government in overcoming unemployment is due to the creation of new jobs that can accommodate prospective workers. This will benefit the community, especially the communities where businesses are established. Factors affecting entrepreneurial interest are high income expectations, support from the family environment and received entrepreneurship education. The indicators used include not being dependent on others, helping the social environment and feeling like being an entrepreneur.
3 Research Method

This research was conducted at the Faculty of Economics, Universitas Negeri Medan in the even semester of 2019. This type of research used in this study is comparative causal research. Comparative causal research is a type of research with the characteristics of problems in the form of a causal relationship between two or more variables. The population of this research is the students of Office Administration Study Program Medan State University class of 2015. The population of Office Administration students of the Faculty of Economics, Medan State University class of 2015 is 101 students where class A has 55 students and class B has 46 students. The number of samples used was 50 respondents with snowball sampling technique. The hypotheses proposed in this study are as follows:

H1: The higher the student's expectations for income generated from entrepreneurship, the higher the student's interest in entrepreneurship will be.

H2: The greater the family's support, the greater their children's interest in entrepreneurship.

H3: The higher the level of students' understanding of entrepreneurship, the higher the student's interest in entrepreneurship will be.

H4: Simultaneous income expectations, family environment and entrepreneurship education have a significant effect on interest in entrepreneurship.

![Fig. 1 Conceptual Framework](image)

The purpose of this study is to prove and analyze the influence of income expectations, family environment and entrepreneurship education on entrepreneurial interest. Based on the purpose of the study, this research is classified as an explanatory research (explanatory research), which is a research that aims to explain the position of the variables studied and the relationship between one variable and another. The population in this study were all students of the Faculty of Economics, Office Administration Department at Medan State University class of 2015 who had participated in entrepreneurship courses totaling 101 students. The number of samples used was 50 respondents with snowball sampling technique.
Data Analysis

To find out or measure the intensity of the relationship between the dependent variable (Y) with several independent variables (X), the type of analysis used is multiple regression analysis [17]. To test the hypothesis, the T test is used to test how far the influence of one independent variable individually in explaining the variation of the dependent variable [17]. The test is based on the results of the significance value of 0.05 or α = 5%. And F test to determine the effect of independent variables namely work experience, work performance, work discipline jointly influence the promotion variable as the dependent variable [17]. The test is based on the results of the significance value of 0.05 or α = 5%.

The coefficient of determination (R2) essentially measures the effect of the independent variable on the dependent variable. The coefficient of determination is between zero and one. A small R2 value means that the ability of independent variables to explain the dependent variable is very limited. A value close to one means that the independent variables provide almost all the information needed to predict the variation of the dependent variable.

3 Results and Discussion

3.1 Analysis of Multiple Linear Regression

Regression analysis is used to test hypotheses about the effect of partially independent variables on the dependent variable. Based on the estimation of multiple linear regression with the IBM SPSS program, the following results are obtained:

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Unstandardized Coefficients B</th>
</tr>
</thead>
<tbody>
<tr>
<td>(constant)</td>
<td>0.794</td>
</tr>
<tr>
<td>Income Expectation (X1)</td>
<td>0.263</td>
</tr>
<tr>
<td>Family Environment (X2)</td>
<td>0.303</td>
</tr>
<tr>
<td>Entrepreneurship Education (X3)</td>
<td>0.470</td>
</tr>
</tbody>
</table>

Source: Data Process Results with IBM

Based on Table 4.1, the regression equation in this study is as follows:

\[ Y = 0.794 + 0.263 X_1 + 0.303 X_2 + 0.470 X_3 \]

Information:
Y = Entrepreneurial Interest
X1 = Revenue Expectations
X2 = Family Environment
X3 = Entrepreneurship Education
The regression equation above can be interpreted as follows:

i. A constant of 0.794 shows the amount of interest in entrepreneurship when income expectations, family environment and entrepreneurship education are zero.

ii. \( b_1 = 0.263 \) indicates that if income expectations increase by 1 unit the interest in entrepreneurship will increase by 0.263 units, and vice versa, assuming the family environment and entrepreneurship education are constant.

iii. \( b_2 = 0.303 \) indicates that if the family environment increases by 1 unit, the interest in entrepreneurship will increase by 0.303 units, and vice versa, assuming income expectations and entrepreneurship education are constant.

iv. \( b_3 = 0.470 \) indicates that if entrepreneurship education increases by 1 unit, the interest in entrepreneurship will increase by 0.470 units, and vice versa, assuming income expectations and the family environment are constant.

3.2 T-test

Hypothesis 1 in this study was tested for truth by using partial tests. Testing is done by looking at the significance level (p-value), if the significance level resulting from calculations below 0.05 then the hypothesis is accepted, conversely if the significance level of the calculated results is greater than 0.05 then the hypothesis is rejected.

<table>
<thead>
<tr>
<th>No</th>
<th>Variable</th>
<th>Sig. Level of Information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Count</td>
</tr>
<tr>
<td>1</td>
<td>Income Expectation</td>
<td>0.001</td>
</tr>
<tr>
<td>2</td>
<td>Family Environment</td>
<td>0.000</td>
</tr>
<tr>
<td>3</td>
<td>Entrepreneurship Education</td>
<td>0.003</td>
</tr>
</tbody>
</table>

Source: Data Process Results with IBM SPSS

From table 4.2, it is known that the comparison between the significance level with the significance of the table is as follows:

i. Partial test results show that income expectations have a significance value of 0.019 and less than 0.05 so that income expectations have a significant effect on the interest in entrepreneurship received. It also shows that income expectations affect entrepreneurial interest, which means that the higher income expectations will have an impact on increasing entrepreneurial interest.

ii. The results of the family environment test have a significance value of 0.004 and less than 0.05 so the family environment hypothesis has a significant influence on the interest in entrepreneurship. This also shows that the family environment influences interest in entrepreneurship, which means the greater family support that is given will have an impact on increasing entrepreneurial interest.
iii. Partial test results show that entrepreneurship education has a significance value of 0.000 smaller than 0.05 so that the entrepreneurship education hypothesis has a significant effect on the interest in entrepreneurship. It also shows that entrepreneurship education affects the interest of entrepreneurship, which means that the higher the level of student understanding of entrepreneurship will have an impact on increasing interest in entrepreneurship.

3.3 F-Test
To test the effect of the independent variables jointly tested using the F test.

<table>
<thead>
<tr>
<th>Table 3. F Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sig. Count</td>
</tr>
<tr>
<td>0.000</td>
</tr>
</tbody>
</table>

Source: Data Process Results with IBM SPSS

The results of the statistical calculations in table 4.3 show the significance value count = 0.000. By using a significance level of 0.05, the significance of the calculation is smaller than the significance level, it can be concluded that simultaneous income expectations, family environment and entrepreneurship education influence the interest in entrepreneurship.

3.4 Coefficient of Determination (R2)
The coefficient of determination is a quantity that indicates the amount of variation in the dependent variable that can be explained by the independent variable. In other words, the coefficient of determination is used to measure how far the independent variables are in explaining the dependent variable.

<table>
<thead>
<tr>
<th>Table 4. Determination Coefficient Test Results (R2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
</tr>
<tr>
<td>----</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
</tbody>
</table>

Source: Data Process Results with IBM SPSS

The SPSS output results show the Adjusted R Square value of 0.857. This shows that 85.7% of entrepreneurial interest in students of the Faculty of Economics, Unmuh Jember is influenced by income expectations, family environment and entrepreneurship education. While the remaining 14.3% is influenced by other variables outside the model or equation, such as psychology, lifestyle and others.

Discussion
Based on the test results statistically it can be clearly seen that partially, all independent variables affect the dependent variable. The influence given by the four independent variables is positive, meaning that the higher the income expectations, family environment and entrepreneurship education, the interest in entrepreneurship will increase. These results are consistent with the proposed hypothesis. The results of this study are also in accordance with the results of previous studies. The explanation of each variable effect is explained as follows:

a. The results of hypothesis testing have proven that there is a significant influence of income expectations on entrepreneurial interest. Through the results of calculations that have been made obtained a significance level of 0.019 smaller than 0.05 which means the hypothesis is accepted. This statistical test proves that the higher the expectations of student income will further increase the interest in entrepreneurship in students of Office Administration Education Medan State University. This result is also supported by research conducted by Suhartini [18] which proves that income has a significant positive effect on student interest in entrepreneurship.

b. The results of hypothesis testing have proven that there is a significant influence of the family environment on entrepreneurial interest. Through the calculation results that have been done obtained a significance level of 0.004 and smaller than 0.05 which means the hypothesis is accepted. This statistical test proves that the greater the support of the family will increase the interest in entrepreneurship in Office Administration Education Medan State University. These results support previous research by Putra [19] and Suhartini [18] which show that the family environment has a significant positive effect on student entrepreneurial interest.

c. The results of hypothesis testing have proven the influence of entrepreneurship education on entrepreneurial interest. Through the results of calculations that have been made obtained a significance level of 0.000 and smaller than 0.05 which means the hypothesis is accepted. This statistical test proves that the higher the level of students' understanding of entrepreneurship will increase the interest of entrepreneurship in students at the Medan State University Office of Administrative Education. The results of this study support previous research, namely research conducted by Hermina, et al and Suhartini [18] which prove that entrepreneurship education has a significant positive effect on student interest in entrepreneurship.

d. The results of hypothesis testing have proven there is a significant effect of simultaneous income expectations, family environment and entrepreneurship education on entrepreneurial interest. Through the results of calculations that have been made obtained a significance level of 0.000 and smaller than 0.05 which means the hypothesis is accepted. This statistical test proves that if students have high expectations about income earned by entrepreneurship, where students have a good understanding of entrepreneurship and the family provides support, it will lead to an increase in entrepreneurship interest in students at the Medan State University Office of Administrative Education.
4. Conclusions and Suggestions

Conclusion
From the statistical tests that have been carried out, the following conclusions can be drawn:

a. Hypothesis Testing Results have proven that there is a positive and significant effect on income expectations on interest in entrepreneurship partially. This means that the higher income expectations will have an impact on the increasing interest in entrepreneurship.

b. Hypothesis Testing Results have proven that there is a positive and significant influence of the family environment on the interest in entrepreneurship partially. This means that the greater support given by the family will have an impact on the increasing interest in entrepreneurship.

c. Hypothesis Testing Results have proven that there is a positive and significant influence on entrepreneurship education on the interest in entrepreneurship partially. This means more students understanding about entrepreneurship will have an impact on the increasing interest in entrepreneurship.

d. Hypothesis Testing Results have proven there is a positive and significant effect on income expectations, family environment and sales entrepreneurship education on the interests of entrepreneurship simultaneously. This means that the better income expectations, family environment and entrepreneurship education will have an impact on the increasing interest in entrepreneurship.

Suggestions
Based on the results of the study there are several suggestions that can be given to interested parties. These suggestions are as follows:

a. For Other Researchers
Referring to the limitations of the study, suggestions that can be given include: The next researcher is expected to increase the number of respondents so that the results of the study can be more accurate or represent the population, and the researcher can then add or replace the independent variables in this study with other variables considered also has an influence on purchasing decisions.

b. For the University
Policy holders such as the Dean of the Faculty of Economics, heads of departments, as well as lecturers in entrepreneurship courses need to improve student entrepreneurship competencies through courses and ongoing workshop programs. In addition, the university can also provide a forum in the form of organizations or Student Activity Units (UKM) for business students to continuously share about entrepreneurial experiences so as to create connections between business students.

5 References


Design of Tortor Revitalization As A Learning Model for Batak Toba

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Abstract. The purpose of this study is to revitalize the Toba Batak tortor in traditional activities in the life of the Batak community, which makes tortor as a medium of expression of gratitude, respect, affection, which is carried out with structured movements as messengers. Tortor is a dance in Indonesian that reflects the lives of the Toba Batak people, who are slowly being abandoned by their owners for various reasons. This research is also motivated by the lack of accurate documentation in the form of writing, video, and other forms of documentation, so that in an effort to familiarize the art, inheritance is carried out through revitalization of tortor. Based on this, relating to the learning of ethnic dance custom torture revitalization activities are used as a model of learning media development. Tortor learning is done by developing Adobe Flass digital media as a tool for the process of transferring knowledge, through the revitalization of tortor as a learning model. This research is a developmental study using descriptive analysis method with a qualitative form, by means of observation, interviews, and documents. From the data that has been collected, data analysis is then carried out in stages; data reduction, data display, and conclusion drawing. To obtain valid data, the data validity test is done using a triangulation model, and the learning media validation through media validation and material validation.

Keyword: Tortor, Toba Batak, Revitalization,

1 Introduction

The progress of the times that is developing at this time causes the local traditions and culture of its existence to begin to change from its original form. They prefer the demands of the times by prioritizing demands rather than inherent culture. Truly the culture that already exists. is a culture that is very compatible with the nation's personality. Forms of outside culture become a spectacle of the young generation with all kinds of patterns, without thinking about the impact. Handling should be carried out in a hurry to restrain culture that is not in accordance with the norms in Indonesia, by introducing the culture of the region itself in the introduction of the introduction process.

Tortor is an art of the Toba Batak tribe that is currently being abandoned by its owner. Many factors cause this to happen such as; the next generation no longer cares about its culture, references to Batak art that are not well publicized. Many studios teach tortors and develop them in the form of Batak dance creations that are displayed in various activities. But the work produced is not always as expected, even sometimes damaging the order, the arrangement that applies in a group of people. This problem arises due to the lack of
information to invite the testator to preserve art forms, both in performances and in learning and documentation that is absolutely supposed to be done.

So far, the inheritance of traditional arts has only been aimed at mastering motion material without being equipped with an understanding of the meaning in dance. Finally in the development process, many choreographers develop without thinking about how the forms already exist in the format they should. If this is left unchecked, it is not impossible that one day the structure of the original form of a traditional dance work will be lost, and the development will be limited to an order that will further eliminate its traditionalism.

One of the efforts to strengthen and preserve tortor is one of them through learning by making it as a learning resource, which in turn can strengthen understanding for tortor mastery. Judistira [1] explains that local culture is not only revealed from the form and expression of a sense of beauty through mere art; but includes all forms, and ways of behaving, acting, and mind patterns that are far behind what appears. Thus the effort to raise again with the aim of introducing tortor, will be conveyed properly, and learning objectives will be achieved according to competence.

As a high cultural value and cultural heritage, tortor certainly must be maintained and developed, by observing the Toba Batak tortor as a traditional dance that deserves to be inherited, so there is a need for new methods in transferring knowledge. Several stages must be carried out in an effort to preserve the cultural heritage, ranging from controlling, inventory and documentation, introduction, to its development.

Seeing the above problems, improvement is needed in providing an understanding of the basis mastered by dancers, so this research is important to be carried out in order to examine what strategic steps can be taken in preserving traditional art forms, so that through this research it is hoped that inheritance of the Toba Batak Tortor can done through revitalization.

Revitalization is a process or method and act to revive something that has previously been lost and to revive any program of activities. In general these activities are efforts to make something important and very necessary. Indonesia is a nation that is famous for its cultural diversity. Therefore, it is appropriate that all levels of society pay attention to playing an active role and participating in efforts to preserve the nation's culture. Culture is the result of human creativity, initiative, and work in the form of science and norms such as the norm of beauty that then produces various kinds of arts.

This study aims to reveal in depth about the forms of traditional ceremonies that include tortor as part of its implementation in general, and specifically aims to revitalize tortor in the traditional ceremonies of the Toba Batak people.

Ediwar [2] explains the art of rapa’i that began to be abandoned after the Tsunami, so that strategic steps are needed to maintain its continuity. For this reason, an understanding of this culture is needed, that rapa’i is a type of Islamic nuanced art that is loaded with religious, cultural, social, beauty and educational values. This art is used as a medium for da’wah and acculturation with local culture. The meaning of expressive symbols of art and religion gives rise to the robustness of the values of Islamic cultural and religious spirituality. Collaboration of music, dance and literature is a special feature that has made rapa’i art as a cultural identity of Aceh. Therefore, rapa’i art must be re-manifested in various activities to return this art to its owner.

Marsudi’s [3] explained that the shift of traditional culture to digital culture, based on the abandonment of art and traditional culture by the student. It is in an effort to enhance students' appreciative attitudes towards local art works by developing learning media. One of them is the making of digital learning media through the use of poor mask craft for learning arts and culture at the junior high level. From the results of this study, it is known that the use of digital
media with attractive display is very helpful for students in understanding and appreciating the culture of the local area. This study serves as a guideline for researchers to analyze regional art as a source in the preparation of digital media in Tortor learning.

Furthermore Awaludin Muin [4] explains that, the role of interactive multimedia increasingly plays a very important role in the field of education in line with the growth of the use of multimedia to facilitate the learning process. The ability is to design appropriate interactive multimedia, integrating with Microsoft Office PowerPoint 2007. Learning art and culture in elementary schools requires new media and methods so students are motivated to learn. Through interactive multimedia learning in elementary schools is expected to increase student motivation. The results of this study can help researchers in designing learning media.

The reference above becomes a reference for researchers, to see how the traditional arts are slowly abandoned by their owners, so that re-appointment of these arts is needed. By revitalizing, it is hoped that culture can be brought back to its owner, by making it a source of learning.

2 Research Method

This research uses descriptive qualitative method by describing the importance of revitalizing local culture in learning the Toba Batak Dance Technique. Sugiyono [5] states that in qualitative research, the research instrument is the researcher himself. In this study, researchers participated directly in the field so that after making observations, researchers can find clear problems and obtain detailed research reports. The study was conducted using several stages, from the collection of library study data, observations and interviews which were then inventoried, and identified for later processing and analysis based on qualitative methods, as material in finding answers to problems.

The qualitative approach used aims to describe the concept of the Toba Batak community placing Tortor in their various activities. To obtain accurate data and information in this study, field research was conducted through interviews with resource persons who can provide information. This descriptive method is used in analyzing the structure of the Toba Batak tortor in the Toba Batak community. Research sites were carried out in a number of Batak Toba areas such as Humbang Hasundutasn, Samosir, Parapat, Medan, Medan City and Unimed Dance Education Study Program.

3 Results and Discussion

The discussion on tortor revitalization research is presented based on the results of preliminary studies and development results. The presentations are carried out in a structured manner: (1) Study of the existence of tortors in various traditional ceremonies, analysis of the need for teaching materials in the form of a tortor documentary film; (2) The results of the development will be in the form of preparation of teaching materials by the documentary tortor documentary media.

a. Tortor

For Batak people Tortor (dance) is not just a mere movement, but a tortor, is part of a traditional rite symbolically driven. Tortor is based on the philosophy of life of the Batak
people. Literally, tortor means human body movements that are carried out regularly, become a habit and are recognized and supported. Tortor movements have patterns, are arranged according to customary rules, and have beauty and religious meanings.

At first tortor was related to animistic beliefs to bring magical power, which served to worship the gods, which came to be known as dance parts of art from the Toba Batak culture, and eventually became a tradition to the community because it was carried out in various activities. Tortor is still used in traditional parties, and has its own role for each of its support groups. Therefore tortor becomes a media to maintain and maintain the continuity of the social system. This function can be seen in traditional ceremonies, social interactions in the community, and social interactions that occur during the manortor (dancing).

b. Tortor in the Life of the Toba Batak People

In the Batak Toba traditional ceremony, there is an activity called "Margondang" in which it contains elements of dance and music. In the Batak proverb it also says "he was a gondang in siadong tortor" (where there is a gondang that tortor is heard). The close relationship between the gondang and tortor becomes a reference in the connection of each element involved in the ceremony, so that they are always there.

c. Tortor in Indigenous Upacar

Tortor for the Batak people is not just an artistic activity, but the inclusion of tortor is an obligation in the life of customs and traditions in the dadap na tolu system (kinship system). In its presentation, tortor is divided into two types, namely 1) Hatopan tortor and 2) Hapunjungan Tortor. Hatopan tortor is a form of general dance (no specialization) or custom. Participants in the event may dance (manortor), by doing simultaneous movements, such as totor hatopan ni suhut (general dance suhut) or tortor hatopan ni boru (general dance of the boru party). Sebalinya, Hapunjungan Tortor is a special dance, where not all participants in traditional events may be manortor. Due to the presentation for a particular purpose according to the ceremony or events Margondang.

Horja or work on traditional activities, including gondang and tortor. They do it in a position of position in Dalihan na tolu, which is shown in posture, hand movements and position with whom the manortor. The attitude of the dancer's body appears when two different elements meet (facing each other), for example hula-hula with borunya, or two people who have the same traditional position meet, for example suhut with dongan body. Even this posture supports the movement of the hands and the height of the hands in front of the dancers. The pattern of hand movements is the dominant movement and is the easiest to show one's position in the dancing together in horja.

d. Tortor in Entertainment Shows

At the entertainment program, tortor is also one of the materials included. Wherever the Batak people reside, they will include a tortor and participate in the manortor as an identity that has been carried out for generations. So there is a saying that says:

"And tartangishon, tumagonma tinortor hon" means that if there is a problem that we are unable to cry about, we better just dance (manortor).

So the Batak people entertain themselves by doing tortor, so that if the Batak people hear the gondang sound, consciously or not, they will irregularly manortor. In entertainment activities, even these tortors are often served or displayed to entertain tourists or for other entertainment activities. Aside from being a social entertainment, tortor presentation is conducted in competitions to celebrate anniversary or anniversary activities in several districts.
Toba Samosir Regency, North Tapanuli Regency, Humbang Hasundutan Regency, and Samosir Regency), which have become the government agenda. The presentation of tortor is also an effort to involve the government in preserving Toba Batak culture through tortor presentation.

e. Stage of Development of Teaching Materials

The development of tortor teaching materials is done based on needs analysis by conducting interviews with samples to find out knowledge about tortors, resource persons (traditional figures, artists) experts in Batak and tortor culture. Then collect reference sources for the development of Toba Batak cultural teaching materials. Furthermore, conducting field research by compiling concept maps of teaching materials such as (a) grouping of tortors in sharing Batak Toba traditional activities, (b) linking field data and references in teaching material materials, (c) interpreting teaching material resources, (d) making synopsis of materials teaching, and (e) making a Toba Batak tortor board story.

The preparation of teaching materials is packaged in the form of (1) material introduction and understanding of the material, (b) film design including elements of the design, story board, and, (c) preparation based on learning objectives. The implementation is carried out based on the analysis of learning objectives, and the preparation of teaching materials. Followed at the trial stage the draft teaching material includes (a) identifying and classifying tortors in traditional activities through film and narrative texts and discussions; (b) mastery of teaching materials from the documentary film tortor and narration; (c) determine methods and media; (d) preparation of draft development of works based on teaching materials.

At the learning stage of the Toba Batak tortor, assessment is based on theoretical and practical understanding through creativity in developing traditional culture. Practical understanding is demonstrated through the ability to demonstrate / demonstrate the work of development. Understanding the theory is seen from the mastery of the task of recognizing Batak culture, mini research as a scientific competency that must be owned.

4 Conclusion

Presentation of Tortor which is currently quite rapidly developing, both in the form of traditional and in the form of reconstruction and revitalization of Toba Batak artists, was developed through art galleries and arts education institutions such as Pedan State University which has three study programs, namely Music Education, Education Dance and Performing Arts. Descriptions of tortor performances by art galleries both in the Batak tribal area and outside have been disseminated through Youtube media in various development models. The writer's hope for artists and creators of Toba Batak art in carrying out reconstruction and revitalization should not change.

5 References

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Porter's Five Forces Model Competition as a Framework for Determining the Competitive Strategy of State University

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Abstract. This study aims to evaluate organizational performance in order to improve competitiveness. This research is a case study at Universitas Negeri Medan, Indonesia. Data collection was carried out by analyzing performance in services, organizations and human resources, finance, and infrastructure. Data was collected from the management level of universities, faculties, and bureaus. Data were analyzed using SWOT analysis, which integrated the Porter's Five Forces Model Competition. The results showed that the margin on the strength component was 1.165, weakness was - 0.069, the opportunity was 0.220, and the threat component was 0.195. It was concluded that the position of Unimed's competitiveness are improving the quality of human resources, improving the quality of study programs, increasing research and innovation, increase the relevance of graduates, and increase vocational education.

Keywords: Porter's five forces model of competition, Competitiveness strategy

1 Introduction

Higher education institutions in Indonesia have the main task of providing education, research, and community service. In the disruptive era, universities were required not only to have the resilience of human resources (lecturers and staff), assets, curriculum, infrastructure, and financial facilities as stipulated in the National Higher Education Standards (SNPT) but also open-oriented management and adaptability to the internal environment and external environment. Colquitt states that adaptability is part of task performance [1]. A college is required not only to perform well, which indicates strength but also must be able to adjust to its environment. Thompson, Peteraf, Gamble, Strickland states that an organization's macro environment includes economic conditions, socio-cultural forces, technological factors, environmental processes, legal/ regulatory factors, and political factors. The implications of various external factors lead to intense competition between institutions or human resources [2].

In the era of completely disruptive and competitive requires universities to have competitive advantages that are not always oriented to non-profit organizations but must also gradually be industry-oriented in managing resources and developing their organizations. Competitive advantage is the core of strategic management, which is defined as everything
that can be done much better by a company when compared to rival companies [3]. Companies in this context can also be illustrated as a college. When a company can do something that cannot be made by a rival company or has something that a rival company wants, it can represent a competitive advantage. To achieve a cooperative advantage, universities need a strategy. The strategy is the set of actions that managers take to outperform the company’s competitors and achieve superior profitability. Strategy means making clear-cut choices about how to compete [2]. Another definition of strategy is stated by Markides [2], namely that strategy is all about combining choices of what to do and what not to do into a system that creates the requisite fit between what the environment needs and what the company does.

Achieving competitive advantage will explain the company's competitive position, and can also explain the company's success or failure position. A company can maintain a competitive advantage by continuously adapting to changes in trends and external activities and capabilities, competencies, and internal resources and by effectively formulating strategies that reinforce these factors. The competitive advantage growth strategy starts from the organization's value and services offered and can be obtained by consumers from higher education institutions after providing fees to obtain these services. Conceptually and implicitly, the services follow the pattern of industrial structure by the mandate and main tasks of higher education functions regulated in the organization of work procedures and statutes as basic rules. The structure of the tertiary industry structure is services in the form of academic services, research and community service, and general administration and finance by exploring factor suppliers, potential entrants, substitutes, and buyers as well as rivalry among similar service providers internally.

The concept of strategic management explains that competitive advantage that indicates a company's competitiveness starts from the declaration of the institutional normative aspects of vision and mission, conducts a self-evaluation report to describe internal strengths and weaknesses as well as external opportunities and threats, develops long-term goals, sets strategy and implementation policies [3]. Vision is a far-sighted future, where and how the company must be taken and work to remain consistent and can exist, anticipatory, innovative, and productive. Vision closely with the question, "what do we want to be?". A mission statement is a statement of purpose that clearly distinguishes one business from other similar companies. Mission related to something that must be carried out or carried out by the company according to the vision set so that organizational goals can be implemented and succeed. External opportunities and threats refer to various economic, social, cultural, demographic, environmental, political, legal, governance, technological and competitive events and events that can significantly benefit or harm an organization in the future and are outside the company's control. Strengths and weaknesses refer to the company's internal conditions in maintaining a competitive advantage. Strengths and weaknesses are controlled activities of an organization that is able to run very well or poorly. Identifying and evaluating organizational strengths and weaknesses in the functional areas of a business is an essential strategic management activity.

Mechanisms to analyze the strengths-weaknesses-opportunities-threats can be done by self-evaluation. Self Evaluation is defined as a systematic effort to collect, sort, and process valid data and information from which facts can be drawn that can be used to take managerial actions to sustain the implementation of an institution or program [4]. Self Evaluation is one of the strategic planning models that definitively is "a systematic process for managing the organizations and its future direction in relation to its environment and the demands of external stakeholders, including strategy formulation, analysis of agency strengths and
Weaknesses, identification of agencies stakeholders, implementation of strategic actions, and issue management" [5]. Strategic planning is a result-oriented process to be achieved throughout 1 (one) to 5 (five) years systematically and continuously by calculating the potential, opportunity, and obstacles that exist or may arise [5].

To find out the competitive advantage, the organization needs performance evaluation, which must be conducted periodically and requires performance management. Armstrong [1] states that performance management focuses on five aspects, namely concern with outputs, concern with measurement and review ("If you can't measure it, you can't manage it"), concern with continuous improvement, concern with continuous development, concern with communication, concern with stakeholders and concern with fairness and transparency. Performance measurement becomes very clear of its role and function in ensuring the success of the organization.

Performance can be interpreted as output or work results or quantitative work achievement of a set of objectives. In reality, performance is not only a matter of the outcome of one's achievement of certain objectives that can be observed but also related to the process of how people achieve those goals. Thus the performance is about what is done and how to do it [6]. The interpretation that performance is a work relevant to the statement that "performance means both behavior and result. Behavior emanates from the performer and transform performance from abstraction to action. Not just the instrument of the result, behaviors are also outcomes in their right-the product of mental and physical effort applied to tasks and can be judged apart of the result. Performance can also be interpreted as the value of the set of employee behaviors that contribute, either positively or negatively, to organizational goal accomplishment. This definition of job performance includes behaviors that are within the control of employees, but it places a boundary on which behaviors are (and are not) relevant to job performance [1]. The statement implies that performance is a set of values of employee behavior, both positive and negative that will affect the achievement of organizational goals. The definition of performance includes behavior that controls the employee itself, but the behavior limits the behavior that is both relevant and not relevant to the job. Possible performance results consist of three conditions, namely lower, by or exceeding the set targets. A series of corrective actions (feedback) based on these performance results can be carried out for improvement and on the other hand targets that have been reached or exceeded can be institutionalized as a "best practice" that can be utilized in policy making in the context of "Continuous Quality Improvement" (CQI) organizations that are not can only have implications for improving organizational performance but can also increase the work satisfaction of human resources within the organization. CQI is one of the four pillars of quality consisting of serving the customers, continuous improvement, managing with facts, respect for people [7].

One analytic mechanism to maintain competitive advantage is to use The Five Forces Model of Competition and emphasizes an organization's competitive analysis to ensure organizational sustainability that emphasizes analysis suppliers, potential entrants, substitutes, and buyers [3,8]. Analysis of competition, according to Porter, when translated includes competition between competing companies in which to be able to exist and develop, the company must be able to provide a comparative and comparative advantage compared to other companies. Second, the potential entry of new competitors (potential entrants) is intended for early warning for a company due to the ease of entry of new companies in similar businesses which results in tight competition both horizontally (with companies that have long been competitors) and vertically (with new competing companies). Third, the potential development of substitute products (substitutes) is defined as a survival and development
strategy if there are producers of substitute products that are cheaper with no significant difference in quality. Fourth, the bargaining power of suppliers (suppliers), which can affect the intensity of competition in an industry in situations and conditions, there are a large number of suppliers or when the transition to other raw materials is very high. Finally, the bargaining power of consumers (buyers), which in principle, is the main force affecting the intensity of competition in an industry.

Fig. 1. Forces Driving Industry Competition [8]

In the context of higher education, the five factors driving competition can be translated into factors for newcomers to both the internal and external environment. The supplier factor indicates the supply of good policies, regulations, information, skills, and knowledge obtained from institutions or individuals. Buyers are analogous to users of educational services and other services offered by tertiary institutions. The buyer's position has a bargaining position that must be carefully calculated by universities. Substitution products are substitute products with the same and different tasks and functions. Inter-competitor factors can be interpreted by private or public universities that have the same mandate and task functions as Unimed. Although The Five Forces Model of Competition is industry-oriented conceptually, it can also be applied to universities considering the formulation of competitive strategies using the principles of strategic management and strategic planning and internal and external analysis based on self-evaluation. To be more effective, then Porter’s Five Forces Competition can be integrated with one management tool, namely SWOT analysis [3].

The last year of the implementation of the Strategic Plan of Universitas Negeri Medan 2015-2019, Indonesia (abbreviated as Unimed) has produced various performance achievements that indicate the realization of the vision and implementation of Unimed's mission [9]. Some of the outstanding performances obtained by Unimed are the ranks of Unimed Higher Education Institution Accreditation including superior rank (Score A), Study Programs have been accredited with A as many as 33 study programs (52.38%), rank 25 ranking of Indonesian Universities in 2018 from 4,200 public and private tertiary institutions, Unimed Digital Library accredited A, Research Institute Performance is ranked First, Second best in public services in 2019 and on November 20 this Unimed will also receive an award as an institution with public information service disclosure in the category of Informative Enough. Even though some achievements have been obtained, if it is associated with the 2019
Key Performance Indicator (KPI) targets, there are still several performance indicators that have not been achieved [10].

Performance evaluation related to the ranking of universities by the Indonesian Ministry of Education and Culture published in the second quarter of 2019. Unimed was ranked 50th of 4,200 universities. The position is far below the target set in the 2019 Performance Agreement, which is ranked 22. Student performance is also not in the top 100. The ranking results require intensive study related to how the strategy so that the image and reputation and achievements of Unimed can be further improved so that the expected status A accreditation for the institutional level can be maintained, so that Unimed's performance can contribute to the achievement of the performance targets of the Indonesian Ministry of Education and Culture in the period 2020-2024.

Unimed resource management requires budget allocations whose acquisition should ideally be able to optimize all potential assets. The status of the Public Service Agency provided to Unimed since 2018 provides flexibility in the management of human, financial, and asset resources. The implication is the opportunity to increase revenue to improve services, not only from Single Tuition but from other efforts in the context of income generation. Many efforts are needed to arrive at the increased income position, one of which is the determination of service rates, both academic and academic support. The service tariffs in order to be competitive must be compared with rates from other universities so that they are by the purchasing power of the community.

The new aspect in determining the tariff components certainly requires another strategy in making tariff policies at Unimed that must consider equality, people's purchasing power, and the principle of justice. The tariff policy requires an accurate analysis of the tariff contestation of education providers of other institutions. The alternative can use The Five Forces Model of Competition [8], which considers threats from suppliers, buyers, product substitutes, new entrants, and rivalry between similar service providers with an industrial structure approach. There is a concept fit between Porter's model and the essence of a Business Services-oriented Public Service Agency, even for non-profit organizations such as universities that still have to prioritize social responsibility. Rates that have implications for the rise and fall of Unimed's budget are not everything, but even the concept of strategic planning has shifted its paradigm from input-based to activity-based and even outcome-based, but it turns out that it still positions the input budget for program and activity implementation.

Unimed performance measurement is carried out every year by compiling a Performance Report based on the Minister of Technology and Higher Education Regulation No. 51/2016 [11]. The analysis of the 2018 Performance Report shows that in-depth analysis has not been done related to the internal and external environment that can affect competitive advantage as a parameter of competitiveness. The year-end report is limited to analyzing the comparison of targets versus the realization of the Key Performance Indicator (KPI) that has been set and the budget absorption in the year concerned. Considering Unimed's performance position, which still needs improvement, especially in entering the Fourth National Medium-Term Development Plan (2020-2024), a strategy is needed to maintain Unimed's competitive advantage.

Analysis of the 2018 Unimed Performance Report which has not yet described in depth the strengths and weaknesses of the internal environment as well as various opportunities and threats from the external environment must be immediately revised by conducting a deeper self-evaluation, followed by using one of the management tools namely SWOT [3,12]. Due to the financial management status of Unimed, which has changed to become a public service agency, the SWOT analysis can be integrated with the Five Forces Model of Competition [8].
Based on identification related to Unimed's performance, this study aims to provide an alternative measurement of performance of the Universitas Negeri Medan (Unimed) using The Five Forces Model Competition combined with SWOT analysis on aspects of company strengths and weaknesses, personal values of key implementation, industry opportunities and breathing, broader social expectations and an emphasis on analysis suppliers, potential entrants, substitutes and buyers [8] integrated with Unimed's business process as a university that is a Public Service Agency. The results of this study are expected to be used as an alternative in the preparation of the 2020-2024 Unimed Strategic Plan, especially in setting strategic goals, Key Performance Indicators, policy directions, strategies, and priority outputs in order to maintain competitiveness.

2 Research Method

This research is a case study at Universitas Negeri Medan (Unimed), Indonesia. Data collection was carried out by analyzing performance in services, organizations and human resources, finance, and infrastructure. Data was collected from the management level of universities, faculties, and bureaus. The data obtained includes performance in academics and student affairs, research and community service, resources: human, curriculum, assets, finance, governance organizations, and management of the Unimed Public Service Board. Data is described and analyzed using the principle of Self Evaluation Report [5], which is one of the strategic management mechanisms [3]. The next stage of data analysis is to use the Porter's Five Forces Model Competition (focus on the analysis of supplier components, potential entrants, substitutes, and buyers) and proceed with a SWOT analysis [8,12]. The results of the SWOT analysis are then used to design policies, priority programs, and Key Performance Indicators [13]. It is expected that all research results will be able to contribute to the process of preparing the Strategic Plan of Universitas Negeri Medan for the period 2020-2024.

3 Result and Discussion

The first stage of using the Porter's Five Forces Model Competition is to identify various parties and aspects, both internal and external, which can be used as indicators that are suspected to affect the competitiveness of a university. Indicators analyzed are related to input, process, output, and outcome. Porter [8] has defined five components that must be identified, which consist of suppliers, potential entrants, substitutes, rivalries, and buyers. The indicators and descriptors then determine the five components. The results of the indicator-descriptor analysis are then used as a framework for the self-evaluation report. Francis and Martin [6] have adopted the Porter industry structure and created a threat paradigm in the organization of higher education. In the Suppliers component, the analysis is emphasized on faculty, administrators, and part-time faculty. The buyer component analysis includes students, parents, industry. In the potential components entrants, the analysis includes new institutions, international institutions, duplicates from existing players. In the substitute component analysis includes online degrees universities, new for-profit offering, corporate training and seminars, corporate universities and distance, open and e-learning. And on the rivalry components among competing sellers or between competitors, the analysis is emphasized on rivalry among higher education institutions.
New entrant, according to Porter [8], is a new competitor industry with similar products to the incumbent industry and entering the market share that has been made the incumbent industry target. Bargaining position, as well as threats to the Potential Entrant component (newcomers), arise and can affect the existence of the incumbent college. The new comers are both public and private colleges from within and outside the country. Anand in Francis and Martin [14] mentions the ease of regulation from the government that drives these situations and conditions. King in Francis and Martin [14] The reputation of the incumbent higher education, especially those with state tertiary status, is relatively difficult to compete with, because there is consistent financial support from the government, also due to the "protection" of accreditation status as an indicator of the quality of accreditation bodies.

The potential entry of new competitors to existing university depends on two factors, namely investment or capital and economic factors, especially related to the ability of higher education organizations to increase productivity and the ability to reduce the average cost of production more efficiently by maximizing the use of resources. Although investment factors that require large capital, due to the development of technological advancements, including information technology, allow the capital barriers to be reduced, an example is an innovation that utilizes information technology for distance learning so that a replica of the learning experience can be presented to students at a relatively low cost.

The resistance of prospective students as buyers of new tertiary institutions is also an inhibiting factor for new tertiary institutions to compete with incumbent tertiary institutions that have relatively reputable ones. The good side is that with the presence of new tertiary institutions, the number of education service providers is growing, and competition is increasing. The competition will have an impact on efficiency, better service quality, more innovation, and more choices for consumers. Pringle and Huisman, 2011 in Francis and Martin [14] said that competition between universities could also have implications for reducing service rates. Although there are many choices, prospective students generally prefer to get an academic degree from a reputable college, because it tends to increase opportunities for employment.

Supplier component, according to Porter [8], is an organization or individual that provides knowledge, information, or materials so that the production process can be carried out, and the product is produced according to market demand. In higher education, the intended supplier/supplier is human resources, both lecturers and employees with the level of education they have said Pringle and Huisman, 2011 in Francis and Martin [14]. Institutions or universities that have graduated human resources are included in the supplier category. Due to the necessity to improve their competence and skills, the institution or university which is used as a place to attend training/ non-degree training is also included in the supplier category. Supply of information from the internet or other sources, such as libraries, reputable national and international journals, and various sources of information from government or non-government institutions, both domestic and foreign, also include the supplier category. Facilitation from the government in the form of regulations, policies, banking institutions that can improve the quality and quantity of management can be categorized as suppliers [15].

The buyer component, according to Porter [8], is the consumer buyer of industrial products. The bargaining position of buyers increases due to the increased sensitivity to the price offered by a product. The bargaining position of buyers can be influenced by the quality of standardized products or not, and the existence of clarity of information about products that include quality and price [2]. Industry structure Porters related to buyers in tertiary institutions
are prospective students and their parents and users of graduates such as business and industry. The quality of service and reputation of higher education institutions informed to the public can increase the strength of prospective students in choosing higher education institutions because they have comparative information said Pringle and Huisman, 2011 in Francis and Martin [14]. Rondonuwu [15] states that the buyer will consider the contribution of higher education to the user environment. This is measured by several criteria, for example, how universities can produce lecturers who can not only contribute to their study programs but also at the faculty, university, or another institution level, both government and private, as long as they do not interfere with their main tasks.

Substitute components, according to Porter [8], are substitute products that perform the same function in different ways. The tendency of consumers will turn to substitute products if they can see the comparability, especially in terms of quality, performance, lower prices, and other relevant attributes, such as availability and attractive prices [2]. In higher education, the potential threat of substitute components includes online degrees universities, new for-profit offers, corporate training and seminars, corporate universities and distance, open and e-learning [14]. The threat of substitutes can be viewed from three attributes, such as time, criteria, and application, with time being the most important product that makes students look for a substitute product. To improve the actuality and existence of education, the university's policy of giving autonomy to faculties to open new study programs, organizing seminars, training is in the substitute category because it provides alternative products besides its regular products, such as producing diplomas, scholars, masters or doctors. Various technical service unit functions, namely language center, counseling, library, archives, career and entrepreneurship center, as well as the role of research and community service institutions or quality assurance institutions that produce a variety of services and superior products are also included in the category of substitute because it complements regular university products, namely graduates. Various works of lecturers that contribute to personal, community, government, the world of science, the world of industry, and students are also included in the substitute category based on the perspective of the Porter industry structure [15].

The last component of Porter [8] is rivalry among competing sellers. Some of the factors driving rivalry that can increase and be stronger are: (a) if buyer demand is slow-growing, (b) similar inter-industry products do not show the difference, (c) rivals have more diversified, strategic and original goals [2]. Competition among competitors can also be caused by price discounts, new product introductions, advertisements, and increased service quality [8,14]. The rivalry between sellers in the structure of the industry in the context of higher education [6] translates to the rivalry which can be categorized into two, namely personal, and this occurs between students, lecturers and employees, and institutions, namely between universities high. The indicator of competition by the Ministry of Research and Technology since 2016 is realized in the ranking of universities. Other university competition is ranking performance both in the fields of student affairs, finance, assets, and bureaucratic reform. Competition indicators can also be analyzed from accreditation both at the institutional level and study programs issued by the National Board of Accreditation. Based on the analysis of self-evaluation related to the external environment, opportunities, and threats that have the potential to affect Unimed's competitive advantage and competitiveness can be identified. Conclusions of the external environment analysis are presented in table 1.
### Table 1. Analysis of External Environment

<table>
<thead>
<tr>
<th>Opportunities</th>
<th>Threats</th>
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<tr>
<td>a. Service: (1) Regulations on career development concerning teachers and</td>
<td>a. Services: (1) The dynamics and integration of</td>
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<tr>
<td>lecturers, (2) Regulations on Teacher Professional Education, (3) Regulations</td>
<td>regulations in the fields of academic, research</td>
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<td>on Public Service Agencies that provide flexible and dynamic financial</td>
<td>and community service, accreditation, financial, integrated planning of</td>
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<td>management opportunities, (4) Regional autonomy policies provide opportunities</td>
<td>the Ministry of Education and Culture requires fast response (2)</td>
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<td>for cooperation with various (5) Industrial revolution 4.0, (6) Regulations</td>
<td>Free-market policies that enable</td>
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<td>on cooperation with foreign universities</td>
<td>foreign workers to compete in the labor</td>
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<tr>
<td>b. Finance: (1) Unimed has the status of a Public Service Agency, (2) There</td>
<td>market in Indonesia (3) Industry Revolution</td>
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<td>are regulations to increase income generation</td>
<td>4.0 which requires fast response and adaptation from all elements of the</td>
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<tr>
<td>c. Organization and Human Resources: (1) Opportunities for conducting</td>
<td>leadership, education staff, lecturers and students to be adaptive to</td>
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<td>business based on expertise, (2) Partnership with local governments to</td>
<td>changes (4) Competition of graduates to work as teachers</td>
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<td>improve the quality of human resources</td>
<td>(5) Limitations of teacher recruitment due to zero growth policies.</td>
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<td>d. Facilities and infrastructure: (1) Unimed has land and building assets,</td>
<td>b. Finance (1) Operational costs of education and research are likely to</td>
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<tr>
<td>(2) Availability of funding from the government</td>
<td>increase (2) Remuneration allocation of 40% of Unimed's revenue, (3)</td>
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<td></td>
<td>competition in service tariffs with other universities</td>
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<td></td>
<td>c. Organization and human resources: Lecturer recruitment is limited due</td>
</tr>
<tr>
<td></td>
<td>to the policy of zero growth.</td>
</tr>
<tr>
<td></td>
<td>d. Facilities and infrastructure (1) The development of equipment</td>
</tr>
<tr>
<td></td>
<td>technology for supporting learning is very fast in the era of RI 4.0</td>
</tr>
<tr>
<td></td>
<td>(2) Competition in facilities and infrastructure with other universities</td>
</tr>
</tbody>
</table>

### Table 2. Analysis of Internal Environment

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Service (1) Has a legal basis for the organization of governance and statutes (2)</td>
<td>a. Service (1) The number of study programs that have been accredited A</td>
</tr>
<tr>
<td>Have a regulation of Minimum Service Standards (3) Higher education accreditation A (4)</td>
<td>is still not on target (2) the lack of academic service SOPs (3) Management</td>
</tr>
<tr>
<td>Has 74 study programs with Diploma, Diploma, Masters and Doctoral levels. (5) Research</td>
<td>Information System for academic data has not been optimally integrated</td>
</tr>
<tr>
<td>funds have been available for 15% of Unimed income/year (6) Has an academic and student</td>
<td>(4) Tracer study data is not yet available about the number of graduates</td>
</tr>
<tr>
<td>management information system (7) Has 32 national accredited online journals (8) Applying</td>
<td>who have worked (5) Lack of numbers of scientific articles published in</td>
</tr>
<tr>
<td>Single Tuition (UKT) which has the principles of justice, equality, proportionality and</td>
<td>reputable international journals (7) Lack of number of Industrial prototypes</td>
</tr>
<tr>
<td>people’s purchasing power (9) Monitoring and evaluation of learning is done periodically</td>
<td>produced by lecturers (8) Lack of innovation products (9) There is still a</td>
</tr>
<tr>
<td>(10) Has a Student Activity Unit (UKM) in the areas of interest, talent and reasoning (11)</td>
<td>lack of competent and professional certified students (10) Lack of numbers</td>
</tr>
</tbody>
</table>
Based on an analysis of external factors that produce opportunity and threat data as well as an analysis of the internal environment that produces information about the strengths and weaknesses of Unimed, a SWOT analysis is carried out on aspects of services, finance, organization, and human resources, and infrastructure. The results of the SWOT analysis are presented in Table 3.

<table>
<thead>
<tr>
<th>Description</th>
<th>Strengths</th>
<th>Weaknesses</th>
<th>Opportunities</th>
<th>Threats</th>
</tr>
</thead>
<tbody>
<tr>
<td>Services Management</td>
<td>1,310</td>
<td>1,103</td>
<td>1,490</td>
<td>1,260</td>
</tr>
<tr>
<td>Finance Management</td>
<td>1,85</td>
<td>0,800</td>
<td>1,250</td>
<td>1,025</td>
</tr>
<tr>
<td>Organization and Human Resource</td>
<td>0,920</td>
<td>0,680</td>
<td>0,800</td>
<td>0,800</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>0,860</td>
<td>0,600</td>
<td>0,950</td>
<td>0,600</td>
</tr>
<tr>
<td>Total</td>
<td>4,940</td>
<td>3,183</td>
<td>4,490</td>
<td>3,685</td>
</tr>
</tbody>
</table>

Note: Strengths – Weaknesses = 1.76 and Opportunities – Threats = 0.805

Based on Table 3, if the total strength results are reduced by weaknesses and the total opportunities reduced by threats, and the results are mapped on the Cartesian axis divided into four quadrants (I to IV), the coordinates are in quadrant I (one) and indicate that Unimed is in a position ready to grow and developing or position in favor of aggressive strategies. If the results of SWOT analysis of the Unimed's Strategic Plan 2015-2019 [9] are compared with the results of the SWOT analysis of this study (table 3), then Unimed's position will be known in the year of 2019 (Fig. 1)
The comparative SWOT analysis data in Figure 1 shows that Unimed's performance from 2015 to 2019 tends to increase. The margin for the Strength component has increased by 4.940-3.375 = 1.165. With Unimed's strengths in 2019, the weakness aspect can be reduced by -0.069 from 3.252 in 2015. Unimed's current position (2019) also opens opportunities for performance improvement that indicates Unimed's competitive advantage. Opportunities for the results of the SWOT analysis show an increase from 2015 of 0.220. It is considering the five forces model, Porter [8], the threat from the external environment increased by 0.195. Potential threats can come from potential entrants consisting of new educational institutions engaged in the provision of similar education, international institutions, or services from other educational institutions that duplicate the types of Unimed services.

In the Substitute component, potential threats can come from online degree universities, new for-profit offerings, training and seminar companies, corporate universities, and distance, open and e-learning [14]. Potential threats from the Industry competitors component among higher education are from other university graduates who have the mandate to produce teacher graduates. The potential threat from the buyer's component is mainly related to capacity compared to the interest of the people entering Unimed. The second factor is limited employment from the business world or the industrial world.

The ratio of Unimed lecturers and students is categorized as sufficient and therefore requires the addition of lecturers so that the categories increase to good categories. The addition of new lecturers with Master's qualifications and minimum competencies is very urgent. Moreover, the new lecturers must then be encouraged to continue their studies to doctoral level. Another alternative to increase the ratio of lecturers: students are to bring in guest lecturers with better qualifications, competencies, and experience to teach according to the curriculum requirements. Although contributing to increasing the ratio of lecturers: students, the potential internal threat from the addition of lecturers is to influence contestation in the selection of structural officials, filling committee positions, and the use of financial resources for academic activities, research, and community service due to increased human resources.

Another aspect that needs to be anticipated is the opening of new study programs, which are a response to the demands of the community and the business/industry world or due to the
mandate of the Ministry of Education and Culture of the Republic of Indonesia, which will increase the operational management budget. The existence of a private university that organizes the education of education staff with relatively lower tuition rates from Unimed is also another potential threat. Although the socialization and dissemination of information related to Unimed Single Tuition (UKT) have been carried out massively and continuously, there are still many people who do not understand the UKT concept. These conditions must be responded to properly. High school graduates benefit from the many options to continue their studies, and this will affect the interest in entering Unimed. Although the number of applicants to Unimed is always increasing every year, it needs to be examined whether these applicants are among the best graduates in their schools.

Regulation that changes dynamically is also a potential threat that requires a fast and measurable response. Various regulations in the fields of academics, research and community service, staffing, accreditation, finance, planning, monitoring and evaluation, reporting are always updated periodically and integrated online with various ministries. This condition requires a fast response from lecturers, staff, and all Unimed leaders. A quick response is needed in understanding, describing in Unimed's policy, and disseminating it to the entire academic community and implementing the regulation. A slow response to the dynamics of regulation will have an impact on the performance of individuals, groups, and organizations.

The next stage of SWOT analysis is to describe and analyze the strengths, weaknesses, opportunities, and threats components that have been identified through IFAS and EFAS using the Tows or SWOT matrix [12]. The correlational combination of IFAS and EFAS will produce 4 combinations consisting of: (a) SO Strategy: creating strategies that use strengths to take advantage of opportunities, (b) WO Strategy: creating strategies that minimize weaknesses to take advantage of opportunities, (c) ST Strategy: creating strategies that use strengths to overcome threats, and (d) WT strategies: create strategies that minimize weaknesses and avoid threats. The results of the SWOT analysis are then used to design policies, priority programs, and Key Performance Indicators [3,13]. Policy Directions, Strategies, and Priority Outputs for 2020-2024 resulting from the SWOT Matrix are described in Table 4.

<table>
<thead>
<tr>
<th>Policy Direction</th>
<th>Strategy</th>
<th>Priority Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increasing access and equity continue to study to Unimed</td>
<td>1. Increasing availability</td>
<td>1. New and existing study programs that match the needs of external stakeholders</td>
</tr>
<tr>
<td></td>
<td>2. Lecturers, technicians and laboratory assistants with qualifications and competencies that support the achievement of graduate competencies</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Infrastructure facilities that support increased capacity and improve the quality of learning</td>
<td>2. Increasing affordability</td>
</tr>
<tr>
<td></td>
<td>1. Bidik Misi Scholarships and other sources, especially CSR from business/industry, and scholarships from local governments and the North Sumatra Provincial Government</td>
<td></td>
</tr>
<tr>
<td>Policy Direction</td>
<td>Strategy</td>
<td>Priority Output</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Improving the quality of resources</td>
<td>1. Improving Human Resources: lecturers, technicians/laboratory assistants, and education staff</td>
<td>2. Percentage of UKT categories lowest ≥ 5%</td>
</tr>
<tr>
<td>and institutions</td>
<td></td>
<td>1. S3 scholarships for lecturers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Competent lecturers and technicians / laboratory assistants</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Allocation of ≥15% of funds for research and community service</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Intellectual Property Rights and online journals are accredited with sufficient funding allocation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Improving the quality of Unimed</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1. Accreditation of superior study programs (A)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Higher education accreditation (A)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Improving the quality of study programs</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1. Study programs that apply internal and external quality service standards</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. KKNI curriculum</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increasing the relevance of research</td>
<td>1. Increasing research and innovation</td>
<td></td>
</tr>
<tr>
<td>and development</td>
<td></td>
<td>1. Business startup and business incubator</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Business Management Agency that manages business innovation based on expertise</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Increasing the relevance of graduates</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1. Student skills, character, and entrepreneurial skills</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Improving vocational education</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Revitalization of vocational education: curriculum, human resources, assets and infrastructure, Professional Certification Institute</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The Strategic Plan for 2015-2019 of Unimed will end in December 2019. The year 2020 is the beginning of the 4th period of the Indonesian Mid-Term Development Plan (2020-2024). Based on the Minister of Research and Technology and Higher Education Regulation no. 51/2016 on the Accountability System of Government Agencies, all universities are required to draw up a Strategic Plan for the period 2020-2024. The policy directions, strategies, and priority outputs will be reported to the Rector of Universitas Negeri Medan (Unimed), Indonesia, and can be used as an alternative in preparing the Unimed Strategic Plan for the 2020-204 period.

Confirmation of the effectiveness of using The Five Forces Model of Competition was also stated by [17] by combining SWOT and The Five Forces Model in formulating marketing strategies to increase corporate profits. Miguel and Elena [18] used Porter's five forces to analyze the effectiveness of innovation, whether as an aspect of motivation or a hindrance to small industries to achieve competitive advantage. The conclusion of this research is that small industries must intensify innovation in facing competition with similar businesses. In different conditions, in semi-commercial organizations, Ichsan has also formulated management strategies using the five forces model to maximize the potential of zakat in society [19]. The Five Forces Model of Competition [8] is devoted to analyzing the strategic position and competitive advantage of the company; however, with the modification, the model is also relevant to be used for the same purpose for a college organization. Concluded that rivalry between similar businesses as a component of Porter's five forces model five
components, and substitute products are factors that can threaten the existence of a company engaged in telecommunications [20]. Francis and Martin [14] in their research related to the university's response strategy to the dynamics of changes in government policy, reforms at universities, pressure from stakeholders concluded that universities need to change strategic management that is responsive to change by considering the results of the Porter's five forces model analysis combined with other analytical instruments in order to guarantee the sustainability of higher education institutions.

Organizations of universities in facing global competition must carry out self-evaluation on an ongoing basis. The aim is not only to find out the strengths and weaknesses of the internal organization but also to identify opportunities and threats from the external environment. It is incumbent upon every university to identify the external environment consisting of economic conditions, sociocultural factors, technological factors, environmental forces, legal/regulatory forces, and political factors [2]. Political factors include government political policies, including in the economic field. Economic conditions include the general economic climate and specific factors such as interest rates, exchange rates, the inflation rate, the unemployment rate, the economic growth rate, trade deficits or surpluses, saving rates and per-capita domestic product. Sociocultural factors include social values, attitudes, social influences, and lifestyles that influence the need for service quality of an organization, company, and government agency. Technological factors include changing trends, changes, and technological development. Environmental forces include environmental and ecological factors such as temperature, climate, climate change, and other factors such as water availability. Legal and regulatory factors, in this case, are regulations and laws that must be obeyed by a company, industry, or an organization and workers.

4 Conclusion

The conclusions of this study are: (1) the mechanism and design of the Porter's five forces model have been integrated in the SWOT analysis with the supply of data from the Self Evaluation Report of Universitas Negeri Medan’s performance during the 2015-2019 period; (2) The results of a comparative between SWOT analysis of this research with the SWOT analysis from the Unimed’s Strategic Plan 2015-2019 conclude that Unimed is in a position ready to grow and develop or a position supporting an aggressive strategy. The results of the analysis indicate that one of Unimed's missions to organize a healthy organization has been achieved. Nevertheless, Unimed must still have a fast response to deal with the dynamics of opportunities and threats through strategic efforts to reduce aspects of organizational weakness. Although in fact the margin of weakness has been reduced compared to the condition in early 2015, Unimed must continue to make systematic, measured and ongoing efforts to address various internal problems in (a) academic and student services, research and community service, and administrative services, (b) financial management, (c) organization and human resources, and (d) infrastructure (3) Strategic targets to support the preparation of the Unimed’s Strategic Plan (2020-2024) can be formulated as follows (a) Improving the quality of learning and scholarship, (b) Increasing the relevance, quality and quantity of human resources, (c) Increasing the relevance and productivity of research and development, (d) Increasing the quality of institutions and collaboration, (e) Increasing quality assurance and internal supervision, (f) Effective, efficient and accountable financial management performance; (4) Based on the formulation of the Strategic Targets and KPIs, the direction of
policies, strategies and priority outputs can be formulated. In the policy direction, an alternative policy direction is given consisting of (a) Increasing access and equitable distribution of public education to Unimed, (b) Improving the quality of resources and institutions, (c) Increasing the relevance of research and development activities; (5) Proposed strategies for preparing Unimed’s Strategic Plan 2020-204 are: (a) Increasing availability, (b) Increasing affordability, (c) Increasing Human Resources; Lecturers, staff, laboratory assistants / technicians (d) Improve the quality of Unimed, (e) Improve the quality of study programs, (f) Increase research and innovation, (g) Improve the relevance of graduates, and (h) Increase vocational education.

It is recommended that the SWOT analysis mechanism that integrates the Porter's five forces model be used as best practice in preparing Strategic Plans at 2020-2024 period at the university, faculty, and study program levels.

5 Acknowledgments

1) Acknowledgments are addressed to the Chancellor of Universitas Negeri Medan for providing permission and funding for policy research on the performance of Universitas Negeri Medan in 2015-2019, and the results of the research will be used as input for the preparation of Universitas Negeri Medan Strategic Plan for 2020-2024.

2) Acknowledgments are also addressed to the Institute of Research and Community Service at Universitas Negeri Medan for management and administrative support so that the 2019 Policy Research can be completed properly.

6 References


Protein Content Analysis of Soybean [Glycine Max (L.) Merr.] Lines Results from the Crossing between Detam-2 Varieties with Grobogan

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Abstract. Soybean is a plant that is widely used in the food industry and one of the main sources of vegetable protein. The lack of soybean supply in 2016 to 2020 was 1.60 million tons, 1.78 million tons, 1.84 million tons, 1.92 million tons and 1.91 million tons, respectively. Soybean protein content ranges from 35-40%. Protein needs of 55 grams per day can be met with foods derived from 157.14 grams of soybeans. This study aims to determine the protein content of the soybean lines from the crossing varieties of Detam 2 with Grobogan. Based on the research results, it obtained line that has high protein content values, namely F6DxG 50-35-4. Overall, the heritability estimated value for all lines have a high estimated value, which means that the characters observed are genetically inherited.

Keywords: soybean lines, protein content analysis, crossing of soybean.

1 Introduction

One of legumes that have a very important role is the soybean crop, which is used widely in the food industry and is one of the main sources of vegetable protein [1]. Currently consumer demand for soybean commodity not only in quantity but has led to the quality as well. At some centers in soybean production there has been a shift in consumer preference from soybean-sized seed medium (about 10 g / 100 seeds) into a soybean-sized large seeds (>14 g / 100 seeds) and soybeans that have early maturity (<80 days) [2].

Based on projected results, is expected to balance production and consumption of soybean in Indonesia increased deficit in the years 2016 - 2020 average of 36.95% per year. Soybean supply shortage 2016 and 2020 amounting to 1.60 million tons, 1.78 million tons, 1.84 million tons, 1.92 million tons and 1.91 million tons [3].

Selection is a process of plant breeding and foundation of the entire repair plant to obtain new superior cultivars [4]. Selection of pedigree is one selection in segregating populations aimed at obtaining new varieties by combining desirable genes found in two or more genotypes are expected to produce a derivative better and superior to the parent [5].

Plants that containing intact soy protein content by 35-40%, which is almost equivalent to the protein content of meat. Protein soybean crop is the only one of the types of nuts that has the essential amino acid composition of the most complete [3]. Soy protein requirement of 55 grams per day can be filled with food that comes from 157.14 grams of soy [6].
This study aims to determine the protein content of a number of lines of soybean (Glycine max L. Merill) of crossbred varieties detam 2 with Grobogan.

2 Research Methods

This research was conducted at tissue culture laboratory and research area of Faculty of Agriculture Universitas Sumatera Utara, Medan. This research was carried out in March to October 2019.

Seed Selection
The seed used is a seed that has a normal size or no wrinkles and no foul.

Preparation of Land
The area required for the research first measured in accordance with the requirements, then cleared weeds there. Then formed as a drainage ditch on the land and made a plot with a size of 2.4 mx 4 m to 4 plots with 50 cm distance between plots.

Planting
Planting is done by making the planting hole at planting area with a depth of ± 2 cm, then put one seed per planting hole and then closed again.

Fertilization
Fertilization is done according to recommended dosage of soybean fertilizer requirements.

Maintenance Plants
Plant maintenance is watering plants, weeding and maintenance of plants from pests and plant diseases.

Harvest
Harvesting conducted by picking the pods one by one using hand. Harvesting is done in accordance with the harvesting each crop varieties. Criteria soybean harvest is marked by skin brownish-yellow pods by 95% and the leaves have fallen.

Analysis of Protein
Analysis of protein was observed by the method performed by Bradford (1976).

3 Results and Discussion

The soy protein content
F6 plant populations indicates that the amount of the protein content of each line is lower than the varieties Detam-2 which has a protein content of 45.58%. This is influenced by environmental conditions and requirements grow soybeans states that a high protein content in soy beans led to the need of nutrients nitrogen (N) more, so the availability of N in infancy is very important to obtain optimal results [7].
Table 1. Values F6 protein assay with elders detam DXG and Grobogan along with comparison factor (gram)

<table>
<thead>
<tr>
<th></th>
<th>detam</th>
<th>Anjasmoro</th>
<th>Grobogan</th>
<th>G5</th>
<th>G50</th>
<th>G49</th>
<th>G13</th>
<th>G80</th>
</tr>
</thead>
<tbody>
<tr>
<td>sample</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>0.37</td>
<td>0.54</td>
<td>0.47</td>
<td>1.07</td>
<td>1.57</td>
<td>1.04</td>
<td>0.74</td>
<td>0.87</td>
</tr>
<tr>
<td>2</td>
<td>0.58</td>
<td>0.53</td>
<td>1.54</td>
<td>0.87</td>
<td>1.04</td>
<td>0.92</td>
<td>1.05</td>
<td>0.83</td>
</tr>
<tr>
<td>3</td>
<td>0.36</td>
<td>0.46</td>
<td>0.42</td>
<td>0.09</td>
<td>2.34</td>
<td>0.08</td>
<td>0.93</td>
<td>2.97</td>
</tr>
<tr>
<td>4</td>
<td>0.38</td>
<td>0.07</td>
<td>0.73</td>
<td>0.81</td>
<td>6.78</td>
<td>1.01</td>
<td>0.84</td>
<td>2.87</td>
</tr>
<tr>
<td>5</td>
<td>0.89</td>
<td>0.47</td>
<td>0.93</td>
<td>0.95</td>
<td>0.94</td>
<td>0.96</td>
<td>0.99</td>
<td>0.93</td>
</tr>
<tr>
<td>Total</td>
<td>2.58</td>
<td>2.07</td>
<td>4.09</td>
<td>0.46</td>
<td>12.67</td>
<td>4.73</td>
<td>4.55</td>
<td>8.47</td>
</tr>
<tr>
<td>Mean</td>
<td>0.52</td>
<td>0.41</td>
<td>0.82</td>
<td>0.92</td>
<td>2.53</td>
<td>0.95</td>
<td>0.91</td>
<td>1.69</td>
</tr>
</tbody>
</table>

The results of the analysis of protein content test showed that the highest levels of the protein contained in the 50 lines contained in the sample 4. This indicates that the sample 4 line G50 has a clear difference with two parents plus the comparative crops. The important aspect of soy as a source of functional food can be observed from the nutrient content in seeds. On the basis of dry weight, soybeans contain about 40% protein, 20% oil, 35% carbohydrates soluble (sucrose, stachyose, raffinose, etc.) and carbohydrates insoluble (dietary fiber), and 5% ash [8].

Coefficient of high genetic diversity found in plant height, number of primary branches, number of pods per plant, number of pods contain, the number of seeds and seed weight. KKG high value showed the presence of the genetic and phenotypic diversity that is high so as to facilitate the selection done [9] states that the value of the coefficient of the high diversity in the character - specific code indicates that the selection will be made effective. Characters with high diversity values can be said to have extensive genetic diversity and vice versa.

Table 2. Values Diversity Genetic (KKG) on the Detam X Grobogan (D X G) at F6 generation

<table>
<thead>
<tr>
<th>Genotype</th>
<th>Character</th>
<th>$\sigma^2_g$</th>
<th>$h^2$</th>
<th>KKG (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>F6 D X G 50-35-4</td>
<td>Flowering age</td>
<td>0.664</td>
<td>0.664 (H)</td>
<td>2.144 (L)</td>
</tr>
<tr>
<td></td>
<td>Plant height</td>
<td>34.079</td>
<td>0.781 (H)</td>
<td>16.138 (H)</td>
</tr>
<tr>
<td></td>
<td>Number of primary branches</td>
<td>0.438</td>
<td>0.572 (H)</td>
<td>16.123 (H)</td>
</tr>
<tr>
<td></td>
<td>Harvest age</td>
<td>8.905</td>
<td>0.797 (H)</td>
<td>2.794 (L)</td>
</tr>
<tr>
<td></td>
<td>number of crop pods</td>
<td>673.288</td>
<td>0.998 (H)</td>
<td>41.118 (H)</td>
</tr>
<tr>
<td></td>
<td>contained number of pods</td>
<td>506.453</td>
<td>0.998 (H)</td>
<td>52.919 (H)</td>
</tr>
<tr>
<td></td>
<td>contained number of planting seeds</td>
<td>1436.110</td>
<td>0.998 (H)</td>
<td>54.178 (H)</td>
</tr>
<tr>
<td></td>
<td>weight of the plant</td>
<td>21.141</td>
<td>0.988 (H)</td>
<td>53.540 (H)</td>
</tr>
<tr>
<td></td>
<td>weight of 100 seeds</td>
<td>0.175</td>
<td>0.097 (L)</td>
<td>3.371 (L)</td>
</tr>
<tr>
<td>F6 D X G 13-4-1</td>
<td>Flowering age</td>
<td>2.068</td>
<td>0.860 (H)</td>
<td>3.710 (L)</td>
</tr>
<tr>
<td></td>
<td>Plant height</td>
<td>71.526</td>
<td>0.882 (H)</td>
<td>26.805 (H)</td>
</tr>
<tr>
<td></td>
<td>Number of primary branches</td>
<td>0.995</td>
<td>0.752 (H)</td>
<td>27.810 (H)</td>
</tr>
<tr>
<td></td>
<td>Harvest age</td>
<td>1.469</td>
<td>0.393 (M)</td>
<td>1.142 (L)</td>
</tr>
<tr>
<td>Genotype</td>
<td>Character</td>
<td>$\sigma^2_g$</td>
<td>$h^2$</td>
<td>KKG (%)</td>
</tr>
<tr>
<td>---------------</td>
<td>---------------------------</td>
<td>-------------</td>
<td>--------</td>
<td>---------</td>
</tr>
<tr>
<td></td>
<td>number of crop pods</td>
<td>995.702</td>
<td>0.999 (H)</td>
<td>52.261 (H)</td>
</tr>
<tr>
<td></td>
<td>number of pods contained</td>
<td>562.346</td>
<td>0.998 (H)</td>
<td>71.044 (H)</td>
</tr>
<tr>
<td></td>
<td>number of planting seeds</td>
<td>1679.697</td>
<td>0.999 (H)</td>
<td>74.284 (H)</td>
</tr>
<tr>
<td></td>
<td>seed weight of the plant</td>
<td>24.571</td>
<td>0.990 (H)</td>
<td>71.244 (H)</td>
</tr>
<tr>
<td></td>
<td>weight of 100 seeds</td>
<td>2.943</td>
<td>0.644 (H)</td>
<td>13.585 (M)</td>
</tr>
<tr>
<td>F&lt;sub&gt;6&lt;/sub&gt; D X G 5-36-5</td>
<td>Flowering age</td>
<td>3.131</td>
<td>0.903 (H)</td>
<td>4.597 (L)</td>
</tr>
<tr>
<td></td>
<td>Plant height</td>
<td>56.964</td>
<td>0.856 (H)</td>
<td>20.946 (H)</td>
</tr>
<tr>
<td></td>
<td>Number of primary branches</td>
<td>1.406</td>
<td>0.811 (H)</td>
<td>31.894 (H)</td>
</tr>
<tr>
<td></td>
<td>Harvest age</td>
<td>0.189</td>
<td>0.077 (L)</td>
<td>0.411 (L)</td>
</tr>
<tr>
<td></td>
<td>number of crop pods</td>
<td>854.944</td>
<td>0.999 (H)</td>
<td>50.324 (H)</td>
</tr>
<tr>
<td></td>
<td>number of pods contained</td>
<td>471.001</td>
<td>0.997 (H)</td>
<td>66.125 (H)</td>
</tr>
<tr>
<td></td>
<td>number of planting seeds</td>
<td>1327.021</td>
<td>0.998 (H)</td>
<td>73.081 (H)</td>
</tr>
<tr>
<td></td>
<td>seed weight of the plant</td>
<td>20.344</td>
<td>0.987 (H)</td>
<td>71.073 (H)</td>
</tr>
<tr>
<td></td>
<td>weight of 100 seeds</td>
<td>1.211</td>
<td>0.427 (M)</td>
<td>8.547 (M)</td>
</tr>
<tr>
<td>F&lt;sub&gt;6&lt;/sub&gt; D X G 49-19-3</td>
<td>Flowering age</td>
<td>1.424</td>
<td>0.809 (H)</td>
<td>3.140 (L)</td>
</tr>
<tr>
<td></td>
<td>Plant height</td>
<td>66.124</td>
<td>0.874 (H)</td>
<td>24.105 (H)</td>
</tr>
<tr>
<td></td>
<td>Number of primary branches</td>
<td>1.512</td>
<td>0.822 (H)</td>
<td>30.741 (H)</td>
</tr>
<tr>
<td></td>
<td>Harvest age</td>
<td>0.204</td>
<td>0.082 (L)</td>
<td>0.426 (L)</td>
</tr>
<tr>
<td></td>
<td>number of crop pods</td>
<td>1156.319</td>
<td>0.999 (H)</td>
<td>54.711 (H)</td>
</tr>
<tr>
<td></td>
<td>number of pods contained</td>
<td>729.983</td>
<td>0.998 (H)</td>
<td>77.280 (H)</td>
</tr>
<tr>
<td></td>
<td>number of planting seeds</td>
<td>2003.609</td>
<td>0.999 (H)</td>
<td>79.332 (H)</td>
</tr>
<tr>
<td></td>
<td>seed weight of the plant</td>
<td>33.108</td>
<td>0.992 (H)</td>
<td>77.004 (H)</td>
</tr>
<tr>
<td></td>
<td>weight of 100 seeds</td>
<td>16.522</td>
<td>0.910 (H)</td>
<td>30.014 (H)</td>
</tr>
<tr>
<td>F&lt;sub&gt;6&lt;/sub&gt; D X G 80-48-3</td>
<td>Flowering age</td>
<td>0.958</td>
<td>0.740 (H)</td>
<td>2.531 (L)</td>
</tr>
<tr>
<td></td>
<td>Plant height</td>
<td>93.187</td>
<td>0.907 (H)</td>
<td>28.730 (H)</td>
</tr>
<tr>
<td></td>
<td>Number of primary branches</td>
<td>1.584</td>
<td>0.828 (H)</td>
<td>35.956 (H)</td>
</tr>
<tr>
<td></td>
<td>Harvest age</td>
<td>-0.793</td>
<td>-0.537 (M)</td>
<td>0.000 (L)</td>
</tr>
<tr>
<td></td>
<td>number of crop pods</td>
<td>1096.574</td>
<td>0.999 (H)</td>
<td>54.485 (H)</td>
</tr>
<tr>
<td></td>
<td>number of pods contained</td>
<td>592.761</td>
<td>0.998 (H)</td>
<td>74.658 (H)</td>
</tr>
<tr>
<td></td>
<td>number of planting</td>
<td>1904.685</td>
<td>0.999 (H)</td>
<td>80.160 (H)</td>
</tr>
</tbody>
</table>
In F6 plant populations showed that the character that has the highest diversity of parameters contained in plant height, number of primary branches, number of pods cropping, pods contain, the number of crop seeds and planting seed weight. Characters that have low diversity values contained in the parameter flowering date and time of harvest, and the characters have a value of genetic diversity that are contained in the 100-seed weight parameters. Coefficient of high diversity in the character - specific code indicates that the selection will be made effective. Characters with high diversity values can be said to have extensive genetic diversity and vice versa. Extensive genetic diversity indicates a more dominant genetic influence than the environmental effects [9].

Extensive genetic diversity can provide an opportunity for breeders to be able to make the selection. Selection is a process of plant breeding and foundation of the entire repair plant to obtain new superior cultivars. The success of the selection depends on the ability of breeders to separate the superior genotypes of unwanted genotypes [10].

### 4 Conclusions

Based on the research results obtained, lines that have a high protein content value, namely F6 D x G 50-34-5 compared to other lines. Overall, the heritability estimated value for all lines have a high estimated value, which means that the characters observed are genetically inherited.

### 5 References


The Relationship Among Motivation, The Implementation Of Learning Approaches and Students’ Performance: A Study From Accounting Education Students

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Abstract – Extant studies highlight that different motivation and learning approach contributes to the different result of study outcomes. This condition reflects in students in Accounting Education Department where they experienced two learning approaches namely: Deep Learning and Surface Learning applied during the completion of their study in the respective university. In students’ batch of 2015 where they refer to the block-curriculum mechanism assuming that students in this batch are in the stream of surface learning. Likewise, students above the 2016 batches are practicing deep learning approach following the implementation of six (6) assignments under KKNI namely: regular assignment, critical book report, critical journal report, mini research, project and idea engineering embedded in each of subjects in the curriculum. This study is set to ascertain the influence of motivation and both learning approaches on students’ performances in both batches. Based on the data collection from 142 students using questionnaires that further tested with a multiple regression analysis method, it is found that students’ motivations and learning approaches influence the students’ performance positively and significantly. The study confirms relevant prior research and the Social Constructivism Theory to the extent that students’ collaboration in various learning activities the have engaged both in and outside classrooms complement the outcome of surface learning approach toward stepping the deep learning one.

Keywords: Learning Approach, Deep Learning Approach, Surface Learning Approach, Motivation, Students’ Performance

1 Introduction

In the learning process, learning achievement is the final part of the learning process or in other words the purpose of learning is to get good achievements. Many factors affect learning achievement, one of which is motivation. Students with high motivation will find it easier to achieve what is expected in learning activities. Students who have high motivation, both from themselves and others eventually will foster enthusiasm, excitement and pleasure in learning. This will have an impact on increasing student’s learning achievement. With the motivation in each lecture process, students will also follow the lecture process well and drive to continue learning better which will have an impact on student achievement.

Another factor that influences learning achievement is the learning approach. In order for the learning process to be effective, a lecturer is required to be able to apply a variety of
appropriate approaches, because the learning approach is needed to provide opportunities for students in order to obtain an optimal learning experience. The learning approach chosen is expected to be a learning approach that allows and emphasizes material and solves problems that are learned independently.

More specifically, learning approaches can be defined as cognitive, affective and psychosocial characteristics that function as relatively stable indicators of how students perceive, interact and respond to the learning environment [1]. This is supported by the social constructivism theory proposed by Vygotsky that states that the learning process is shaped by the surrounding social environment [2]. For example if a student is in an environment that has a high level of competition then he will be encouraged to get good results by studying seriously so that he can understand all the material being taught, conversely if a student is in an environment that has a high level of competition low, then he will be lazy to learn and learn even just to get grades and the important thing can go to the next stage, he just memorizes the material without getting an understanding of the material.

The learning approach or often called Approach to Learning was first put forward by Marton and Saljo in 1976 who conducted research in Sweden using qualitative methods, they grouped the learning approach into 2 types, namely deep learning and surface learning. Furthermore, this research continues to be developed by other researchers, such as Jhon Biggs. Jhon Biggs did a lot of research on the Deep Learning Approach and Surface Learning Approach and to some extent, especially for researchers in this loop, called this approach as the Jhon Biggs approach. Biggs and Tang [3] and Biggs et al. [4] describe "the surface learning approach as an intention only to gain enough knowledge, the knowledge obtained is used only to complete assignments or pass examinations". This approach aims to avoid failure in learning but with minimal effort. Students who apply this approach tend to focus on memorizing material without getting an understanding of the material they are memorizing. Meanwhile Biggs et al. [4] posits "the deep learning approach as an intention instilled from within to commit to gaining knowledge and understanding in depth material". Students who apply this approach will think analytically and try to connect the knowledge gained with the knowledge previously obtained.

Universitas Negeri Medan (UNIMED) has now implemented the KKNI curriculum for each generation except the 2015 class. This also applies to students of the 2016 class in accounting and accounting education courses. With this KKNI curriculum-based, there are many tasks faced from starting Critical Book Review (CBR), Critical Journal Review (CJR), routine assignments, mini research, projects, and engineering ideas to make students have a learning process that takes up a lot of their time in doing the task. The existence of this KKNI curriculum makes students have a long learning time so that each of their learning has a different learning approach such as the surface learning approach and the deep learning approach. Student learning approaches have variations in applying the learning approach to learning in the classroom and outside the classroom.

This study aims to find examine the effect of motivation and learning approaches on learning performance of students in the 2015 and 2016 batches. Class of 2015 is a non-KKNI curriculum based while the 2016 class is the first class that applies KKNI curriculum-based. The result of this study brings interesting findings with regards to the application of different learning approaches in learning systems from two batches of students that applies different curriculum-based. This research is also important to the extent of determining the consistency of the social constructivism theory and prior study conducted by Everaert et al. [5] from the study performed in a developing country.
Achievement is an outcome obtained by individuals or groups. Each individual or group would want a good achievement, to get a good achievement requires the ability, skills and tenacity in carrying out an activity. If related to learning activities, learning achievement is the final result obtained through expertise, ability and skills through optimal effort. Based on the theory of social constructivism, the process of understanding in teaching and learning activities depends on the learner himself, how he sees a topic in learning and what motivations influence it so that it will have an impact on learning achievement to be obtained. For example, students who are in an environment with a high level of competition will also have a high motivation from within themselves to obtain optimal learning achievement so as to be able to get the best rank among others, conversely if someone is in an environment with a low level of competition, then he will also be carried away by the atmosphere, he will have low motivation to learn and do the task just because the demands are only and most importantly pass and can continue to the next stage.

Learning Motivation is one of the factors that influence learning activities. Motivation in learning is anything that gives impetus (psychology, feelings, and emotions) and directs someone to act or do something in accordance with is a process to arouse, maintain, and control the interests of impulse within to achieve a goal. In addition, the Learning Motivation that exists in students so that students can follow the process of implementing the learning program well and more quickly understand the accounting subjects that are being taught / delivered. Teaching and learning activities will succeed well if students are diligent in doing the task, the tenacity of students in solving problems and obstacles independently so that later in the end students will get an appreciation, namely in the form of achieving good Learning Achievements. If students have high learning motivation then their academic performance can also be achieved to the maximum level. Likewise, if students have low learning motivation then learning performance of students will follow suit.

A student who has tenacity, ability and good skills in the learning process will get a good learning achievement as well. Student achievement is also influenced by several factors, one of which is motivation. Schunk et al. [6] define "motivation as the process that evokes and maintains functional behavior". Motivation itself is divided into 2, namely intrinsic motivation and extrinsic motivation. Intrinsic motivation refers to the willingness to complete certain tasks and there is a sense of satisfaction in being able to complete them [7]. This reflects personal goals that come from within and interest in the material. Meanwhile extrinsic motivation is guided by external goals in completing tasks, for example only to get grades. It is strongly influenced by appreciation and pressure from outside, for example someone wants to do a job because it is lured by certain rewards [8]. According to Saljo [5] "someone who is highly motivated tends to apply deep learning to his learning activities". Besides that someone who has intrinsic motivation learns from curiosity, interest or satisfaction [5]. The same thing was said by Donald [5] that states "intrinsic motivation leads to a deep learning approach". Someone with high motivation in learning and has a desire to be able to master all the material being taught will definitely get a high learning achievement. Meanwhile according to Tang [5] "students who have extrinsic motivation in doing their work in learning tend to adopt a surface learning approach."

Along with motivation, the learning approach is a way to manage learning activities and student behavior so that he/she can actively carry out learning tasks in achieving instructional goals for a particular instructional unit so as to obtain optimal learning achievement. The learning approach in this case is divided into two namely the deep learning approach and the
surface learning approach. The approach of deep learning is an approach to learning that is done by better understanding a material not just memorizing it when it will take an exam, in contrast to the surface learning approach that is more memorizing a material. The learning approach influences the achievement of learning achievement both the deep learning approach and the surface learning approach.

In particular, the result of a study conducted by [5] indicates that accounting students had slightly higher scores for the deep learning approach compared to the surface learning approach. In addition, high intrinsic motivation and extrinsic motivation have a significant positive effect on the deep learning approach. Furthermore, learning leads to higher academic performance; surface-learning approach on the other hand leads to lower academic performance. Deep learning approach has significant effect on academic achievement when entering the duration of learning variables underlining a higher motivation to study than their peers who use the surface learning one.

In the accounting related department attached to the university, it is very important for students to practice the principles in accounting by continuing to do a lot of practice, do it gradually and learn with a lot of time [5]. This is in accordance with the explanation from Scully & Kerr “students report that they receive a heavy burden and high time pressure in the accounting department”. According to Biggs and Tang [3] ”students who apply the deep learning approach have an interest and are always actively involved in doing their work”. Students who apply a deep learning approach really want to understand the material as a whole, not just knowing and memorizing the material. Therefore, this research formulates the research hypothesis that motivation and the implementation of deep learning approach and surface learning approach influence the students’ performance in the accounting education department of Faculty of Economics of UNIMED.

2 Research Method

The population of this study is all students of Accounting Education Study Program class of 2015 and 2016. The details of the population can be seen in the following table:

<table>
<thead>
<tr>
<th>Batch</th>
<th>Class</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>A</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>D</td>
<td>28</td>
</tr>
<tr>
<td>2016</td>
<td>A</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>36</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>221</td>
</tr>
</tbody>
</table>

From the total of 221 respondents, we then use the Slovin’s formula to generate the number of representative samples resulting 142 samples from both batches of students. The survey instrument using questionnaires were distributed to the respective number of respondents who were selected purposively from the three classes from each batch. Prior to do so, we performed validity and reliability checks using Pearson correlation for the construct
validity and Cronbach’s alpha of internal-consistency coefficient respectively. The result of tests shows there is no issue in the construct validity and reliability among items presented in the questionnaire.

To test hypotheses, we conduct the multiple regression analysis that requires several procedures of tests before applying the respective regression analysis. The procedures are widely known as assumption tests consisted of normality, linearity, heteroscedasticity, autocorrelation and multi co-linearity tests that must be no issue presented prior performing the regression analysis [10].

3 Results and Discussion

a. Descriptive Statistic of Variables

The data presented in this study were obtained from a questionnaire and also documentation of Grade Point Average (GPA) of accounting education students from batches of 2015 and 2016. The variables in this study are motivation to learn (notated with X1) and learning approaches (notated with X2). Both of learning motivation and learning approaches are independent variables. The dependent variable is the learning achievement indicated by the accounting education students’ GPA of the 2015 and 2016 batches (notated by Y). The presentation of the descriptive statistic data from each variable can be seen as follow:

Motivation (X1)

Results data regarding the learning motivation of 2015 and 2016 batches of accounting education students in the economics faculty of UNIMED were obtained from questionnaire answers given to 142 respondents. After the instrument has been tested for validity and reliability, there are 25 items of statements that must be filled honestly by respondents. Subsequently, the observed responses are processed using the SPSS Version 21 program resulting the highest score of 125, the lowest score of 84, the Mean of 103,950, the median is 104, and the mode or is 107.

Learning Approaches (X2)

In contrast to learning motivation, after being tested for validity and reliability the learning approach is represented by 20 statement items, so that the total statement is 45 items. The data regarding the results of the 2015 and 2016 batches of accounting education students in the economics faculty of UNIMED. The result of descriptive statistic show the highest score of 92, the lowest score of 65, the Mean of 78.993, the median of 78, and the mode is 78.

Learning Achievement (Y)

Data regarding learning achievements used in this study were sourced from the cumulative achievement index of all respondents of the 2015 and 2016 accounting education students of the Faculty of Economics, State University of Medan, the value used at this university was a scale of 4, then the data presented also used a scale of 4. After all the data to be analyzed are presented, the next step before testing the hypothesis is to conduct the classical assumption tests accordingly.

The normality test is used to determine whether the data obtained from the research results are normally distributed or not. A data is confirmed to have normal distribution if the significance level> 0.05, whereas if the significance level <0.05 then the data is said to be not
normally distributed. If the data is normally distributed, it will be analyzed by parametric
categorical tests (Product Moment Correlation Analysis). Meanwhile, if the data are not
normally distributed, according to the discussion in the previous chapter, it will be analyzed
by non-parametric static tests (Kendall's Correlation Test and Spearman).

<table>
<thead>
<tr>
<th>Table 2. The Result of Normality Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kolmogorov-Smirnov*</td>
</tr>
<tr>
<td>Statistic</td>
</tr>
<tr>
<td>Motivation</td>
</tr>
<tr>
<td>Learning Approaches</td>
</tr>
<tr>
<td>Students' Performance</td>
</tr>
</tbody>
</table>

Table 3. The Result of Linearity Test (ANOVA Table)

<table>
<thead>
<tr>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motivation * Students’ Performance Between Groups (Combined)</td>
<td>3,946</td>
<td>34</td>
<td>.116</td>
<td>1,689</td>
</tr>
<tr>
<td>Linearity</td>
<td>.542</td>
<td>1</td>
<td>.542</td>
<td>8,727</td>
</tr>
<tr>
<td>Deviation from Linearity</td>
<td>3,404</td>
<td>33</td>
<td>.103</td>
<td>.661</td>
</tr>
<tr>
<td>Within Groups</td>
<td>6,643</td>
<td>107</td>
<td>.062</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>10,588</td>
<td>141</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Subsequently, the linearity test aims to determine whether two variables have a linear
relationship or not significantly. This test is usually used as a prerequisite in correlation
analysis or linear regression. Testing on SPSS using Test for Linearity with a significance
level of 0.05. Two variables are said to have a linear relationship if the significance (linearity) is
less than 0.05.

The next procedure is conducting the autocorrelation test which is used to determine
whether there is a correlation between the confounding variable at a certain period with the
previous variable. For time series data autocorrelation often occurs. But for data whose sample
cross-section rarely occurs because the confounding variables are different from one another.
In detecting autocorrelation using Durbin-Watson (D-W) values with criteria if:
- The score of D-W below -2 means there is a positive autocorrelation,
- The score of D-W between -2 and +2 means there is no autocorrelation, and
- The score of D-W above +2 means there is a negative correlation.

**Table 4. The Result of Auto-Correlation Test Model Summary**

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std/ Error of the Estimate</th>
<th>Change Statistics</th>
<th>Durbin-Watson</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>.274</td>
<td>.075</td>
<td>.062</td>
<td>.26543</td>
<td>.075</td>
<td>5.645</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Motivation, Learning Approaches
b. Dependent Variable: Students’ Performance

The result shows that the Durbin-Watson value of 1.8874 is found between the values of -2 and +2, so it is said that there is no positive autocorrelation.

In term of the multi co-linearity that is intended to determine whether there is a similarity between independent variables. The similarity between independent variables will result in a very strong correlation. Besides this test is also to avoid the habit in the decision-making process regarding the effect of the partial test of each independent variable on the dependent variable. Tolerance and VIF produced between 1-10 will not occur multi co-linearity.

**Table 5. The Result of Multi co-linearity Test Coefficients**

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>Collinearity Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
</tr>
<tr>
<td>Constant</td>
<td>3.132</td>
<td>.269</td>
<td>.269</td>
</tr>
<tr>
<td>Motivation</td>
<td>.008</td>
<td>.002</td>
<td>.360</td>
</tr>
<tr>
<td>Learning Approaches</td>
<td>.000</td>
<td>.003</td>
<td>-.010</td>
</tr>
</tbody>
</table>

From the test, the tolerance variable of motivation and learning approach is obtained with the same value of 1.00> 0.1, so it is said that there is no multi co-linearity. Just like the tolerance value, the VIF value for the motivation variable and the learning approach are also the same that is 1.00 <10.0 so it is said that there is no multi co-linearity.

Lastly, the heteroskedasticity test was conducted to examine the difference in residual variance of one observation period to another observation period. How to predict the presence or absence of heteroskedasticity in a model can be seen with the Scatterplot pattern, regression that does not occur heteroscedasticity if the data points spread above and below or around zero, the data points do not collect just above or below it, the spread of points - points data may not form wavy patterns then widen and then narrow and widen again, the spread of data points is not patterned.
Fig 1. The Scatterplot Pattern

From the image shown in the Scatterplot pattern show a spread pattern of points indicating that the heteroscedasticity does not occur. Thus, with no single issue is found among classical assumption tests, the multiple regression analysis can be conducted accordingly.

b. Multiple Regression Analysis

In testing the hypothesis of this study, multiple linear regression techniques were used. This hypothesis test was used to determine the influence of motivation (X1), learning approaches (X2) on students’ performance (Y) from Accounting Education Study Program batches of 2015 and 2016 in Faculty of Economics, UNIMED.

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Constant</td>
<td>2.041</td>
<td>.393</td>
<td>5.188</td>
</tr>
<tr>
<td></td>
<td>Motivation</td>
<td>.007</td>
<td>.003</td>
<td>.224</td>
</tr>
<tr>
<td></td>
<td>Learning Approaches</td>
<td>.007</td>
<td>.003</td>
<td>.155</td>
</tr>
</tbody>
</table>

Based on the result shown in the Table 6, the motivation has a significant value of 0.007 which is less than 0.05 meaning that the hypothesis is supported. The variable of learning motivation has a significant effect on the students’ performance variable. Whereas the
implementation of learning approaches has a significant value of 0.060 which is slightly greater than 0.05. This result rejects the hypothesis indicating that the implementation learning approaches in students batches of 2015 and 2016 does not significantly influence the Accounting Education students' performance.

Furthermore, to find out the influence of motivation variables and learning approaches on students’ performance can be analyzed from the result presented in the following table:

Table 7. The Result of F-Test ANOVA\(^a\)

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Regression</td>
<td>7,95</td>
<td>2</td>
<td>3,98</td>
<td>5,645</td>
<td>.004(^b)</td>
</tr>
<tr>
<td>Residual</td>
<td>9,793</td>
<td>139</td>
<td>.070</td>
<td>.007</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>10,588</td>
<td>141</td>
<td></td>
<td>.060</td>
<td></td>
</tr>
</tbody>
</table>

a. Dependent Variable: Students' Performance
b. Predictors: (Constant), Motivation, Learning Approaches

Based on the table above, the significant value is 0.004 < 0.05, which means that the hypothesis is accepted, which means that the motivation variable and the learning approaches variable have a significant effect together on the students’ performance variable indicated from the F-test can assess multiple coefficients simultaneously. Both motivational and learning approaches variables together have a significant effect on learning achievement where the significant value is 0.004 < 0.05. The effect of motivation and learning approaches on students’ performance simultaneously is equal to 27.4%. Judging from the magnitude of the effect, the value can be interpreted as low. There are still 72.6% of other factors that affect learning achievement. Many things can affect learning achievement as revealed by number of scholars. To name a few is Muhibbinsyah [9] that globally, apart from the implementation of learning approaches there are factors that influence students’ performance. They are: (1) internal factors (factors from within students), including two aspects namely: a) physiological aspects, consisting of: the sense of hearing and the sense of sight, b) psychological aspects, consisting of: student intelligence, student attitudes, student talents, student interests, and student motivation; (2) external factors (factors from outside students), namely the environmental conditions around students. This includes two aspects, namely: a) social environment, consisting of the school environment, the community, neighbors, and parents, b) non-social environment, consisting of: school buildings and their location, homes and locations, learning tools, weather conditions and study time.

4 Conclusion

Based on the results of research and discussion that has been described, it can be concluded that there is a significant influence of students’ motivation, learning approaches on students’ performance from accounting education department batches of 2015 and 2016. Even though, in general the result of the study still confirms the social constructivism theory highlighting the importance of embedding internal motivation from students towards achieving a good learning achievement; the results of this study differ from studies conducted by Everaert et al. [5] to the extent that there is no impact of learning approaches on learning
achievement.
This difference is likely due to no separation of observation in each learning approach (deep learning and surface learning approaches) for each batch who applying different learning approach reflected from the different application of curriculum-based.
Thus, the future research in this area can do a further study that distinguishing the application of learning approach in both observation and analysis. It is also recommended to accommodate several factors as suggested by Muhibbinsyah [9] toward presenting a higher predictive value on students’ performance.

5 References

Confirmatory Factor Analysis Of Indonesian Employment Seen From Industrial Economic Views

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Abstract. Labor plays an important role in the establishment of a company. The number of companies or industries is also a driver of economic growth. This study is aimed at analyzing the influence of the labor force, employment opportunities, education level, employment status, and unemployment rate in Indonesia in 2002-2018. The results obtained in this study are stated that the labor force variable has a positive and significant effect on the labor industry in Indonesia. Absorption of industrial labor in Indonesia is strongly influenced by the labor force, employment opportunities, education status of employment status, and unemployment rate also have a positive and significant impact on the absorption of industrial labor in Indonesia.

Keywords: Labor, Industrial Economy, Labor Force.

1 Introduction

According to UU No. 5 of 1984 concerning Industry, the industry is an economic activity that processes raw materials, raw materials, semi-finished goods, and finished goods into goods with a higher value for their use, including engineering design and industrial engineering activities. The industry is generally known as the next chain of efforts to meet the needs (economy) associated with the earth, namely after agriculture, plantations, and mining, which are closely related to land.

Labor plays an important role in the establishment of a company. In a company, humans need to communicate with each other to achieve something that is their goal. Similar to companies, companies also have the goal of wanting to get as much profit as possible. Labor problems are problems that will be faced by every company. Industries that rely on talent, skills, and creativity are the basic elements of every individual. Large and modern companies have used machines or automated devices for computers, but the people who control all the running of these machines are human.

As stated in Square [1] that small industries play a large role in the absorption of labor, in labor absorption is influenced by several factors, one of which is the number of industries and the value of production produced by the industry.

As said [2] that efforts to expand industrial activities to increase labor demand are inseparable from the factors that influence it, such as the number of business units, investment value, and production value. One way to expand industrial activities is through the development of labor-intensive industries, namely small and medium industries.
The number of workers in Indonesia reached 131.55 million, with the absorption of 124.54 million or reaching 94 percent. Even though it is seen, a good problem arises because when viewed from the labor force, around 57 percent of Indonesian people who work have junior high school education and below. Based on the 2018 national labor force survey (Sakernas) reported by Indef, 14.93 percent of workers came from those with less than elementary school education, 24.55 percent of elementary school graduates, and 17.98 percent of junior high school graduates. This figure is even sadder when seeing those who graduated from vocational high school, high school, even diplomas, and universities get lower employment rates, respectively 10.72 percent, 11.76 percent, 2.8 percent, and 9.45 percent [3].

The labor force is the potential of a country, but not all workers are absorbed by number of available jobs. This situation led to unemployment. Efforts to reduce unemployment continue to be made, to avoid various risks. Data on the August 2017 Labor Force from the Central Statistics Agency (BPS) recorded that there were around 7 million unemployed people, out of a total of 128 million workforces. More specifically by age group, the largest workforce in Indonesia is the people aged 35-39 years. The labor force of this age group reaches 17.6 million people. The second-largest position is occupied by those aged 30-34 years, with a total of 15.5 million people. Thus, the situation of the labor force in Indonesia - referring to the age group, is the productive age group, which is at the same time as the main worker group. That is, this labor force has the potential to be a driving force in the production of goods and services.

The low level of education and the mismatch of expertise and skills possessed by job seekers with the qualifications needed by companies triggered the low absorption of Indonesian workers. Following is an explanation of the distribution of Indonesian workers; there is a pretty fundamental change in the Indonesian workforce when viewed in terms of quality. Employment absorption in Indonesia is still very low, with 32% of the 2,381,841 registered job vacancies apparently unable to be filled by job seekers. This is triggered by the low level education and the incompatibility of expertise and skills possessed by job seekers with the qualifications needed by the company.

<table>
<thead>
<tr>
<th>Level of Education</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pendidikan</td>
<td>77.7%</td>
<td>77.8%</td>
<td>77.7%</td>
<td>76.8%</td>
<td>76.3%</td>
<td>75.8%</td>
<td>75.6%</td>
<td>74.9%</td>
<td>73.5%</td>
<td>71.3%</td>
<td>69.4%</td>
</tr>
<tr>
<td>Kurang Terdidik</td>
<td>62.1%</td>
<td>62.1%</td>
<td>60.9%</td>
<td>56.7%</td>
<td>56.5%</td>
<td>56.2%</td>
<td>55.6%</td>
<td>54.6%</td>
<td>54.5%</td>
<td>52.6%</td>
<td>50.4%</td>
</tr>
<tr>
<td>≥ Tamat SD</td>
<td>15.6%</td>
<td>16.6%</td>
<td>16.7%</td>
<td>20.1%</td>
<td>19.8%</td>
<td>19.5%</td>
<td>20.0%</td>
<td>20.3%</td>
<td>19.0%</td>
<td>18.5%</td>
<td>19.1%</td>
</tr>
<tr>
<td>SLTP</td>
<td>22.3%</td>
<td>22.2%</td>
<td>22.3%</td>
<td>23.2%</td>
<td>23.7%</td>
<td>24.2%</td>
<td>24.4%</td>
<td>25.1%</td>
<td>26.5%</td>
<td>28.9%</td>
<td>30.6%</td>
</tr>
<tr>
<td>Terdidik</td>
<td>17.9%</td>
<td>17.4%</td>
<td>17.6%</td>
<td>18.6%</td>
<td>18.4%</td>
<td>18.8%</td>
<td>18.0%</td>
<td>19.1%</td>
<td>20.2%</td>
<td>21.0%</td>
<td>22.9%</td>
</tr>
<tr>
<td>SMU/SMK</td>
<td>2.2%</td>
<td>2.2%</td>
<td>2.1%</td>
<td>2.1%</td>
<td>2.1%</td>
<td>2.2%</td>
<td>2.2%</td>
<td>2.2%</td>
<td>2.3%</td>
<td>2.5%</td>
<td>2.7%</td>
</tr>
<tr>
<td>Akadeemi/Dipl.</td>
<td>2.2%</td>
<td>2.2%</td>
<td>2.1%</td>
<td>1.9%</td>
<td>2.2%</td>
<td>2.3%</td>
<td>2.3%</td>
<td>2.5%</td>
<td>2.6%</td>
<td>2.7%</td>
<td>2.8%</td>
</tr>
<tr>
<td>Universitas</td>
<td>2.2%</td>
<td>2.6%</td>
<td>2.6%</td>
<td>2.7%</td>
<td>3.0%</td>
<td>3.1%</td>
<td>3.3%</td>
<td>3.6%</td>
<td>3.7%</td>
<td>4.4%</td>
<td>4.8%</td>
</tr>
</tbody>
</table>

Workers with a junior high school education or lower are classified as a less educated labor force, while workers who have at least successfully completed education at the high school / vocational level are classified as an educated labor force.

Based on this data, the proportion of educated workforce continues to increase from 22.3% in 2000 to 30.6% in 2010. Furthermore, the table above shows that this increase occurred both in those who graduated from high school / vocational school or college graduates (including programs diploma).
On the contrary, the decrease in the proportion of workers who are less educated is driven by a decrease in the proportion of those who have only completed primary school (SD) or lower, while the proportion of those who have only completed junior high school tends to continue to increase. This situation is the impact of government policies in the field of basic education in the form of fee waivers for elementary school and junior high school (SLTP) levels.

A labor force that is equipped with skills, productive, and can have a career in employment if 38 percent of the 124 million workforces in Indonesia is apparently still dominated by elementary school graduates. In fact, the government wants Indonesian workers to be ready to face the Industrial Revolution Era 4.0.

Based on the highest level of education completed, elementary school graduates dominate the share of Indonesian labor. In the period 2014 to 2018, at least a quarter of the labors were elementary school graduates. In 2014, there was 28.75 percent of elementary school graduates. The number continues to decline until it reached 25.21 percent in 2018. The second-largest contributor is the junior high school graduate. The composition of the labor who are junior high school graduates ranges from 17-18 percent annually, when the total composition between elementary and junior high school graduates reaches 43 percent.

However, the combined group of high school and equivalent graduates (SMK) also belongs to the majority because it controls more than a quarter of the labor. In 2014, the combined high school and vocational school controlled 25.39 percent of the labor. With an upward trend in the high school and vocational groups, the combined portion of the group also went up. As of 2018, a combination of high school and vocational graduates controlled 29.04 percent of the share of Indonesian workers. Meanwhile, workers who have never attended school and did not complete elementary school contribute 15 to 18 percent annually with a downward trend. Interestingly, SMK graduates who are staying ready to enter the labor even contribute fewer workers than elementary and junior high school graduates. Although experiencing an upward trend, the highest number had only reached 11.03 percent in 2018. This lower contribution compared to other groups is quite reasonable because the share of the labor force of SMK graduates also ranges from 9-11 percent of the total workforce over the past five years.

Fig 1. Labor Composition 2014 - 2018
Junior high school graduates are the second largest contributor to the manufacturing or manufacturing industry, with a composition of 22.8 percent or around 4.16 million workers. When combined, elementary and junior high school graduates control almost half the share of the workforce in the manufacturing sector with 45.86 percent. Vocational High School graduates who are prepared to work in the industry only contribute 17.31 percent or 3.16 million workers. The contribution is relatively small compared to the lower education.

The economic slowdown (2011-2015) when the commodity boom of the 2000s suddenly ended amid a global economic slowdown. This is another sign that the Indonesian economy is too dependent on commodity prices (which are volatile). Therefore, President Joko Widodo's efforts to reduce Indonesia's dependence on (raw) commodity exports are valued and should lead to a structurally stronger economy in the future. This should also have a positive impact on unemployment in Indonesia.

Unemployment in Indonesia (Relative):

<table>
<thead>
<tr>
<th>Year</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unemployment (% of total labor)</td>
<td>6.2</td>
<td>5.9</td>
<td>6.2</td>
<td>5.6</td>
<td>5.5</td>
<td>5.1</td>
</tr>
<tr>
<td>Year</td>
<td>2006</td>
<td>2007</td>
<td>2008</td>
<td>2009</td>
<td>2010</td>
<td>2011</td>
</tr>
<tr>
<td>Unemployment (% of total labor)</td>
<td>10.3</td>
<td>9.1</td>
<td>8.4</td>
<td>7.9</td>
<td>7.1</td>
<td>6.6</td>
</tr>
</tbody>
</table>

Source: Statistics Indonesia (BPS)

If we look at unemployment in urban and rural areas in Indonesia, we can see that unemployment is - significantly - higher in urban areas compared to rural areas. Equally interesting is that the gap between urban and rural unemployment has widened over the past four years because rural unemployment has declined faster than urban unemployment.

The Ministry of Industry projects that the demand for labor in the industrial sector will rise to exceed 8% until 2035. This increase is spread across all manufacturing sub-sectors, such as the food and beverage, metal, textile and clothing, and automotive industries. “The
high labor demand is in line with the entry of a number of investments in Indonesia and the government's efforts to increasingly encourage the industrial sector to continue to expand, both in order to meet the domestic and export markets," said Coordinator of the Industrial Human Resources Development Agency (BPSDMI) of the Ministry of Industry, Mujiyono. Ministry of Industry page, Jakarta, Wednesday [5]. Based on the introduction above, it is important to study how the industrial labor in Indonesia and the factors that affect the labor force, employment opportunities, education level, employment status, and the unemployment rate in the work industry.

2 Research Methods

This analysis uses research objects in the Indonesian industry. And is a type of quantitative descriptive (secondary) research, and the data used comes from websites and books in numbers at the Central Statistics Agency. In this study, the number of samples used was labor data for 2002-2018 [6]. The operational definition of the independent variable is Industrial Labor from 2002 - 2018.

![CFA Conceptual Framework](image)

This mini-research uses the Confirmatory Factor Analysis (CFA) method and Multiple Linear Regression. Confirmatory Factor analysis (CFA) [7].

To answer the first hypothesis, the Confirmatory Factor Analysis (CFA) method is used. CFA aims to find a way to summarize the information contained in the original (initial) variable into a set of new dimensions or factors by the formula:

\[ Xi = Bi1 F1 + Bi2 F2 + Bi3 F3 + \ldots \ldots + Vi \mu \]

\[ Xi = Bi1 F1 + Bi2 F2 + Bi3 F3 + Bi4 F4 + Bi5 F5 \]

TKIN = b1 AK + b2 KK+ b3 TP+ b4SP+ b5 TPT

Explanation:
Xi = Standardized i-th variable
Bij = Partial regression coefficient for variable i on the j-th common factor
Fj = The i-common factor
Vi = Standardized regression coefficients for i-th variables on i-unique factors
\( \mu_i \) = Variable unique factor

### 3 Results and Discussion

**Confirmatory Factor Analysis (CFA) Results**

To analyze the research data, the researcher conducts and applies a quantitative analysis method by managing the data and then interpreting it so that a true picture of the problem under study will be obtained. Then a factor analysis is performed, which aims to find a way to summarize the information contained in the original (initial) variable into a new set of dimensions or variables (factors). Data processing using the SPSS program, with the following results:

**Factor Analysis**

<table>
<thead>
<tr>
<th>Table 3. KMO and Bartlett's Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kaiser-Meyer-Olkin Measure of Sampling Adequacy.</td>
</tr>
<tr>
<td>Bartlett's Test of Sphericity</td>
</tr>
<tr>
<td>df</td>
</tr>
<tr>
<td>Sig.</td>
</tr>
</tbody>
</table>

The method used in this factor analysis is the Main Component method. From the KMO and Bartlett's Test table, the Kaiser Mayer Olkin (KMO) value of 0.781 is obtained where the value is greater than 0.5. This value indicates the data is valid for further analysis with factor analysis. Bartlet test value of 206.443 with a significant value of 0.000 below 5%, then the correlation matrix formed is the identity matrix, or in other words, the factor model used is good. Next to see which variables have communalities values above or below 0.5 or above 50% can be seen in the following communalities table.

<table>
<thead>
<tr>
<th>Table 4. Communalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial</td>
</tr>
<tr>
<td>Labor Force</td>
</tr>
<tr>
<td>Employment Opportunity</td>
</tr>
<tr>
<td>Level of education</td>
</tr>
<tr>
<td>Job status</td>
</tr>
<tr>
<td>Open Unemployment Rate</td>
</tr>
</tbody>
</table>

Extraction Method: Principal Component Analysis.

The results of data analysis indicate the greater the communalities of a variable, meaning the more closely related to the factors formed. The Communalities table shows the results of extraction individually. There are 5 (all) variables that have contributions that exceed 0.5 or 50%. However, further feasibility must be tested with Explained variance.
Table 5. Total Variance Explained

<table>
<thead>
<tr>
<th>Component</th>
<th>Initial Eigenvalues</th>
<th>Extraction Sums of Squared Loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>% of Variance</td>
</tr>
<tr>
<td>1</td>
<td>4.836</td>
<td>96.728</td>
</tr>
<tr>
<td>2</td>
<td>.103</td>
<td>2.054</td>
</tr>
<tr>
<td>3</td>
<td>.037</td>
<td>.733</td>
</tr>
<tr>
<td>4</td>
<td>.024</td>
<td>.475</td>
</tr>
<tr>
<td>5</td>
<td>.001</td>
<td>.011</td>
</tr>
</tbody>
</table>

Extraction Method: Principal Component

Analysis

Based on the results of the total variance explained in the initial table of Eigenvalues, it is known that there is only 1 component of the variable, which is a relevant factor affecting the Industrial Workforce. Eigenvalues show the relative importance of each factor in calculating the variance to the five factors analyzed. From the table above, it appears that there is only 1 factor formed. Because only one factor has a total value of eigenvalues above 1, that is, $\lambda = 4.836$ for factor 1. This shows that one factor is best for summarizing these five variables, so the factoring process stops at just one factor that will participate in further analysis.

From the scree plot image above, it appears that factor 1 is above number 1, then factor 1 to 2 in the direction of the graph decreases sharply but is already below number 1. This shows that 1 factor is the best for summarizing the five factors.
Table 6. Component Matrix

<table>
<thead>
<tr>
<th>Component</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workforce</td>
<td>.995</td>
</tr>
<tr>
<td>Employment</td>
<td>.997</td>
</tr>
<tr>
<td>Opportunity</td>
<td>.974</td>
</tr>
<tr>
<td>Level of education</td>
<td>.986</td>
</tr>
<tr>
<td>Job status</td>
<td></td>
</tr>
<tr>
<td>Open Unemployment Rate</td>
<td>-.966</td>
</tr>
</tbody>
</table>

Discussion

Analysis of Confirmatory Factor Analysis Results (CFA)

The results of the confirmatory factor analysis (CFA) test revealed that the KMO value and Bartlett's test value showed that the correlation matrix formed was an identity matrix; in other words, the model factor used was good. Furthermore, the commonalities table shows the extraction results individually; there are 5 (five) variables that have a contribution exceeding 50%, namely the Labor Force, Job Opportunities, Education Level, Employment Status, Open Unemployment Rate.

After knowing that 1 factor is the most optimal number, it can be seen in the Component Matrix table showing the distribution of the five variables on 1 factor formed. While the figures in the table are factor loadings, which show the correlation between variables with factor 1. The process of determining which variables are most relevant to influencing the Industrial Workforce is done by comparing the large correlations of each factor. In the component matrix table shows correlations above 0.5, there are four factors, namely:

1. Job Opportunities
2. Labor Force
3. Job Status
4. Education Level

The results of the confirmatory factor analysis (CFA) test revealed that the KMO value and Bartlett's test value showed that the correlation matrix formed was an identity matrix; in other words, the model factor used was good. Furthermore, the commonalities table shows the extraction results individually; there are five variables that have a contribution exceeding 50%, namely the labor force, employment opportunities, education level, employment status, and unemployment rate.

Based on the results of the total variance explained in the initial table of Eigenvalues, it is known that there is only one component of the variable, which is a relevant factor affecting the Industrial Labor. Eigenvalues show the relative importance of each factor in calculating the variance to the five factors analyzed. From the table above, it can be seen that there is only 1 factor formed because only one factor has a total value of eigenvalues above one that is, = 4,836 for factor 1. This shows that one factor is best for summarizing the five
variables, so the factoring process stops at just one factor that will participate in further analysis.

After knowing that the factor is the most optimal number, then in the Component Matrix table shows the distribution of the five variables on the formed factor shows the correlation between variables with the Labor Force factor. The component matrix table shows correlations above 0.5 in employment, labor force, employment status and education level.

Furthermore, after the Rotation or Rotation factor process is carried out on the formed factor which aims to clarify the variables that enter into certain factors in the Rotated Component Matrix table the Rotation Component Matrix shows a clearer and more real distribution of variables. It appears that the loading factor that used to be smaller is getting smaller and the large loading factor is getting bigger. Based on the results of the component matrix values, it is known that of the five factors, what is feasible to influence industrial labor is the workforce factor.

Thus the results of the Confirmatory Factor Analysis which aims to find a way to summarize the information contained in the original variables, namely the five original variables (labor force, employment opportunity, education level, employment status, open unemployment rate) have found a new set of dimensions, namely the labor force. This means that of the five initial variables relevant to influencing the workforce is the workforce. Manpower is a workforce, which means a country with a good workforce also has a good workforce.

By increasing the income of the labor industry, a company has an important role in choosing the labor that it needs through the workforce, employment opportunities, the level of education of the workforce, the employment status of a workforce and the level of unemployment is also very important in increasing an industry's income.

4 Conclusion and Suggestion

Conclusion

Based on the results of the analysis previously stated, it can be concluded, After passing a series of tests from the CFA testing process it can be seen that from the five components of the variable it is known that there is only one variable component that is an influencing factor, which because these factors have a total value of the eigenvalues above 1. Thus the results of the Confirmatory Factor Analysis which aim to find a way to summarize the information contained in the original variables namely the five original variables (labor force, employment opportunity, education level, employment status, and unemployment rate) have found a new set of dimensions namely labor force. This means that of the five initial variables relevant to increasing industry income is the Labor Force.

Suggestion

Seen from the results of the CFA that the workforce has the best influence of the five other variable components of the Industrial workforce, it means that the government should be able to further promote the labor force program in increasing revenue for industrial companies in Indonesia so that it will be able to raise the opinion of a company. And this will improve the welfare of a company's labor force.
5 References


Factors That Influence Investments in The Indonesia Stock Exchange to Improve Understanding of Capital Market Subjects Study on Unimed Campus Communities

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Abstract. Inflation occurring in Indonesia tends to not be able to cover investment in the form of savings. The capital market in Indonesia is currently promoting investment in shares with the slogan “let’s save shares”, which at this time the returns continue to improve. This research was conducted to identify the characteristics of stock investors in the Indonesian stock exchange, analyze the decision making process of stock investors to choose stocks in the Indonesian stock exchange and find out what factors influence investors in investing in the capital market and to be an additional understanding in capital market subjects. This research was conducted at the faculty of economics UNIMED. This research is a qualitative study using primary data and secondary data. This study uses a simple random sampling method with the slovin’s formula and the sample is 316 respondents. The data analysis technique used is the validity and reliability of the questionnaire given to respondents, descriptive analysis and factor analysis. From the results of the study found that the validity and reliability in this study are valid and reliable. In the decision-making stage of stock purchase, it is obtained the introduction of problems with sources of income as the main goal to get capital gains and dividends. Most information searches come from the internet with information searching time around 1-2 days. In evaluating alternatives in making purchases, it turns out stock is the main choice with the main consideration being the profit potential. In determining the purchase decision all respondents have planned well and themselves have the most influence with the decision making time ranging from 2-7 days. Post-purchase behavior respondents were satisfied with their decision and the waiting time to get benefits ranged from 3-4 weeks. This research shows, there are 4 factors that influence investors in buying and selling shares on the Indonesia Stock Exchange, namely information factors, preferred stock factors, market activity factors and risk limiting factors. The most influential dominant factor is the information factor of 46.52 percent.

Keywords: Capital Market, Investors, Education, Factor Analysis

1 Introduction

Inflation is a financial threat faced by every individual. Individuals who do not prepare their financial planning have great potential to lose money in the future. Inflation can be interpreted as a decrease in the purchasing power of money for goods or services [1]. Money with the
same nominal over time can’t afford to buy goods of the same value or the same. Indonesia's annual inflation data for the past five years can be seen in the figure below.

![Graph showing annual inflation and bank interest rates in Indonesia](image1)

**Fig 1.** Data on annual inflation and bank interest rates in Indonesia

Indonesia's annual inflation tends to fluctuate. During the period 2014 to 2018, Indonesia's inflation rate averaged 4.30 percent. After dropping to its lowest point in five years at 3 percent Year on Year in 2016, Indonesia's inflation increased again at 3.6 percent in 2017. Many ways can be done to deal with inflation. It can be in the form of saving money in a bank by expecting a return in the form of interest rates or investing with opportunities for acquisition greater than the amount of inflation. When compared to the amount of the return, between saving at the bank with investment, the investment is worthy of choice because savings have an average interest rate of 6.05 percent or only a difference of 1.75 percent of Indonesia's average inflation. While investment products have an average return of 8.11 percent in the last 3 years.

According to Haming and Basalamah [2], investment can be interpreted as an activity to invest a number of capital or money carried out at this time in the hope of obtaining profits or returns from capital within a certain period of time. Each type of investment has its own characteristics related to the returns obtained, namely the level of investment risk, the ideal investment period, the ease of withdrawing investment, and the amount of capital needed. Investment can be made in various instruments and places. One of them is investing in the capital market or capital market. The capital market acts as a liaison between investors and companies or government institutions through trading long-term instruments such as stocks, bonds, mutual funds and so forth. The purpose of investors in investing is to get a return on the amount of capital invested. Different investment products also have different returns. Data on the return on investment products can be seen in the figure below.

![Graph showing return on investment products](image2)

**Fig 2.** Return on Investment Products
Capital market investment products in the form of shares have the highest rate of return compared to other products with an average growth of 11.59 percent per year. In addition to the high rate of return, stocks are also an investment that is easily disbursed by investors. Choosing a stock as an investment must consider many factors, if one chooses a stock, it is not the profit gained but the loss. Some of these factors include the issuer, the time of purchase and sale, the company's financial statements, the history of stock movements, global market conditions, government policies and other factors that can be taken into consideration during the decision making process.

According to Cholidia [3] the decision-making process in choosing stocks produces two types of investors, namely investors who consider rationally and investors who emphasize psychological aspects such as experience and trust in other people's references. Decision-making that only based on irrational considerations will produce results that are not optimal, of course, this is detrimental to investors.

Investor growth in the Indonesian capital market is considered quite good. However, when compared to other countries, the public interest in Indonesia for investment is still quite low, namely only around 0.15% of Indonesia's population, while the population of Malaysia is around 15%, Singapore 30% and Australia 30%. Based on data from the Financial Services Authority in Indonesia, the number of securities accounts is still very small, which is less than 600,000 accounts compared to Thailand that has reached 25 million accounts. PT BEI (BEI) recorded the number of investors through the Single Investor Identification (SID) has reached 494 thousand as of August 22, 2016. The number of investors has increased every month. As of August 10, 2016, IDX released data on the number of Indonesian companies that successfully went public, amounting to 517. The number of new companies could be one of the factors driving the number of investors, especially in stock investments in the capital market. However, the large number of companies alone will not significantly influence the growth of the number of investors if the awareness of investment from the community itself is still low. OJK in 2013 conducted a survey regarding the level of literacy in financial comprehension. The survey results obtained by the FSA show that only about 21.8 percent of the 9,000 respondents in all of Indonesia, meaning that only a small number of Indonesians understand financial. Even though the number of investors in the capital market is increasing every year, based on data released by the Indonesian Central Securities Depository (KSEI), it is reported that based on ownership, the total assets of shares until July 29, 2016 are still dominated by foreign investors.

Indonesia is a developing country where its financial orientation is short-term or in the category of saving society. When compared with developed countries, the orientation is more in the long term or in the category of investing society. Awareness of their financial management is so great that they are able to set aside 30 percent of their income for investment. Therefore, intensive and sustained public education is needed to change the society from a saving society to an investing society. Education that is carried out in stages is expected to be able to build community motivation to move from saving to investing.

Education about the capital market to the public is important because it is useful to increase the number of interested parties to invest in the capital market [4]. Therefore, the government through the IDX launched a campaign movement program called "Let's Save Stocks" in order to increase the number of investors in the Indonesian capital market. This campaign aims to motivate, educate and develop the capital market industry, as well as adding new investors who target young people, such as students, students, and young employees. Existing investments have various types. One form of investment that is popular and attractive nowadays is investment in the form of shares. Shares are proof of ownership of a company in
which the owner is also a shareholder [5]. Based on a survey conducted by IDX, Nielsen, and the University of Indonesia, it is known that young people have great potential to become stock investors. From the results of these studies it turns out that ownership of shares began to become part of people's lifestyles [6]. The trend in buying luxury and branded goods to be used as investment instruments began to recede. Lately, the public has again looked at investments in the capital market through share saving. This is inseparable from the campaign movement carried out by IDX. Unimed campus community is also a target of the IDX as investors and prospective investors, information to add insight and confidence in understanding capital market courses will also increase motivation in investing and on the background described above. The formulation of the problem in this research is what factors influence the Unimed campus community in investing in the IDX. The scope of this research is the financial study of the factors that influence investors in investing in the IDX and the respondents involved are lecturers, employees and students who have taken or are currently taking capital market courses.

This study aims to identify the characteristics of stock investors on the IDX, analyze the investor decision-making process and see what factors influence the unimed campus community in investing in the capital market. The benefit of this research is that it can provide information to investors who will invest in the capital market, so that investors can obtain maximum investment returns and can increase understanding of investor behavior in stock investment decision-making and can provide additional information and data for research with similar themes.

**Purchase Decision Process**

Consumer decision making includes all the processes that consumers go through in identifying problems, finding solutions, evaluating alternatives, and choosing between their purchasing choices. According to Kotler and Keller [7], there are five stages of the purchase decision process, namely problem recognition, information search, alternative evaluation, purchase decision, and post-purchase behavior. We can describe the decision process as follows:

a. Problem Recognition, the buying process starts when the buyer is aware of a problem or need that is triggered by internal and external stimuli. With internal stimulation one of one's normal needs rises to the maximum level and becomes an impulse; or needs can arise due to external stimuli.

b. Information Search, we can distinguish between two levels of involvement with search. This lower search state is called sharp attention. At this level a person just becomes more receptive to information about a product. At the next level, one can enter active information search by looking for reading material, calling friends, doing online activities, and visiting stores to learn about the product. There are main sources of information where consumers are divided into four groups: personal (family, friends, neighbors, colleagues), commercial (advertisements, websites, sales people, distributors, packaging, display), public (mass media, consumer rating organizations), and experimental (handling, checking, product use).

c. Alternative Evaluation, the basic concept that helps us understand the evaluation process that is consumers are trying to satisfy a need, consumers are looking for certain benefits from product solutions and consumers see each product as a group of attributes with various abilities to deliver the benefits needed to satisfy these needs. Consumers will pay the greatest attention to the attributes that deliver benefits that meet needs.
d. Purchasing Decisions, in the evaluation phase, consumers form inter-brand preferences in a collection of choices. Consumers might also form an intention to buy the most preferred brand. In carrying out the purchase intention, consumers can form five sub-decisions namely brand, supplier, quantity, time, and payment method.

e. Post Purchase Behavior, after a purchase consumers may experience conflict due to seeing certain worrying features or hearing pleasant things about other brands and be alert to information that supports their decision.

Factors That Influence Investors in Investing

Investment can be interpreted as an activity to invest a number of capital or money carried out at this time in the hope of obtaining profits or returns from that capital within a certain time period. This statement is in line with the opinion of Tandelilin [8] commitment to a number of funds or other resources made at this time with the aim of obtaining future benefits. Broadly speaking, investment is divided into two types, namely real investment and financial investment. Real investment can be defined as investment with real or real objects, for example investment in property, gold, land, trading, and so on. While financial investment is an investment in financial assets for example stocks, deposits, bonds, and so forth. The psychology of a trader greatly influences the level of success in investing, because it affects the decisions taken when trading stocks. According to Wira [9] the basic behavior of traders when trading shares is divided into two, namely seeking pleasure and avoiding suffering/loss. When in a state of loss the trader will make several alternative choices including fighting, that is, the trader is confident in his analysis. Then the second alternative is to survive or accept the situation, and the last is to leave a loss or cut loss. There are many factors that can influence stock investment decisions on the IDX. According to Septyanto [10] there are several factors that influence investment in the capital market, both internal company factors in the form of information, risks and returns, corporate policies, and external factors in the form of world market conditions, as well as issues or rumors.

Information. Information has a significant influence to shape an investor's perception in making decisions. Scoot [7] states that accounting information contains information if it helps investors revise the initial beliefs of shares in the decision making process of buying or selling shares. Information limitations make a decision difficult and affect investors' decisions to choose the offered stock. Product information can be received by investors in various forms such as financial statements, fundamental and technical analysis of shares, business performance of listed companies, future business prospects and recommendations from stock analysts.

Risk and Return. Risk is an opportunity for failure to get a yield in accordance with estimates in an investment and according to Tandelilin [8] risk is the possibility of the difference between the actual return received and the expected return. Risk has a close relationship with the rate of return and these two things can not be separated so that it affects the investment style of a trader. Broadly speaking, there are two strategies that are commonly used by investors in buying and selling shares related to this, namely the stock investment strategy and stock trading May 2017. The stock investment strategy tends to have a low risk because this strategy can reduce the risk of price fluctuations by investing in a stock in the long run. While the stock trading strategy is to buy and sell shares in the short term and focus on the profits derived from the difference between the buying and selling prices, this strategy has a higher risk than the stock investment strategy because it utilizes fluctuations in stock prices. The
close relationship between risk and profit causes risk and return to be factors that investors consider in investing.

**Corporate Policy.** Corporate policy is an initiative taken by a company that can have an impact on investor share ownership or the price of the stock itself. Some corporate actions commonly carried out by issuers are buyback and right issue. Buyback is a policy to repurchase shares outstanding in the public by an issuer to increase its share ownership and reduce the number of shares outstanding in the public. While the right issue is a policy to increase the number of shares outstanding in the public with the aim of obtaining additional funds for the issuer.

**Investor World Market Conditions.** Investors who invest in IDX do not only come from domestic, foreign investors also participate in stock trading on the IDX. This influx of foreign investors also influences the investment strategy of domestic investors by following the activities of foreign investors in buying or selling a stock. This results when foreign investors release their shares, domestic investors join in so that it can cause the index to fall even sharper. Foreign investors invest their capital in exchanges throughout the world so that the exchanges in the world have global links. The events and dynamics of stock prices between one stock exchange with another exchanged influence, especially with exchanges from neighboring countries such as crashes that occur in the Singapore exchange will have an impact on the Taiwan, Hong Kong, Japan and Indonesia stock exchanges.

**Rumors or Issues.** The strategy of "buy on rumors, sell on news" is mostly carried out by investors in the capital market. Investors have an expectation of getting an abnormal return by buying shares before they become news [11]. In addition to the chance of abnormal returns, the strategy also carries a higher risk. Risks that arise related to changes in patterns of stock price volatility because rumors must be validated before they become information [12].

## 2 Research Methods

**2.1 Place and Type of Research**

The study was conducted at Unimed using questionnaire sheets filled out by investors or potential investors. Types and sources of data used are primary and secondary data. This type of research is quantitative research. The research flowchart illustrates what will be done on the fishbone diagram below:

![Fishbone Diagram](image)
2.2 Data Analysis Technique

The population in this study is the unimed campus community residing in the faculty of economics, including the population are lecturers, employees and students who have taken or are currently taking capital market courses totaling approximately 1,500 people. The sampling method used is the probability sampling method that is random sampling using simple random sampling. The number of respondents needed in this study was determined by the Slovin formula and the sample in this study was 316 respondents with an error rate of five percent. Validity testing is done using SPSS Statistics software with the technique used Pearson Product Moment. The reliability test used in this study was the Cronbach's Alpha technique. Descriptive statistics are used to describe or give an idea of the object under study through sample data. Factor analysis according to Ghozali [13] is an analysis which aims to define the structure of a data matrix and analyze the structure of interrelationships (correlation) between a large number of variables (test scores, test items, questionnaire answers) by defining a set of variables or dimensions and often called a factor or component. The factor analysis used is principal component analysis (PCA) and common factor analysis which is often called principal axis factoring.

3 Results and Discussion

3.1 Characteristics of Respondents

Characteristics of respondents in this study can be distinguished by sex, age, last education, occupation and investment duration. Characteristics of respondents can be seen in the table below:

<table>
<thead>
<tr>
<th>No</th>
<th>Characteristics</th>
<th>Sum</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Man</td>
<td>161</td>
<td>50.9</td>
</tr>
<tr>
<td></td>
<td>Woman</td>
<td>155</td>
<td>49.1</td>
</tr>
<tr>
<td>2</td>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>17 – 25 Years</td>
<td>275</td>
<td>87</td>
</tr>
<tr>
<td></td>
<td>26 – 30 Years</td>
<td>6</td>
<td>1.9</td>
</tr>
<tr>
<td></td>
<td>31 – 35 Years</td>
<td>6</td>
<td>1.9</td>
</tr>
<tr>
<td></td>
<td>36 – 40 Years</td>
<td>17</td>
<td>5.4</td>
</tr>
<tr>
<td></td>
<td>41 – 45 Years</td>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td></td>
<td>46 – 50 Years</td>
<td>6</td>
<td>1.9</td>
</tr>
<tr>
<td></td>
<td>50 Years and up</td>
<td>5</td>
<td>1.6</td>
</tr>
<tr>
<td>3</td>
<td>Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SMA/SMK</td>
<td>269</td>
<td>85.1</td>
</tr>
<tr>
<td></td>
<td>D3</td>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td></td>
<td>S1</td>
<td>5</td>
<td>1.6</td>
</tr>
<tr>
<td></td>
<td>S2</td>
<td>33</td>
<td>10.4</td>
</tr>
<tr>
<td></td>
<td>S3</td>
<td>8</td>
<td>2.5</td>
</tr>
<tr>
<td>4</td>
<td>Job</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mahasiswa</td>
<td>269</td>
<td>85.1</td>
</tr>
<tr>
<td></td>
<td>PNS</td>
<td>41</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Wiraswasta</td>
<td>6</td>
<td>1.9</td>
</tr>
<tr>
<td>5</td>
<td>Long Invest</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Based on the table it can be seen that respondents by sex, more respondents with male sex 50.9 percent compared with women 49.1 percent. This shows that the interest of men to invest shares in the IDX is quite large. Based on the age of more respondents in the age range 17 to 25 years 87 percent. If seen based on the last education of respondents with the most recent high school / vocational education dominates with the number of 85.1 percent, based on the work of respondents with jobs as students more with a number of 85 percent then followed by respondents with jobs as civil servants by 13 percent. Based on the length of investment in the capital market, most respondents have invested in a span of less than 1 year on the IDX with 157 respondents followed by 1-5 years as many as 141 people.

### 3.2 Validity and Reliability

The validity test results state that all items declared valid, because the value of r count is greater than the value of r table. The average value of r count is in the range of 0.437 - 0.800 which is greater than the value of r table of 0.1104. Based on statistical tests obtained Cronbach's Alpha value of 0.940 which is greater than 0.60, the statement in this study can be stated reliably.

### 3.3 Descriptive Analysis of Decision Making

Based on the theory according to Kotler and Keller [7] there are five stages of the purchase decision process, namely problem recognition, information search, alternative evaluation, purchase decision, and post-purchase behavior. The results of the study can be seen in the table below:

<table>
<thead>
<tr>
<th>No</th>
<th>Decision Making Stage</th>
<th>Process</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Problem Recognition</td>
<td>1. Investment Objectives</td>
<td>42%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>a. Source of Income</td>
<td>42%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b. Instructional Media</td>
<td>35%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c. Inflation Solution</td>
<td>18%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>d. Inheritance and Others</td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Investment Benefits</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>a. Get CG and Dividends</td>
<td>40.8%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b. Get Dividends</td>
<td>38.3%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c. Get Capital Gain</td>
<td>19.3%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>d. Others</td>
<td>1.6%</td>
</tr>
<tr>
<td>2</td>
<td>Information Search</td>
<td>1. Information Source</td>
<td>56%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>a. Internet</td>
<td>56%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b. Seminar/Workshop</td>
<td>18.4%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c. University</td>
<td>13.6%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>d. Friends, Family, Media, Analyst</td>
<td>11.9%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Information Search Time</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>a. 1-2 Days</td>
<td>63.9%</td>
</tr>
<tr>
<td>No</td>
<td>Decision Making Stage</td>
<td>Process</td>
<td>Percentage (%)</td>
</tr>
<tr>
<td>-----</td>
<td>------------------------------</td>
<td>----------------------------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>b.</td>
<td>4-6 Hours</td>
<td></td>
<td>13.6%</td>
</tr>
<tr>
<td>c.</td>
<td>2-7 Days</td>
<td></td>
<td>12.3%</td>
</tr>
<tr>
<td>d.</td>
<td>Others</td>
<td></td>
<td>10.2%</td>
</tr>
<tr>
<td>3</td>
<td>Alternative Evaluation</td>
<td>1. Choosing Stock Considerations</td>
<td></td>
</tr>
<tr>
<td>a.</td>
<td>Potential Benefits</td>
<td></td>
<td>43.7%</td>
</tr>
<tr>
<td>b.</td>
<td>Stock Price</td>
<td></td>
<td>24.7%</td>
</tr>
<tr>
<td>c.</td>
<td>Main Business of the Company</td>
<td></td>
<td>10.1%</td>
</tr>
<tr>
<td>d.</td>
<td>Others</td>
<td></td>
<td>21.5%</td>
</tr>
<tr>
<td></td>
<td>2. Investment Options Other Than Stocks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a.</td>
<td>Yes</td>
<td></td>
<td>99%</td>
</tr>
<tr>
<td>b.</td>
<td>No</td>
<td></td>
<td>1%</td>
</tr>
<tr>
<td>4</td>
<td>Purchasing Decisions</td>
<td>1. How to Get Decisions</td>
<td></td>
</tr>
<tr>
<td>a.</td>
<td>Planned</td>
<td></td>
<td>100%</td>
</tr>
<tr>
<td>2</td>
<td>Decision Infender</td>
<td>a. Self</td>
<td>75.3%</td>
</tr>
<tr>
<td>b.</td>
<td>Stock Analyst</td>
<td></td>
<td>10.1%</td>
</tr>
<tr>
<td>c.</td>
<td>Family</td>
<td></td>
<td>8.1%</td>
</tr>
<tr>
<td>d.</td>
<td>Friends, Web and Others</td>
<td></td>
<td>6.4%</td>
</tr>
<tr>
<td>3</td>
<td>Time of Decision Making</td>
<td>a. 2-7 Days</td>
<td>64.6%</td>
</tr>
<tr>
<td>b.</td>
<td>1-2 Days</td>
<td></td>
<td>13.3%</td>
</tr>
<tr>
<td>c.</td>
<td>2-4 Weeks</td>
<td></td>
<td>10.1%</td>
</tr>
<tr>
<td>d.</td>
<td>Others</td>
<td></td>
<td>12%</td>
</tr>
<tr>
<td>5</td>
<td>Post Purchase Behavior</td>
<td>1. Time to get profit</td>
<td></td>
</tr>
<tr>
<td>a.</td>
<td>3-4 Weeks</td>
<td></td>
<td>36.4%</td>
</tr>
<tr>
<td>b.</td>
<td>Less 1 Weeks</td>
<td></td>
<td>32%</td>
</tr>
<tr>
<td>c.</td>
<td>1-2 Weeks</td>
<td></td>
<td>31%</td>
</tr>
<tr>
<td>d.</td>
<td>Others</td>
<td></td>
<td>0.6%</td>
</tr>
<tr>
<td>2</td>
<td>Satisfaction Level</td>
<td>a. Satisfied</td>
<td>56.3%</td>
</tr>
<tr>
<td>b.</td>
<td>Very Satisfied</td>
<td></td>
<td>34.2%</td>
</tr>
<tr>
<td>c.</td>
<td>Quite Satisfied</td>
<td></td>
<td>8.5%</td>
</tr>
<tr>
<td>d.</td>
<td>Less Satisfied</td>
<td></td>
<td>1%</td>
</tr>
</tbody>
</table>

Based on the above table, it can be seen that the respondents in this research when making the process of making a decision to buy and sell shares, in the introduction stage of the problem of choosing a source of income as the main goal of investing by 42 percent, followed by the media for learning financial products by 35 percent. The expected benefit is getting capital gains and dividends at the same time with a percentage of 40.8 percent and followed by those who only expect a dividend of 38.3 percent. Evaluating the alternative, shares remain the main choice with a percentage of 99 percent and consideration in choosing shares because of the potential profit of 43.7 percent and followed by a share price of 24.7 percent. In the decision making process, respondents are 100 percent planned, and the most influential thing in making decisions is self by 75.3 percent then by stock analysts by 10.1 percent. Post-purchase behaviour of respondents as much as 56.3 percent were satisfied, and as many as 34.2 percent felt very satisfied, the time needed to get a profit of 36.4 percent answered for 3-4 weeks, while less than 1 week was 32 percent.
3.4 Factor Analysis

In this study there are five factors used for factor analysis, namely information factors, risks and returns, corporate policies, world markets, and rumors or issues. This factor has 21 variable elements, namely, financial statements, charts of price movements, issuer's performance, issuer's business prospects, stock analyst recommendations, capital gains and / or dividends, stock support and resistance, bluechip shares, fried stocks, -2% risk of losses, -8% stop loss, right issue, buyback, stock split, GMS, dividend distribution, net foreign buy, net foreign sell, good rumors, and bad rumors.

The first step in factor analysis is to look at the value of the Kaiser-Mayer Olkinmaure of sampling adequacy (KMO). This KMO value is used to determine whether the indicator is suitable to be used. The KMO value can be said to meet the criteria if it is greater or equal to 0.5 then the variable is feasible to be tested and can be continued to the next stage. The KMO value obtained from the studied variable is 0.885. The KMO value obtained is greater than 0.5, so factor analysis is feasible to be used in this study.

The next step is to look at the matrices anti-image table. In the anti-image matrices table there is an anti-image correlation column which can show the MSA value in the form of a number that forms diagonally. MSA value must be greater than 0.5. If a variable has an MSA value below 0.5 then that variable must be eliminated. For the variables tested, the MSA values for all variables above 0.5 so that it can proceed to the next stage.

Then in the next stage communalities values are generated through extraction with the Principal Component Analysis (PCA) method. The PCA method also produces Total Variance Explained which shows the value of Eigenvalues. Eigenvalues of more than 1 indicate that each factor is able to represent the variables analyzed which are indicated by the magnitude of the variance described. In the extraction process using the PCA method, there are 4 new factors that have more than 1 Eigenvalues.

<table>
<thead>
<tr>
<th>No</th>
<th>New Factor</th>
<th>Percentage Of Variance</th>
<th>Variabel Loading Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Information 46.52</td>
<td>Financial Statement Information 0.829</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Business Prospects 0.790</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Daily Stock Movement Charts 0.770</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Right Issue 0.748</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Buyback 0.712</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Performance of The Company 0.703</td>
<td></td>
</tr>
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<td></td>
<td></td>
<td>Stock Analysts 0.688</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>GMS 0.654</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dividend Distributin 0.622</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Stock Split 0.594</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pay Dividend 0.564</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Preferred Stock 9.56</td>
<td>Area Resistent 0.792</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Area Support 0.735</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Bluechip Stock 0.712</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fried Stock 0.608</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Market Activity 7.63</td>
<td>Net Foreign Sell 0.823</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Good Rumors 0.774</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Net Foreign Buy 0.732</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bad Rumors 0.659</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Risk Limitation 5.76</td>
<td>Loss Risk -2% All 0.783</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Loss Risk -8%/emiten 0.696</td>
<td></td>
</tr>
</tbody>
</table>
First Factor (Information)

The first factor formed from factor analysis is named information that has eleven variables, namely financial statement variables, stock price charts, issuer's performance, issuer's prospects, stock analysts, announcements and dividend distribution, right issues, buy backs, stock splits and GMS. This factor is the biggest factor formed from the analysis of factors that have a data diversity of 46.52 percent, which means that the decision making process in choosing stocks to buy and or sell takes into account internal and external information factors of 46.52 percent and is the most important factor to be considered in choosing shares on the IDX. The factor loading values for the variables in the information factor are in the range 0.829 to 0.564.

The information factor therein is the financial statement variable which has the highest loading factor, which is 0.829, which indicates that before investors make a purchase or sale of shares, the main financial statement information is seen to determine the decision whether the issuer's shares are worth buying or selling, when the company's financial statements issued will influence the decision making process of investors in buying and selling shares on the IDX. The financial statements reflect the company's performance in quarterly or quarterly periods over three months. A healthy and profitable financial report certainly attracts investors to buy the issuer's shares and vice versa, if based on the financial statements the issuer suffers losses and has a lot of debt the investor will deal with the issuer's shares.

Furthermore, there is a business prospect variable which has the second biggest loading factor, namely 0.790, future business prospects of listed companies are considered because the better the prospects of the company in the future, the more attractive the investor's interest to invest in these shares and causes the stock price to increase and vice versa. Daily stock movement charts can reflect and predict stock price movements on the next trading day. This daily stock movement chart will be analyzed by technical analysis. The simplest technical analysis is to determine the area of support and resistance of the stock. Variable chart daily movement of shares can influence the decision making process of investors in buying and selling shares on the Stock Exchange.

The right issue variable with a loading factor of 0.748, is a policy to increase the outstanding shares in the public by the company. This policy is carried out by the issuer as one way to get cash. The funds from the rights issue can be used by issuers for market expansion and to pay debts. Share prices will rise and influence investors to buy when it is published that right issue funds will be used for market expansion and other positive company activities, otherwise the rights issue will fail to attract investors if it turns out that the funds are only used to pay company debts.

The stock buy back variable has a loading factor of 0.712 which indicates that this variable greatly influences investors' decision making in buying and selling shares on the IDX. Buy back shares are repurchases of shares outstanding in the public by the company. The implication of this policy is that stock prices will rise to a certain price limit offered by the company. Investors who participate when there is this policy are generally the type of short-term traders because the buy back moment occurs in a relatively short time.

The variable performance of the company or company operations with a loading factor of 0.703. The company's operations also take into consideration investors in buying and selling shares on the Stock Exchange, because by knowing the operational activities and products or services offered by the company running well, investors expect the company to obtain sales profits which will then be distributed to investors in the form of dividends.
The stock analyst recommendation variable has a loading factor of 0.688 which means that this variable influences the investor's decision making process in buying and selling shares on the IDX. Stock analysts usually provide recommendations on what stocks are interesting to buy or sell every morning before the trading floor opens. Stock analysts are either paid or free from securities. Not a few investors who use stock analysts as a guide in buying and selling shares on the Stock Exchange, especially novice investors.

The GMS variable has a loading factor of 0.654 which means that this variable influences the investor's decision making process in buying and selling shares on the IDX. When there is a RUPS or general meeting of shareholders, it will influence investors to accumulate the shares of the issuer, because after the RUPS there is usually no dividend distribution to shareholders. In addition there is a motive for investors who buy shares when a RUPS will be held to get the opportunity to attend the GSM that has been scheduled and know the policies and actions that have been and will be carried out by the company in the future.

Dividend distribution variable with transaction at cum date and ex date with loading factor of 0.622 and issuer variable that distributed dividend with loading factor of 0.564. Dividends are yields given to each shareholder in question. To obtain dividend rights, investors must be registered as shareholders at the cum date or accumulation date and ex date or exit date. At the time before the cum date stock prices will usually surge because many investors buy the shares and go down when ex date is caused by retail investors who directly sell their shares because they only target the recording date of dividend recipients in addition to that companies that routinely distribute dividends also attract investors in long term investment.

The last variable is a stock split with a loading factor of 0.594. Stock split is the breakdown of the number of shares into a number of more shares by using a lower nominal value per share proportionally, this causes investors to buy shares at a cheaper price. Issuers that carry out stock split stocks usually price per share is included in the expensive category that affects the liquidity of these shares.

**Second Factor (Preferred Stock)**

The second factor that is formed from the factor analysis is named preferred stock which has four variables namely the area resistant variable, area support, bluchip stock and fried stock. This factor has a diversity of data of 9.56 percent, which means that the decision making process of investors in buying shares on the Stock Exchange considers the preferred stock factor of 9.56 percent. The loading factor of the variable diversity of yield factor is in the range of 0.792 to 0.608.

The resistant area variable or price is in the Resistant Area with a loading factor of 0.792. When the stock price is in the resistant area there are two possibilities that will occur namely, if the price can break resistant and make a new high price (break out new high) then investors will tend to buy this stock and continue to accelerate the stock price increase, but if the price fails to penetrate area resistant investors will sell their shares in order to secure the profits they have earned and cause the stock price to go down quickly.

The second variable included in the factor of choice is the price in the support area with a loading factor of 0.735. When the stock price is in the support area there are two possibilities that will occur namely, if the price breaks the support, investors will tend to sell their shares because the price will tend to continue to fall and form new support, but if the price fails to penetrate the support area and turn around investors will buy these shares because it is likely that prices will rise within a period of time.
The next variable in the preferred stock factor is bluechip stock with a loading factor of 0.712. Bluechip shares are shares that are classified as large capitalized stock issuers listed on the IDX. These stock issuers are generally the market leaders in the businesses they run. Bluechip shares attract investors to buy and sell shares because the shares of this company are classified as safe and low risk to invest for a long time.

The last variable on the preferred stock factor is often to buy fried foods with a loading factor of 0.608. Fried stock is a type of stock that at the time of purchase will provide a loss in the short term, but not long after this type of stock can turn up and provide benefits with a pretty good return value. Fried stocks have illiquid movements and are easily manipulated because of their low prices, so that their movements are easy to go up and down. It will be difficult for novice investors with not much information, fried stock might cause more harm than profit. Stock prices can fall very sharply to near the limit of suspensions, but can go up again to the upper limit of stock suspensions. Therefore, it requires a lot of courage and guts for investors who want to play in this type of stock and suitable for investors who like risk in stock investments.

Third Factor (Market Activity)

The third factor formed from factor analysis is named market activity which has four variables, namely Net Foreign Sell, good rumors, Net Foreign Buy, and bad rumors. This factor has a diversity of data of 7.63 percent, meaning that the decision making process of investors in choosing stocks to buy or sell takes into account the market activity factor of 7.63 percent. The factor loading value of the variables in the market activity factor is in the range 0.823 to 0.659.

Market activity factor there is a Net Foreign Sell variable which has the highest loading factor of 0.823 which indicates that when a foreign investor conducts sales activity on a stock issuer, it will psychologically influence the stock investor to sell his shares to the issuer.

The second variable on the market activity factor is buying when there are good rumors with a leading factor of 0.774. Good rumors usually make the stock price go up in a short time because it attracts investors to take part in accumulating the issuer's shares until finally the official news is published.

The next variable is Net Foreign Buy which has a loading factor that is equal to 0.732. Contrary to net foreign sell when there is a surge in volume on a stock caused by net foreign buy, then usually local investors also accumulate these shares.

The last variable is selling when there are bad rumors with a loading factor of 0.659. The investor's decision to sell his shares when bad rumors circulate is one risk management to reduce losses if the rumor turns out to be true.

Fourth Factor (Risk Limitation)

The fourth factor that is formed from the factor analysis is named risk limitation which has two variables namely the maximum stop loss tolerance variable -8% of trading per share issuer and the maximum risk of loss -2% of the total investment capital. This factor has a diversity of data of 5.76 percent which means that the decision making process of investors in buying shares on the Stock Exchange considers a risk limitation factor of 5.76 percent. The loading value of the variable diversity of risk limiting factors is in the range of 0.783 to 0.696.

The first variable in the risk limiting factor is the maximum stop loss tolerance variable -8% of trading per share issuer that has a loading factor of 0.696. This variable influences the decision making process of investors in buying and selling shares on the IDX, investors will tend to consider stop loss or sell their shares if the stock falls from the purchase price of -8%,
the figure depends on the money management of each investor there is less than -8% already 
stop loss there is also more than -8%.
The next variable is the maximum risk of loss of -2% of the total investment capital with 
a loading factor of 0.783. These results indicate that investors will consider and evaluate the 
performance of their shares if they reach a risk of maximum loss of -2% of the total 
investment capital.

4 Conclusions and Suggestions

4.1 Conclusions

Based on the results of research that has been done, it can be concluded as follows:

1) Stock investor respondents on the Stock Exchange numbered 316 people, dominated by 
     male sex investors with a percentage of 50.9 percent, 87 percent of respondents aged 17 to 
     25 years, then the most dominant last education was SMA / SMK 85.1 percent as well as 
     employment are students with the same percentage, and as many as 49.7 percent of 
     respondents have invested shares in the IDX for less than 1 year.

2) Test the validity of all statement items in the range of values 0.437 - 0.803 above r Table 
     of 0.1104 so that all statement items in this study are valid. Reliability test by looking at 
     the Cronbach's alpha value of 0.940 which is greater than 0.6 then the statement in this 
     study was declared reliable.

3) The decision making process of stock investors to choose shares on the IDX is divided into 
     five stages. At the introduction of needs, the motivation that drives investors to invest in 
     shares is as a source of income with the benefit of getting capital gains and dividends. In 
     the information search stage, sources of information about listed companies are obtained 
     from information searches on the internet with information searching time of around 1-2 
     days. The next stage is an alternative evaluation that investors consider in choosing stocks 
     because of the potential profit and almost 100 percent of investors have no investment 
     choice other than stock investment. In the decision process stage, all investors plan in 
     advance to buy shares and the biggest influence giver is themselves then the time needed 
     to determine investment choices is 2-7 days. In the post-decision stage, the time 
     experienced in obtaining profit ranges from 3-4 weeks, so the level of satisfaction felt by 
     investors after investing is satisfied and will advise others to invest in shares on the IDX.

4) There are four factors that influence the decision making of stock investors in choosing 
     shares on the Stock Exchange, namely 46.52 percent information factor, 9.56 percent 
     preferred stock factor, 7.63 percent market activity factor and 5 risk limiting factors; 76 
     percent.

4.2 Suggestions

Based on the conclusions obtained, the suggestions made are as follows:

1) Investors must make it a habit to make a summary of the information obtained, in order to 
     arrange trading plans and make money management so that the profits obtained are 
     consistent. Investors should keep a record of every transaction that has been done to 
     evaluate the performance of their stock portfolio in a period, for example, on weekends or 
     at the end of the month.
2) Respondents in this study are dominant students as status, so it is recommended to conduct stock transactions with investment type not swing trader or scalper because based on the research results, factors that influence investors to buy and sell shares are information, so it takes more time and experience in studying information to get the right decision in investing.

3) It is hoped that further researchers will add to factors other than those examined in this study, such as macroeconomic, microeconomic, and political factors in order to supplement this research in influencing stock purchase decisions on the IDX.

5 References


Implementation Of Integration Learning Model
In Universitas Negeri Medan

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Abstract. This study aims to implement an integrated learning model in an effort to improve student learning outcomes in the Industrial Engineering course at the Faculty of Engineering Unimed. Another research objective is to determine the impact of implementing the integration learning model. The research method used was quasi-experimental. Data collection through a questionnaire to capture the learning impact and the accompanying impact of the integration model implementation. To see the learning outcomes used tests. To see the conditions of higher learning outcomes used the t test. The results showed that the learning outcomes of students using the integration learning model were higher when compared to student learning outcomes using an expository learning model in which they conducted experiments in the workshop. The impact of the implementation of the integrated learning model is that there is an increase in learning outcomes, besides the accompanying impact is the growth of creativity, self-determination, student motivation in producing innovative products based on the specifications of the study program chosen.

Keywords: Implementation of Integration learning Model.

1 Introduction

Industrial Engineering is a subject at the Fakultas Teknik Universitas Negeri Medan. The integration learning model was developed with the aim of improving the learning outcomes of Industrial Engineering courses [1]. The effectiveness of the integration learning model can be seen through quasi-experimental research by comparing it with expository learning models in which practice is carried out in the workshop.

Industrial Engineering Learning in the Fakultas Teknik facilitates students to produce products that are characteristic of the Fakultas Teknik that are tailored to the talents, interests and specifications of the study program. The results of the course products will be exhibited at expo activities at the Faculty at the end of each semester. The products produced by students are mini research tasks, engineering ideas and projects in learning Industrial Engineering.

Implementation of the Integration Learning Model.

Implementation of the integration learning model in learning consists of 7 stages. The stages of the integration learning model are: 1) the orientation phase, 2) the self-learning stage, 3) the web-based learning stage, 4) the workshops-based learning stage, 5) the percentage of product results, 6) the product results revision stage and 7) the product exhibition stage [1]. The orientation phase is a discussion of learning objectives, learning mechanisms, providing motivation to students and an explanation of the use of the web as a source of learning.
The independent learning stage, students are facilitated so that they can learn to stand in search for ideas and concepts about the product to be developed, students conduct field studies in an effort to see the comparison of products to be developed with existing products in the field. In this condition students will empower themselves and carry out activities that can trigger their creativity in making decisions about the products to be developed. Before making a decision about the product to be developed, students make instruments about the feasibility of the product they will make.

On the web-based learning stage, students will look for material about products that will be developed through the web. Through web-based learning students will be motivated in product development, in addition it will form a strong self-determination in an effort to increase self-confidence, that they will be able to realize the product development plan. Through web-based learning students will be motivated to make products by looking at products in the field through the web. Students will be able to provide a comparison with the product plan to be developed, so they can express the advantages of the product being developed when compared to those in the field.

The workshop-based learning phase will train students to produce products based on miniresearch in the field. Based on miniresearch students do an idea idea about the product to be developed. Furthermore, students will develop products in the workshop, by consulting the supervisor and expert staff. Work on the workshop will be monitored by supervisors and expert staff so that the products made have a predetermined quality standard.

The product percentage stage is an activity carried out in the classroom in an effort to present the product as well as to show the product being developed by the supervisor and classmates. In the product presentation stage, students will get input in an effort to improve the product being developed. Students will engage in interactive talks with lecturers, expert staff and classmates. From the results of the percentage of students will provide conclusions about the products that will be developed by explaining the parts that will be refined based on input from the supervisor, expert staff and classmates.

The product revision stage was carried out at the workshop. The product revision stage may also be carried out independently, according to the needs of the product revision being developed. The product revision stage is carried out independently, still in consultation with the supervisor and expert staff in an effort to perfect the product being developed. After completing the revision stage, it means that the product developed has been perfect. When the product is in perfect condition, the product is worth showing it to the public.

The product exhibition stage is an activity to showcase all student products in Industrial Engineering learning. In the product exhibition activities students are trained to make product exhibition proposals for stakeholders in an effort to find support for the implementation of a product exhibition. At the product exhibition students design a product exhibition that has been developed, so that it can perform well, is attractive and can provide benefits to stakeholders. In addition, the products on display were in accordance with the talents, interests and specifications of the study programs chosen by students.

The implementation of the integration learning model at the poroduk design plan stage begins with product survey activities in the field in accordance with the interests and areas of expertise. The results of the field survey were analyzed to get the product to be developed primarily about the product name, product usability, product advantages, and product weaknesses. To produce products requires the approval of a lecturer or expert staff about plans to develop product ideas engineered. Analysis of product planning based on market analysis and the results of product surveys in the field. The superior product developed is the result of field survey analysis.
Identification of the equipment needed in producing the results of engineering ideas starts from product planning in accordance with the interests and areas of expertise, reasons for product selection, product use and identification of the needs of tools and materials to produce products. What is needed and produce product engineering ideas, design the product manufacturing process, the development of the production design process, the development of the production design process requires validation from experts.

Impact of Implementation of Integration Learning Model.

Implementation of the integration learning model, when students do miniresearch is done in teams. Colquit [2] states that teamwork that supports one another will be able to improve work results. Student work through miniresearch is field data to determine the products to be made. Based on the analysis of field data students will be able to come up with creative ideas in an effort to determine the product to be made. Through discussions with fellow teams, will be able to come up with creative ideas that can contribute to the excellence of the product to be made when compared to the conditions in the field. This shows that the implementation of the integration learning model can lead to students' creative ideas in creating products. Dwi [3] explains that when a person has high creativity, he will be able to solve the problems he faces. Happy [4] explains that when a person has high self-confidence it will lead to high creativity in solving problems.

The learning process in the workshop activities in realizing the products developed is also a teamwork. Effective teamwork can increase teamwork productivity [5]. With the increased productivity of teamwork, it will increase student confidence in realizing products that will be developed. When students have high motivation to create products, students will be able to maximize their potential by creating products that will be made. If students already have high self-determination in realizing products, students will see that there is always a solution to the problems encountered in making products that have been planned. High self-determination will be able to maximize individual efforts in realizing the goals that have been set in his mind [6]. High self-determination will be able to maximize the efforts made by students to realize the products to be developed.

Implementation of the integration learning model in integration courses requires visionary educators. Endah [7] explained that overall visionary leadership and lecturer performance had a positive and significant effect on university quality. Visionary leadership is able to apply its role as a direction maker, change agent, spokesperson, and trainer. Visionary lecturers who facilitate students in learning integration will be able to motivate students to create innovative products and facilitate students and train students so they can be skilled in realizing developed products. Besides that good management in the learning process, increasing student motivation to produce high performance [8].

Visionary educators can motivate students, especially if facilitated with laboratory equipment and personnel in accordance with the competencies that will be achieved it will be able to motivate students to maximize their potential so as to produce high learning outcomes. Kreitner [9] explains that if individuals in carrying out their work have gained inspiration and motivation, then the individual will be able to improve their work. The work of the individual increases because the individual can increase his potential so as to achieve goals become easy.

Students who are highly motivated will be eager to complete their task of creating innovative products of engineering ideas into real objects that are ready to be exhibited at the expo. As explained by Kiki [10] explains that when someone has a high work motivation, it will be able to produce high performance.
2 Research Method

The study was conducted at the Fakultas Teknik Universitas Negeri Medan. a quasi-experimental research method and to see the high learning outcomes of the two implemented models used a one-party t test. To see the learning outcomes used tests. To find out the effects of learning, questionnaires were used. The study population is lecturers and students who carry out learning in industrial engineering courses. Sampling was done randomly.

3 Results and Discussion

Student learning outcomes in the Industrial Engineering course using the integration learning model, showed that there were 36% of students in the high category. 58% of students are in the high enough category. 6% of students are in the low category as in the following table.

<table>
<thead>
<tr>
<th>Score</th>
<th>f - Observation</th>
<th>f - Relatively (%)</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>96 - 124</td>
<td>0</td>
<td>0,00</td>
<td>Very High</td>
</tr>
<tr>
<td>77 - 95</td>
<td>18</td>
<td>36,00</td>
<td>High</td>
</tr>
<tr>
<td>67 - 76</td>
<td>30</td>
<td>58,00</td>
<td>High Enough</td>
</tr>
<tr>
<td>48 - 66</td>
<td>3</td>
<td>6,00</td>
<td>Low</td>
</tr>
<tr>
<td>29 - 47</td>
<td>0</td>
<td>0,00</td>
<td>Very Low</td>
</tr>
<tr>
<td>Total</td>
<td>51</td>
<td>100,00</td>
<td></td>
</tr>
</tbody>
</table>

The control class carries out conventional learning which applies an expository learning model in which there is learning in the workshop. The results of the study after being tested by t-test, showed that there were significant differences between the two learning outcomes. Student learning outcomes in learning integration are higher than student learning outcomes in conventional learning. The conventional learning model is learning that uses expository methods which also carry out practical work in the workshop. Learning outcomes with conventional learning models are as in the following table 2.
Table 2. Learning Outcomes in Conventional Learning

<table>
<thead>
<tr>
<th>Score</th>
<th>f - Observation</th>
<th>f - Relatively (%)</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>91 - 118</td>
<td>0</td>
<td>0,00</td>
<td>Very High</td>
</tr>
<tr>
<td>82 - 90</td>
<td>4</td>
<td>8,00</td>
<td>High</td>
</tr>
<tr>
<td>64 - 81</td>
<td>41</td>
<td>80,00</td>
<td>High Enough</td>
</tr>
<tr>
<td>46 - 63</td>
<td>6</td>
<td>12,00</td>
<td>Low</td>
</tr>
<tr>
<td>28 - 45</td>
<td>0</td>
<td>0,00</td>
<td>Very Low</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>51</strong></td>
<td><strong>100,00</strong></td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Shows that there are 8% of students in the high category. 80% of students are in the high enough category and there are still 12% of students in the low category. The results of the questionnaire analysis of student creativity that appears in the implementation of the learning integration model are as follows.

Table 3. Condition of Student Creativity in Producing Products.

<table>
<thead>
<tr>
<th>Score</th>
<th>f - Observation</th>
<th>f - Relatively (%)</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>106 - 125</td>
<td>0</td>
<td>0,00</td>
<td>Very High</td>
</tr>
<tr>
<td>86 - 105</td>
<td>25</td>
<td>49,00</td>
<td>High</td>
</tr>
<tr>
<td>66 - 85</td>
<td>23</td>
<td>45,00</td>
<td>High Enough</td>
</tr>
<tr>
<td>46 - 65</td>
<td>3</td>
<td>6,00</td>
<td>Low</td>
</tr>
<tr>
<td>26 - 45</td>
<td>0</td>
<td>0,00</td>
<td>Very Low</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>51</strong></td>
<td><strong>100,00</strong></td>
<td></td>
</tr>
</tbody>
</table>

Table 3 shows that the creativity of students in the effort to produce products developed in the high category. High student creativity can be seen from the results of the products on display that have a variety of superior products, and are suitable to be marketed and in accordance with the talents, interests and specifications of the study program chosen. In addition, students' self-determination also increases as in the following table.

Table 4. Student's Self Determination on Integration Learning Implementation.

<table>
<thead>
<tr>
<th>Score</th>
<th>f - Observation</th>
<th>f - Relatively (%)</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>41 - 71</td>
<td>0</td>
<td>0,00</td>
<td>Very High</td>
</tr>
<tr>
<td>72 - 102</td>
<td>43</td>
<td>84,00</td>
<td>High</td>
</tr>
<tr>
<td>103 - 133</td>
<td>8</td>
<td>16,00</td>
<td>High Enough</td>
</tr>
<tr>
<td>134 - 164</td>
<td>0</td>
<td>0,00</td>
<td>Low</td>
</tr>
<tr>
<td>165 - 195</td>
<td>0</td>
<td>0,00</td>
<td>Very Low</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>51</strong></td>
<td><strong>100,00</strong></td>
<td></td>
</tr>
</tbody>
</table>

Table 4 shows that students' self-determination to produce mini research, idea engineering and project products in the high category. It is seen that all design plans, can be pursued and realized into superior products that are in accordance with the talents, interests
and specifications of student study programs. Regarding student motivation in the implementation of learning integration can be seen in the following table.

<table>
<thead>
<tr>
<th>Score Range</th>
<th>f - Observation</th>
<th>f - Relatively (%)</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>107 - 126</td>
<td>0</td>
<td>0,00</td>
<td>Very High</td>
</tr>
<tr>
<td>87 - 106</td>
<td>31</td>
<td>60,78</td>
<td>High</td>
</tr>
<tr>
<td>67 - 86</td>
<td>20</td>
<td>39,22</td>
<td>High Enough</td>
</tr>
<tr>
<td>47 - 66</td>
<td>0</td>
<td>0,00</td>
<td>Low</td>
</tr>
<tr>
<td>27 - 46</td>
<td>0</td>
<td>0,00</td>
<td>Very Low</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>51</td>
<td>100,00</td>
<td></td>
</tr>
</tbody>
</table>

Table 5 shows that the motivation of students in learning integration in the category is quite high. This was shown by students when carrying out the production and exhibition process. In the process of product production, exhibition preparation and exhibition, students are still willing to carry out their tasks even though the time has exceeded the schedule. In addition, during the exhibition preparation, all students came up with creative and innovative ideas and high spirits, so that the exhibition was successful.

Discussion

The results of the analysis test on the research hypothesis, using the t-test, showed that there were significant differences between learning outcomes, between students who used the integration learning model and the conventional learning model. The results of one-party t-test analysis show that the learning outcomes of students who use the integration learning model are higher when compared to the learning outcomes of students who use conventional learning models.

Implementation of the integration learning model, when students are at the stage of the field survey to look for comparisons of product designs to be made, students are motivated to design products that are developed have advantages over products in the field. By looking at products in the field and compared to searching on the web will be able to increase students' self-determination, that they will be able to develop products that have been designed. This self-determination will also be higher when the necessary materials and tools are found in the field. At the time of finishing the product in the workshop, students can come up with creative and innovative ideas in the effort to improve the product. Students' creativity increases when they get support from lecturers and experts in the effort to create products that are developed.

4 Conclusions

Conclusions from the results of the study indicate that student learning outcomes using the integration learning model are higher when compared to student learning outcomes using conventional learning models. The learning impact of the research results shows that students have higher learning outcomes. There is an increase in learning outcomes using the integration learning model. While the other accompanying impact is that it can further enhance creativity,
self-determination and motivation of students in efforts to create products of mini research, engineering ideas and projects in Industrial Engineering courses at the Faculty of Engineering, State University of Medan.

5 References


The Implementation of Team Based Learning (TBL) and Generic Competency Among Teacher’s Candidates in Accounting: A Study Case From Universitas Negeri Medan

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Abstract. The aim of the research is to examine the influence of the implementation of TBL on generic competency among students in the Accounting Education department of Faculty of Economics at Universitas Negeri Medan (UNIMED). The theoretical background of this study lies in the perspective of Social Constructivism Theory (SCT) highlighting the contribution of implementing TBL to enhance the communication-related skill (required when students engage in groups and between peers), problem solving-related skill and critical thinking skill that beneficial for the candidates in facing the real condition of teaching environment once they become a professional teacher in future. The sample of study consisted of 162 students as respondents using questionnaires as the research instrument. The data was analyzed using the linear regression analysis indicating that there is a significant effect of the implementation of TBL on the generic competency among teacher’s candidates from Accounting Education Department with t-count is greater than t-table and significance score is lower than significance level (0.00 < 0.05). Even though the coefficient determination (R²) score indicates a quite upper low level (37.87%), it underlines the importance of implementing TBL on equipping teacher’s candidates with generic skills for conducting their educators service in future.

Keywords: TBL, Generic Competency, Teacher Candidates, Accounting Education

1 Introduction

Higher education should be able to organize a quality learning process that not only develops the ability of students to be limited to one cognitive aspect, while other aspects especially skills are rarely touched. This has become one of the causes of the inability of tertiary education graduates to compete in the world of work or allow graduates to work in fields that are not in accordance with their educational qualifications. In accordance with the 2013 Indonesian National Qualification Framework (KKNI), that tertiary graduates must be able to apply their fields of expertise and utilize science and technology in their fields in problem solving and be able to adapt to the situation at hand, master the theoretical concepts of certain knowledge areas in general and the theoretical concepts of special sections in the field of knowledge in depth, as well as being able to formulate procedural problem solving. Referring to what is written in the 2013 KKNI in the implementation of learning in higher
education, especially the aspects of skills become one of the main indicators of the success of an educational process.

Universities are expected to be able to trained and developed students’ various skills during the learning process, especially the generic skills. Generic skills become one of the basic assets for students, both while attending lectures and when they are in the workforce. According to Kamsah [1], generic skills are employability skills that are used to apply knowledge. This skill crosses all fields of work in the horizontal direction and crosses all levels in the vertical direction. This definition is in line with that proposed by the National Skill Task Force [2], that generic skills are skills that cross a number of different jobs. Kearns [3] defines generic skills as skills and attributes for life and Yeung et al. [3] stated that generic skills are very useful for continuing education and career success. From the various understandings given by some experts it can be concluded that generic skills are skills needed for various fields of work and life.

A high cumulative grade performance average (CGPA) – known in local term as *Indeks Prestasi Kumulatif* or abbreviated as IPK - at this time cannot be used as the main indicator of graduates of a tertiary institution to be able to compete in the world of work. Irma [4] reports that the CPI ranks only 17th in indicators and abilities that reflect a person's quality. Other factors, for example the ability to communicate, honesty and integrity, the ability to cooperate, analytical power, leadership, etc. play an important role in the success of a person in the workplace. From the survey results it can be concluded that the world of work does not only require prospective workers who only have cognitive abilities but rather requires prospective workers who are able to apply their cognitive abilities in various forms of skills. The intended skills are generic/soft skills as well as the employability skills.

Medan State University (UNIMED) is one of the state universities in North Sumatra Province in Indonesia. At present UNIMED has implemented the KKNI curriculum for each class except for the class of 2015. But this also applies to students of the class of 2015 in the accounting education program. With the KKNI curriculum not being implemented for the class of 2015, the task load is relatively not as complex as the students in the class of 2016. Here the researchers take the population of 2015 accounting education students who have not implemented the KKNI and 2017 brands who have implemented KKNI. This is to see whether the application of the curriculum can influence or not on the generic abilities to be studied. As we already know the application of the KKNI-based curriculum in tertiary institutions is highly needed because it can hone the potential of students to become agents who are broad-minded and have skills that are in accordance with the criteria needed in the community, so here the researchers want to see how much influence it has. Financial Accounting is one of the compulsory courses in the Accounting Education Study Program, Faculty of Economics of UNIMED. This course is used as a learning evaluation material in this study with the aim to find out how the influence of Team Based Learning on students' generic abilities after attending the lecture process. This is based on the characteristics of this course which in its implementation is almost 90% carried out with various activities which theoretically should be able to improve various generic skills of students.

Based on the observations conducted by the author, it is known that the average student viewed from the origin of the school class of 2015 was 16.8 consisting of Vocational Schools (16 people), Senior Public High Schools (18 people), Senior Private High Schools (17 people). Meanwhile, the average number of students seen from the origin of the 2017 school year is 15, consisting of Vocational Schools (16 people), Senior Public High Schools (26 people), Senior Private High Schools (20 people).
This research lies on the view of the study conducted by Christensen et al [5] highlighting the implementation of TBL (Team Based Learning) that helps improving educational outcomes and students' ability. Students from introductory accounting courses are organized into permanent strategic teams and work in many activities in teams. TBL as a key pedagogical component of their learning activities. Thus, the objective of the study is set to determine the effect of Team Based Learning on Student Generic Capabilities in Accounting Education Program batches of 2015 and 2017.

Team Based Learning (TBL)

Clair and Chihara (2012) state that "TBL is an effective teaching process that refers to exercises done by students or the application of statistical concepts in class. With assignments given to students, either individual or group assignments, students are motivated to be better prepared to participate in group activities". In addition, Nanes (2014) underlines that the implementation of TBL can enhance the students' critical thinking abilities. Therefore, it can be posited that the use of TBL in the learning process establishes an effective teaching process that refers to the exercises conducted by students or the application of statistical concepts in class. With assignments given to students, both individual or group assignments can improve students' thinking abilities.

In particular, Michael (2008) elaborates successful keys in implementing TBL that are embedded in four important elements as follows:

1) Groups – groups must be truly formed and managed. The TBL learning requires the teacher to oversee the formation of groups so that they can manage three important things namely:
   a. Ensuring that the group has adequate resources (group members) in the problem solving process.
   b. Avoid membership coalitions that may interfere with the development of group cohesiveness.
   c. Ensure that each group has the opportunity to develop into a learning team.

   In the implementation of TBL, activities are carried out by students are mostly used for group activities such as completing worksheets or tests given by the teacher. The results of the activities carried out by lecturers can be used to make groups more structured.

2) Accountability – students must take responsibility for themselves pre-learning in class and in teamwork. When students are less prepared in pre-class learning material, it will hamper the development of team cohesiveness.
   a. Feedback – students must receive feedback frequently and on time.
   b. Assignment Design – group assignments must enhance learning and team development.

The implementation of TBL that influence the students’ generic related skills is reflected in the lens of the theory of social constructivism. This theory is a refinement of Piaget's cognitive constructivism that separates learning based on the context. Proposed by Vygotsky in 1978, the social constructivism perspective focuses on shifting the paradigm to make students become active in the learning process (Han and Newell, 2014). The process of understanding knowledge is based on the student himself, how he learns will affect his understanding of the material taught in learning activities. What they do outside of class time is their responsibility and choice but it will affect their learning achievement [6]. The next section discusses about the conceptual aspect of students’ generic capabilities.
Generic Competency

Generic competency are very important for students because these abilities are needed by students in developing their careers going forward in accordance with their respective fields, especially in the field of accounting. Generic abilities are not obtained suddenly, but these abilities must be trained continuously for an increase. In general, generic competency is the ability that can be used to learn various concepts and solve various accounting problems, to understand abstract concepts in general, high reasoning abilities are needed and to achieve these high reasoning abilities students are accustomed to learning methods that demand the use of reasoning. Students are trained to use reasoning so in the process of understanding the concepts students not only use empirical experience, but are also accustomed to understanding concepts through reasoning. Generic ability can be said as a new thing that has not been developed or classified by experts. For example, until now there has been no expert formulated in detail and complete about generic abilities, especially in the field of accounting.

Several studies highlight the important of acquiring generic skills from the learning process conducted in higher education institutions. For instance, Kenny et al. [7] stressed that the students’ generic capabilities are reflected in their writing, verbal and interpersonal skills that needed for their future professional activities. The Education and Manpower Bureau [8] also posit that generic abilities are the basis for helping students how to study that are developed through learning and teaching in the context of different subjects and areas, and can be transferred into different learning situations.

In particular, there are several previous studies related to research underlining the influence of TBL’s implementation on the Generic Competency of students. To name a few, Kenny et al. [7] conducted a research on “Improving the students’ tax experience: a team-based learning approach for undergraduate accounting students”. This study compared the impact of using two different team learning approaches, namely conventional and Team Based Learning at Australian universities in 2013 and 2014 for undergraduate tax law tutorials with teaching used in 2009 and 2010. The result of research shows that TBL results encourage the development of student groups and skills generic, and this helps entrepreneurs. Furthermore, there are great benefits for lecturers at universities as they add to the joy of teaching. Subsequently, the study conducted by Opdecam & Everaert [6] with a focus on choice-based learning: lecture-based or team learning indicates that team learning has a positive relationship on learning outcomes. If students are faced with a choice between TBL and conventional, the majority of them choose TBL-based learning. Finally, choice-based learning provides satisfaction for students because they can determine for themselves what type of learning is of interest. These results can re-energize ongoing discussions about why and how to involve students in learning activities.

2 Research Method

This causal comparative research is set to investigate the possibility of existing causal relationships, looking for facts that might be the cause through certain data. Comparative causal research is research directed to investigate cause-effect relationships based on observations of the effects that occur and look for factors that cause through the data collected. The approach used in this study is a quantitative approach to the analysis used is statistical analysis with regression analysis. This research was designed in the form of survey research.
Survey research is a study that takes a sample from a population and uses a questionnaire as a primary data collection tool, usually by testing hypotheses.

Based on data from 162 respondents of accounting education program students, the 2015 and 2017 flags through a list of questions (questionnaire) obtained the condition of the respondent based on the origin of the school. The sampling method used in this study was carried out with a simple random sampling technique using the Slovin formula to generate the number of students from both incorporating the KKNI curriculum based (batch of 2017) and non-KKNI curriculum based (batch of 2015). Accordingly, the number of samples determined in this study was extracted using the Slovin formula. The details are presented as follow:

\[ n = \frac{N}{1 + Ne^2} \]

- \( n \): sample size; \( N \): population; \( e \): critical value (set at 0.05).

For the students Accounting Education Program batch of 2015:

\[ n = \frac{109}{1 + 109(0.05)^2} \]
\[ n = \frac{109}{1 + 109(0.0025)} \]
\[ n = 85 \text{ students} \]
\[ 85 \times 100 = 78\% \]

Subsequently, for students Accounting Education Program batch of 2017:

\[ n = \frac{96}{1 + 96(0.05)^2} \]
\[ n = \frac{96}{1 + 96(0.0025)} \]
\[ n = 77 \text{ students} \]
\[ 77 \times 100 = 80\% \]

From the above formula, a total sample of 85 people was obtained with a percentage of the population of 78% for students of the 2015 accounting education program and for students of the 2017 accounting education program, the number of samples was 77 people with a percentage of 80% from the population.

The calculation of sample composition using stratified sampling based on KKNI curriculum-based and non-KKNI curriculum based are proceeded as follow:
- the number of KKNI samples = (96:205) x 162 = 76 respondents.
- the number of non-KKNI samples = (109: 205) x 162 = 86 respondents.

The data obtained from questionnaires were subjected for validity and reliability tests prior conducting for the hypotheses analyses using the linier regression analysis. The linier regression analysis is used to determine the influence of the implementation of TBL on generic capabilities for each students of accounting education program on batches 2015 and
2017 respectively. Accordingly, we also performed the independent sample t-test to determine whether there are significant differences in terms of TBL and generic capabilities between accounting education students from 2015 and 2017 batches.

3 Results and Discussion

Prior conducting the linear regression analysis, the data was tested for normality, linearity, heteroscedasticity that are part of classical assumption test. These test series were conducted in order to provide certainty of the generated regression equation that has accuracy in estimation, unbiased and consistent [9].

A good regression model is one that distributes normally. From the result of normality test using Kolmogorov-Smirnov test the significant value is greater than 0.05 indicating a normally distributed data (see Table 1).

<table>
<thead>
<tr>
<th>Batches</th>
<th>Asymp. Sig. (2-tailed)</th>
<th>Unstandardized Residual</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>0.370</td>
<td>0.370</td>
</tr>
<tr>
<td>2017</td>
<td>0.177</td>
<td>0.177</td>
</tr>
</tbody>
</table>

Thus, it can be concluded that the data analyzed, both the 2015 and 2017 batches, came from populations a normal distribution.

The linearity test is used to determine whether the data analyzed is linearly related or not. Linearity test seen from the significance value. Deviation from Linearity > 0.05, the regression model is linear and vice versa.

<table>
<thead>
<tr>
<th>Batches</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015 TBL * Generic Capabilities</td>
<td>0.616</td>
</tr>
<tr>
<td>2017 TBL * Generic Capabilities</td>
<td>0.425</td>
</tr>
</tbody>
</table>

Based on Table 2, the value of Deviation from linearity is > 0.05, hence the linear regression can be used to explain the effect of TBL on generic ability. It can also be concluded that the pattern of relations between the two independent and dependent variables forms a straight line in both the 2015 and the 2017 batches respectively.

The heteroscedasticity test aims to test whether in the regression model there is an inequality of variance from the residuals of one observation to another. The heteroscedasticity test can be done with a glacier test, this test is done by regressing the independent variables on the absolute value of the residual. If there is a significant influence of independent variables on the absolute value of the residuals in the regression model there is a heteroscedasticity problem.

<table>
<thead>
<tr>
<th>Batches</th>
<th>Model</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>TBL</td>
<td>0.219</td>
</tr>
<tr>
<td>2017</td>
<td>TBL</td>
<td>0.193</td>
</tr>
</tbody>
</table>
Based on the table above, shows that the regression model does not occur symptoms of heteroscedacity. This is because the variable has a probability value greater than 0.05. Thus it can be concluded that the estimation of parameters is considered efficient both the 2015 and 2017 batches because they have a minimum variance so that the error range is constant or also called that the heteroscedacity assumption is met.

3.1 The Result of Linier Regression Analysis

Based on classical assumption tests above showing there are no issue among normality, linearity and heteroscedasticity therefore the linear regression test can be performed. The result of the regression linier test are shown in the following table:

Table 4. Linier Regression Test Output for Respondents from batch 2015

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>94,927</td>
<td>1</td>
<td>94,927</td>
<td>6,916</td>
<td>.010</td>
</tr>
<tr>
<td>Residual</td>
<td>1029,385</td>
<td>75</td>
<td>13,725</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1124,312</td>
<td>76</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Dependent Variable: Generic Competency
b. Predictors: (Constant), TBL

Table 5. Linier Regression Test Output for Respondents from batch 2017

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>402,314</td>
<td>1</td>
<td>402,314</td>
<td>41,956</td>
<td>.000</td>
</tr>
<tr>
<td>Residual</td>
<td>795,875</td>
<td>83</td>
<td>9,589</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1198,188</td>
<td>84</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Dependent Variable: Generic Competency
b. Predictors: (Constant), TBL

Coefficients:

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
</tr>
<tr>
<td>(Constant)</td>
<td>26,190</td>
<td>7,313</td>
</tr>
<tr>
<td>TBL</td>
<td>1,177</td>
<td>.448</td>
</tr>
</tbody>
</table>

Coefficients:

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
</tr>
<tr>
<td>(Constant)</td>
<td>19,101</td>
<td>4,380</td>
</tr>
<tr>
<td>TBL</td>
<td>1,781</td>
<td>.275</td>
</tr>
</tbody>
</table>

a. Dependent Variable: Generic Competency
Based on the data set provided in the Table 4 and Table 5 for accounting education students from batches of 2015 and 2017 respectively, the significance value for both respondents are less than 0.05. The results indicate that there positive and significant influence of the implementation of TBL on generic ability for both the 2015 and 2017 respectively. The results also support the Everaert et al. [11] and the social constructivism theory in general.

In particular, in term of determinant coefficients for respondents on the batch of 2015, based on the output table 6 below, indicates the coefficient of determination or R square is equal to 0.336. R square value of 0.084 is obtained from the square of the correlation coefficient or "R", which is 0.579 x 0.579 = 0.336. The magnitude of the coefficient of determination (R square) is 0.336 or equal to 8.4%. This number implies that the TBL variable influences the Generic Capacity variable by 33.6%.

**Table 6.** The Coefficient Determination for Respondents batch of 2015

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.291*</td>
<td>0.084</td>
<td>0.072</td>
<td>3.70474</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), TBL

Accordingly for respondents of the batch 2017, based on the output table 7 above, it is known that the coefficient of determination or R square is 0.084. R square value of 0.084 is obtained from the square of the correlation coefficient or "R", which is 0.291 x 0.291 = 0.084. The magnitude of the coefficient of determination (R square) is 0.084 or equal to 8.4%. This number implies that the TBL variable influences the Generic Capacity variable by 8.4%. The result of the coefficient determination also implies that the the implementation of TBL is not the only predictor for the students’ generic ability. Other factors include parenting, peer participation and family environment.

**3.2 The Results of Independent Sample t-tests for TBL and Generic Competency**

Based on the "Group Statistics" output table below, it is known that the amount of TBL data for the 2015 batch is 85 students, while for the 2017 batch is 77 students. The average TBL or Mean value for the 2015 batch is 16.36, while for the 2017 batch is 16.31.

**Table 8.** Group Statistics

<table>
<thead>
<tr>
<th>Batch</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Mean</th>
<th>Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>TBL</td>
<td>2015</td>
<td>85</td>
<td>16.36</td>
<td>0.949</td>
<td>.103</td>
</tr>
<tr>
<td></td>
<td>2017</td>
<td>77</td>
<td>16.31</td>
<td>0.950</td>
<td>.108</td>
</tr>
</tbody>
</table>

Thus, in descriptive statistics it can be concluded that there is a difference in the average TBL between the 2015 and the 2017 batches. Furthermore, to prove whether the difference is significant (real) or not, it is necessary to interpret the output of the "Independent Samples Test" below.
Table 9. Independent Sample t-tests for TBL between respondents batches 2015 and 2017

<table>
<thead>
<tr>
<th>Team Based Learning</th>
<th>Equal variances assumed</th>
<th>F</th>
<th>Sig.</th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
<th>Mean Difference</th>
<th>Std. Error Difference</th>
<th>95% Confidence Interval of the Difference</th>
<th>Lower</th>
<th>Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>.591</td>
<td>.443</td>
<td>.884</td>
<td>160</td>
<td>.037</td>
<td>9.449</td>
<td>.6238</td>
<td>-.6803, 1.7834</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>.887</td>
<td>159.702</td>
<td>.038</td>
<td>160</td>
<td>.037</td>
<td>9.449</td>
<td>.6220</td>
<td>-.6769, 1.7800</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Based on the above output, Sig. Levene's Test for Equality of Variance is 0.443 > 0.05, so it can be interpreted that the data variance between 2015 and 2017 batches can be homogeneous or the same (Sujarweni, 2014). The estimation of the Independent Samples Test output table above is based on the values contained in the "Equal variances assumed" table. Based on the "Independent Samples Test" output table in the "Equal variances assumed" section, the Sig. (2-tailed) of 0.037 <0.05, then as the basis for decision making in the independent sample t-test it can be concluded that Ho is rejected and H is accepted. Thus it can be concluded that there is a significant (real) difference between the average TBL in respondents of batch 2015 and the 2017 batch.

In particular for the comparison of the generic abilities performance between respondents in batches 2015 and 2017, it is known that the total number of Generic Ability data for the 2015 batch is 85 students, while for the 2017 batch is 77 students. The average value of Generic Capability or Mean for the 2015 batch is 45,941, while for the 2017 batch is 45,390.

Table 10. Group Statistics for Generic Competency between respondents of 2015 and 2017 batches

<table>
<thead>
<tr>
<th>Batch</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generic Competency</td>
<td>2015</td>
<td>85</td>
<td>45,941</td>
<td>4,0689</td>
</tr>
<tr>
<td></td>
<td>2017</td>
<td>77</td>
<td>55,390</td>
<td>3,8462</td>
</tr>
</tbody>
</table>

Thus, in descriptive statistics it can be concluded that there are differences in the average Generic Ability between respondents from 2015 and 2017 batches. Furthermore, to prove whether the difference is significant (real) or not, it is necessary to interpret the output of the "Independent Samples Test" below.
Table 11. The Output of Independent Sample t-test between respondents of 2015 and 2017 batches

<table>
<thead>
<tr>
<th>Generic Competency</th>
<th>Equal variances assumed</th>
<th>Equal variances not assumed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Levene's Test for Equality of Variances</td>
<td>F</td>
<td>Sig.</td>
</tr>
<tr>
<td></td>
<td>.591</td>
<td>.443</td>
</tr>
<tr>
<td></td>
<td>.887</td>
<td>.159,702</td>
</tr>
</tbody>
</table>

4 Conclusion

Based on the results of research that has been carried out regarding the effect of TBL on the generic competency of students in the accounting education study program of 2015 and 2017 that indicators used to determine the generic related-abilities, including writing skills, verbal and interpersonal abilities. Generally, it can be concluded that there is positive and significance influence of the implementation of TBL on generic abilities in the 2015 and 2017 batches. The magnitude of the coefficient of determination (R square) is 0.336 or equal to 33.6%. For respondents in batch of 2017 the value of sig. 0.010> 0.05 and the coefficient of determination (R square) is 0.084 or equal to 8.4%. The generic competency is not the only factor that can improve the learning of Team Based Learning for students of accounting education in 2015 and 2017 batches.

Based on the Independent Sample t-test comparison test between 2015 and 2017 batches, it can be concluded that there is a difference in the average TBL and generic ability between respondents in batches of 2015 and 2017. This can occurred due to there are more 2015 samples ie 85 people compared to the 2017 cane which only numbered 77 people. Then it could also be caused by the seriousness of the respondents in answering the questions listed in the questionnaire. While the results of the study were seen from the seriousness of the respondents participating in answering each question.

5 References


Developing A Mini Research Guide Book On Student Development Subject

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Abstract. This study aims to develop a mini research guidebook on student development subject for first semester education students in Universitas Negeri Medan. This research is a development study following the Borg and Gall model. The subjects were the first semester education’s students in Universitas Negeri Medan. Expert’s judgment includes content expert and instructional media expert. The method of taking the subject used purposive sampling. The data collection method used a questionnaire. The main field trial used 50 students and the operational field trial used 150 students. The results of the research development is based on the assessment of material experts obtained 97.5 with a very good category, media experts obtained 93 as an excellent category. The main field trial is 95.18 as very good category and the operational field trial is 91.78 as very good criteria. It can be concluded that a mini research guidebook on student development subject is appropriate to be used as a learning media.

Keywords: Guide Book, Mini Research, Student Development.

1 Introduction

Student Development Course is a basic education subject with a load of two credits and is given in semester I. This course is a University course, so that all educational students in Unimed are required to take this course in semester I. The purpose of this course is to equip students in forming and developing basic professional skills in education in an effort to understand the development of students. Through this course, students are expected to be able to understand each student's development in adolescence which consists of physical, cognitive, language, emotional, social, special talents, morals, developmental tasks, self-concept, self-adjustment and personality.

The results of observations and interviews with a number of lecturers who have taken courses in Student Development at Medan State University stated that there is a need for a guidebook to help students carry out mini research assignments. Supporting lecturers generally do not provide a guidebook to give to students so that students can practice independently. If this system continues to be conducted, the competencies and skills of students in conducting mini research cannot be honed in depth because it is not yet clear the direction of mini research conducted by lecturers and students without a guidebook.

Student competencies in conducting mini research can be trained independently with practice outside of class hours to answer the challenges of the Indonesian National Qualifications Framework Curriculum where S-1 graduates have reached level 6 which means they are able to apply their fields of expertise and utilize science, technology, and / or art in
their fields in problem solving and being able to adapt to the situation at hand, mastering the theoretical concepts of a particular field of knowledge in general and the theoretical concepts of special sections in that field of knowledge in depth [1]. The Indonesian National Qualifications Framework Curriculum is embodied in a number of assessments, one of which is the student's mini research assignment in conducting research to school.

Based on the description above, it is clear that the importance of the mini research handbook in the subject of student development at Medan State University. To be able to achieve these expectations, this research is entitled "Developing A Mini Research Guide Book on Student Development Subject for First Semester Education Students of Medan State University"

Mini Research Guide Book

Practice Handbook is often referred to as manuals, guidebooks, and handbooks. The guidebook is a book that contains information and instruction. That is a guide for the reader to know something completely. The practicum guide book is an independent learning book which includes a series of practicum activities planned systematically to help students to be able to carry out group counseling practices well so that the goals of group counseling can be achieved. Where the contents of the practicum guidebook are in the form of instructions and descriptions for practicum.

Guidebook is one form of teaching material that is packaged in a complete and systematic manner that includes a set of learning experiences as a learning tool that is independent so that students can learn independently. This opinion is in line with the Ministry of National Education [1] that explains that the guidebook is a set of teaching materials that are presented systematically so that students can learn with or without a teacher.

Widodo & Jasmadi [2] mention several steps in the preparation of the guidebook are as follows: (1) determine competency standards, (2) carry out a needs analysis of the learning guidebook, (3) drafting a guidebook, (4) do trial of draft manuals, (5) validation, (6) revision and production. By taking into account the steps in preparing the guidebook, making the development process of the guidebook will be structured.

The aspects and indicators that are used to evaluate the lesson guide book so that knowing a good guidebook is to consider assessment aspects such as (1) aspects of feasibility of content, (2) linguistic aspects, (3) aspects of presentation, and (4) aspects of graphics. From these aspects it can be used as a reference to make an instrument for assessing the feasibility of a guidebook (National Education Department).

The guidebook made is a book provided to facilitate prospective teacher students in carrying out Mini Research, so a Worksheet was prepared, so that what students observed as prospective teachers could be documented. Through learning material in the form of a Mini Research manual, students can learn easily get information related to the procedure or stages in completing a Mini Research assignment.

Mini Research Tasks

The mini research is a scientific paper written by students as an assignment given by lecturers in a course. The purpose of this mini research is to find out the thoughts or ideas of students about a particular problem. The theme raised in this paper is free. The written work can be in the form of research ideas, business ideas, and the like. With this mini research, it is expected that the relevant student can apply his creative ideas into a written form so that in the future he will be able to assist the student in conducting actual research.
Adolescent Development Tasks

a. Physical Development

Damon said there are at least four mechanisms that are known to influence physical development, namely: factors looking for targets or self-stabilizing factors (self-stabilizing factor or self-stabilizing factor), speed of maturity, regulation of feedback (feedback regulation) and body mass.

b. Cognitive Development

The characteristic of cognitive development in childhood is concrete operational thought. At this stage, operation carried out by changing actions mentally, showing conservation skills, and reasoning logically replaces intuitive reasoning, but only in concrete, non-abstract situations, with the help of children's cognitive educators can be developed.

c. Language Development

Based on the results of the research, developmental psychologists define language development as an individual's ability to master the vocabulary, speech, grammatical, and pronunciation ethics in a certain period in accordance with the development of chronological age. Comparison between chronological age and individual language ability shows the individual's language development.

d. Emotional Development

Chaplin in the Dictionary of Psychology defines emotion as an aroused state of an organism including conscious changes that are profound in nature from behavioral change. Chaplin distinguishes emotions from feelings, and he defines feelings as feelings of conscious experience that are activated both by external stimulants and by various physical states.

e. Development of Special Talents

Talent implies that Bawan's ability is a potential (potential ability) that still needs further development and training. Because of its potential or latent nature, talent is a potential that still requires serious and systematic development and training efforts to be realized.

f. Social Development

Sunarto and Hartono state that social relations (socialization) are relationships between people who need each other. Social relationships start from simple and limited levels, which are based on simple needs. As adults mature and age, human needs become complex and thus the level of social relations also develops complexly so that it needs to be stimulated by educated educators.

g. Moral Development

Moral development (moral development) includes the development of thoughts, feelings, and behavior according to rules or habits regarding things that should be done when someone interacts with others (Hurlock). Moral development is very influential on the environment so that during these children the parents and the environment are very influential on the child's moral development, positive morals will have a good impact on the future, and vice versa if the child from childhood only accepts negative moral then the child will develop not in accordance with that his parents expected.

h. Development of Self-Concept

Self-concept is defined by Atwater states that in the overall self-concept of self-image, which includes one's perception of self, feelings, beliefs, and values related to him. Next, identify the self-concept of three forms, namely the first body image, awareness about the
body, namely how a person sees himself; the second ideal self, how one's ideals and expectations about him; and third, social self, namely how other people see themselves.

i. Personality Development

Adolescence is a time of identity development that is a central issue in adolescents that provides a basis for adulthood. It can also be said to be a central aspect of a healthy personality that reflects self-awareness, the ability to identify other people, and to learn other goals so that they can participate in their culture. If adolescents fail to integrate aspects and choices or feel unable to choose, they will experience confusion (confusion) and need the help of educators.

3 Research Method

The research carried out is the type of research and development (Research and Development or R & D). Development research steps followed Borg and Gall [3] in Sugiyono [4] said that the model of development has the following steps:

1. Research and information gathering
   a. Requirement analysis

   At the initial research stage, data collection was carried out through observation and interviews with lecturers in the subject of student development on March 20, 2019. Based on the interview results obtained information that there is no guidebook for mini research assignments that can be used as learning media. In addition, the results of the needs analysis for students on April 5, 2019 about the need for developing a mini research assignment manual for Unimed students showed a very high category of 95%. Based on the results of the needs analysis conducted it can be concluded that the development of a mini research assignment handbook for the subject of Student Development in accordance with the needs in the Unimed educational study program.

   At this stage, various kinds of literature studies are carried out by studying the relevant literature and in accordance with the variables of the research to be developed, namely the literature relating to Student Development[8]. Based on the literature on the discussion of literature review, related material is:

   1) Mini Research Instrument of Physical Development
   2) Mini Research Instrument of Cognitive Development
   3) Mini Research Instrument of Emotional Development
   4) Mini Research Instrument of Language Development
   5) Mini Research Instrument of Special Talent Development
   6) Mini Research Instrument of Social Development
   7) Mini Research Instrument of Moral Development
   8) Mini Research Instrument of Adolescent Development Tasks
   9) Mini Research Instrument of Self-Concept Development
   10) Mini Research Instrument of Self Adjustment Development
   11) Mini Research Instrument of Personality Development
b. Planning

The media developed in this study is the development of media in the form of a guidebook. The guidebook is one of the media that contains elements of images, text and independent assignments[5]. This is intended to generate positive enthusiasm from students. Handbook material contains a mini assignment research guide for Student Development subjects.

2. Initial product development is making and compiling material about the Mini Research Tasks of Student Development Subjects, then made into a guidebook (draft 1).

3. Initial field trials are testing the quality of the guidebooks. This trial was conducted to measure the feasibility of the manual through the validation of material experts and media experts.

4. Revised preliminary field trials of the quality of the guidebooks that have been tested with material experts, media experts, and BK service experts and then revised according to what was suggested as a guidebook (draft II).

5. Main field trials, testing a guidebook on a small group of 50 student subjects using a sample selection technique that is random sampling.

6. Revision of the main field trial, if there is a result of the content of the manual book that is unsatisfactory or the material that is not appropriate in the main field test then the manual is revised again in accordance with the suggestions and criticisms from small groups (Draft III).

7. Operational field trials, trying a guidebook to a large group of 150 students on trial subjects.

8. The final product, based on the results of evaluations from operational field trials, has become an appropriate final product to be implemented.

9. Product dissemination and implementation, disseminating the manuals that have been made and disseminating and disseminating them, which can be done in collaboration with publishers to publish the products that have been made.

The product development that will be carried out in this research reaches the tenth stage, which is the Dissemination and Implementation of the product, disseminating the manuals that have been made and disseminating and disseminating them [6,7].

Data Collection Techniques and Instruments

Data collection techniques in this study used a questionnaire to assess the feasibility of the guidebook through material experts and media experts[8]. Data collection techniques are the method chosen and used in research activities so that research can run systematically. The data collection in this study used questionnaire data collection or questionnaire of the feasibility of the guidebook through expert validation and the effectiveness of the guidebook questionnaire given to students in limited product trials [9].

The development procedure in this study can be presented in this figure below
Fig 1. Development Research Steps

Data analysis technique

The data analysis technique used in the research development of this guidebook is to use quantitative data analysis. Quantitative data analysis was obtained by descriptive quantitative analysis, namely analyzing quantitative data obtained from expert validation and limited field trials and trials of Suharsimi’s operational field [10]. In this study a questionnaire was used with the following formula:

\[
\text{Value} = \frac{\text{Obtained Score}}{\text{Total score}} \times 100
\]

4 Results and Discussion

The development of a mini research assignment manual for Unimed Education Semester I students has been completed. The process of completing this manual is carried out in stages in order to produce communicative learning media products that are suitable for use. The making of this guidebook product has gone through a series of expert validations and field trials on users, besides expert validation and field trials are intended to obtain data as revision material.

The process of making this manual has been revised gradually in accordance with the advice given by material experts, media experts and data obtained from field trials at each stage. After the main field trials and operational field trials and data analysis at each stage of the trial, it can be concluded that this manual has become an excellent final product to be used as a learning medium that can be used by Unimed students.

The excellent results obtained by the service media are based on the results of the validation of media experts, material experts, as well as the process of main field trials and operational field trials. At the media expert validation stage, a score of 78 was obtained so that the value of 97.5 was in “Very Good” category. At the material validation stage the score was 93 so that the value of 93 was in “Very Good” category. At the main field trial stage, Based on the
results of the questionnaire obtained a total score of 4759 so that the value of 95.18 with Very Good category. At the operational field trial stage, the total score of 13768 was obtained so that the value of 91.78 was in Very Good category.

The Effectiveness of the Mini Research Guide Book for Developmental Student Subject

The results of students' level of understanding of the mini research assignment handbook for students' developmental subjects were carried out after an operational field test. The assessment was carried out using a questionnaire level of effectiveness of the mini research assignment handbook for Student Development Subjects held on Wednesday, August 20, 2019 in the first semester of Unimed Education with a total of 30 students. the results of the assessment of the level of understanding of students known number of scores obtained 1240 so that the value of 93 with the category Very Good.

5 Conclusion

The results of this research and development are mini research assignment manuals for students' development for Unimed Education's first semester students. This manual contains cover, preface, table of contents, how to use, introduction, and material that each has their own instruments, cover, and bibliography. Mini assignment research manual for student development course for first semester students in Education Unimed from the results of the assessment by experts has been declared fit for use as a learning medium, and from the results of trials by users after going through initial field trials, main field trials, and operational field tests included in the very good category.

6 References


Productivity Analysis and Welfare of Salt Farmers in Tanoh Anoe Village, Bireun-Indonesia

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Abstract. The purpose of this study is to identify the factors that influence the productivity and welfare of salt farmers in Tanoh Anoe Village, Kecamatan Term Bireun-Aceh District, which are seen from internal and external factors. To check the validity and reliability of the instrument through confirmatory factors using the SEM (Structural Equation Modeling) analysis method by testing the latent relationship model of the latent variables and getting a model to answer the estimates From the results of the study it was found that the factors that influence the productivity and welfare of salt farmers in Tanoh Anoe village are education, work experience, land area, income, health, and living conditions. What does not affect the productivity and welfare of salt farmers in Tanoh Anoe village is labor, capital, raw materials, counseling, training and capital assistance.

Keywords: salt farmers, productivity, welfare level, production factors, government policies, SEM

1 Introduction

Indonesia is the largest archipelago country in the world with 17,508 islands and an area of 7,700,000 km². Indonesia has the 4th longest line in the world which is + 95,181 km. Of the advantages possessed by the State of Indonesia as a maritime country, of course there are various abundant marine and fisheries potentials, but these potentials have not yet been explored optimally.

Agricultural development is defined as an integrated rural development strategy that is environmentally sound, aiming to create growth and gradual socio-economic change from agrarian, towards industrial agrarian (agro-industry). Development is an effort of the government to develop the economy and increase the income of the community can be done by developing businesses that are in the community, both in the agricultural sector, industrial sector or service sector.

One of the potentials of the marine and fisheries sector that can be extracted is salt. Salt is a basic need and daily consumption of Indonesian people. Salt is a strategic commodity, because in
addition to being a basic necessity that is consumed by humans approximately 4kg/year it is also used as industrial raw material [1]. Salt users are broadly divided into 3 (three) groups, namely (1) Salt for human consumption, (2) Salt for salting and various foods and (3) Salt for industry. In Indonesia, salt is produced by evaporating seawater on a piece of coastal land with the help of wind and sunlight as a source of evaporation energy. Meanwhile, the Ministry of Industry calculates that the national salt requirement in 2016 is estimated to be around 2.6 million tons and the industry sector that uses the most salt is the kostik (chlor alkali plant), various food and pharmaceutical industries.

High demand cannot yet be met in domestic production and must be imported. Whereas local salt has only been able to meet consumption needs. In meeting the basic needs of local salt, domestic production has not been able to meet their needs, so in meeting the basic needs of salt is still dependent on salt from abroad. Meeting the national salt needs so far has been done through self-production and imports. The great potential of salt from the sea does not provide sufficient national salt needs. With the potential and the carrying capacity of marine nature, Indonesia should be able to produce and meet its own salt needs. The area of salt reaches 33,625 ha and only around 17,625 ha (52.4%) is used to produce salt. The largest salt fields in 9 provinces are Nanggroe Aceh Darusalam (+), West Java (2,787 ha, 1,746 ha utilized), Central Java (3,249 ha, 3,248 ha utilized) and East Java (13,047 ha, 9,713 ha utilized), Bali (used 20 ha), East Nusa Tenggara (9,740 ha, used 304 ha), West Nusa Tenggara (1,574 ha, utilized 1,052), South Sulawesi (1,264 ha, used 1,260 ha) and Southeast Sulawesi (2,000 ha, used 300 ha). The Province of Aceh has the potential of a very supportive marine resource, NaCl (Sodium Chlorida) salt which is obtained by evaporation of sea water and other methods, and is safe to use as food. Iodine is one of the important micronutrients for the human body. Lack of these substances can cause a variety of disorders known as IDD (Sodium Deficiency Disorders). As a result of iodized salt deficiency, the most widely known is enlargement of the thyroid gland. Iodine is also very useful for preventing dwarfism, miscarriage and death after childbirth as well as impaired ability of the brain by decreasing the power of brain intelligence (IQ).

The largest salt-making areas in Aceh Province are in nine districts, which consist of Aceh Besar, Pidie, Pidie Jaya, North Aceh, East Aceh, Southwest Aceh, South Aceh, Aceh Tamiang and Bireun. Bireun Regency is a potential area for the development of salt-making businesses that can create jobs for people who live in this area. Bireun Regency is a regency located not far in the Malacca Strait so that the state of the land around the Lira Sira (Pondok Garam) contains a lot of salt. This has made many people around Bireun Regency work as salt farmers. They work individually on their lira sira (Pondok Garam) and only produce traditional salt. In Tanoh Anoe Village, Term District of Bireun District, the majority of salt farmers are women, who also play a role as housewives. This is caused by the desire of the housewife to increase household income, because the income earned by the husband is still lacking to meet household needs.

In this village the process of producing salt can be said to be still fairly traditional making, this can be seen from the community who still use boreholes to suck water directly into cooking stoves and fuel for cooking still use firewood, then cook until dry so that the granules are seen white crystalline color called salt. The price of salt produced by farmers is relatively cheap because it has not been mixed with iodine. In a day the farmer can produce salt reaching 150kg the selling price of farmer salt is Rp.6,200 / kg with an operational cost of approximately Rp.260,000 / day for 45kg of salt. If the current wholesale sale price of salt is Rp.6,200 / kg and then multiplied
by the total production of 45kg, the gross income is Rp.279,000. minus the production costs of Rp.260,000, the profit is around Rp.19,000 if the average salt farmer produces 3 times a day, then the profit is not up to Rp.60,000. This makes the salt farmers overwhelmed in spending capital to produce salt.

Until now the results of salt production in Bireun Regency are still below expectations. Where the quality of salt itself is less attention. This is because the management method is still traditional and does not pay attention to the cleanliness of salt production itself. Besides the very high production costs. By looking at the situation, the salting process in Bireun Regency needs to be improved, namely by shifting to the salting technology.

The formulation of the problem in this study are:
1. Does Demography affect Productivity in Tanoh Anoe Village, Kecamatan Term Bireun-Aceh District.
2. Does demography affect the welfare level of Salt Farmers in Tanoh Anoe Village, Kecamatan Term Bireun-Aceh.
3. Does the Production Factor affect Productivity in the Tanoh Anoe Village, Kecamatan Term Bireun-Aceh District.
4. Does the Production Factor affect the Welfare Level of Salt Farmers in Tanoh Anoe Village, Kecamatan Term Bireun-Aceh District.

The purpose of this study is to analyze the partial and simultaneous influence of demographics and production factors on the productivity and welfare of salt farmers in Tanoh Anoe Village, Kecamatan Term Bireun-Aceh Regency.

Productivity

Productivity is an important factor in realizing the success of increasing the income of farmers themselves, besides that it can also produce farm products that are free of chemicals whose impacts are natural and environmental damage [2]. Sulaeman [3] states productivity reflects a good work ethic of farmers, both in terms of mental and others. Thus, the peasants who plunge directly try to improve their performance with various policies that are efficient, able to increase their productivity. In addition, there are many factors that cause the decline in the agricultural sector as seen from its productivity. In a study conducted by Subiyanto [4] states that there is a real relationship between formal education, farming experience, extensive land use and working capital, labor and the application of technology to farm productivity.

Supriyanto and Machfudz [5] say that productivity implies a comparison between the results achieved (output) with the overall resources used. The factors that affect productivity can be classified in three groups, namely:

- Quality and physical abilities of employees is including levels of education, work motivation, work ethic, mental and physical abilities of employees and training.
- Supporting facilities regarding the work environment, including technology and production methods, facilities and equipment used, the level of occupational safety and health as well as the atmosphere in the work environment itself and concerning employee welfare which is reflected in the wage system and social security as well as guarantees continuity of work.
• Supra-facility, the company's activities are always influenced by what happens outside. As factors of production to be used, marketing prospects, taxation, licensing, environment and others. Government policies in the field of export-import, restriction and supervision also affect the scope of company leadership and the course of activities in the company.

The indicators of the Productivity variable, among others:

- Location
  - According to Griffin, location is the physical position or geographical location of a facility and must be determined by the needs of the organization.

- Education
  - Notoatmodjo argues education is a process of developing capabilities in the direction desired by the organization concerned. According to Admodiwiniro, education is learning prepared to improve the implementation of work in the future or to improve someone to be able to accept a responsibility in new tasks.

- Work experience
  - According to Handoko, work experience is the mastery of employees' knowledge and skills measured by the length of work, the level of knowledge and skills possessed by employees. Experience is only gained through the workplace.

Prosperity Level

According to the Central Statistics Agency [6] in Rahmad Sembiring [7] there are eight indicators used to determine the level of welfare, namely: income, consumption, family expenses, living conditions, housing facilities, health of family members, easy access to health services, the ease of entering children into education and the ease of transportation.

Increasing community welfare is the essence of national development. This level of community welfare reflects the quality of life of a family. A family with a higher level of welfare means having a better quality of life, so that in the end the family is able to create better conditions to improve their welfare. According to Kusnadi [8] it is difficult to improve the welfare of a number of internal and external factors.

Furthermore it is also said that population education is often used as an indicator of the progress of a nation and an indicator in an effort to improve people's welfare. Education in today's life has been considered as a basic need that cannot be postponed. An overview of the level of welfare of the people can also be seen from the conditions and facilities of their residence. Housing is one of the most important basic needs besides food and clothing to meet decent needs. In addition, nutritional factors are also a major indicator in the nutritional and consumption components used in describing the lower standard of living of the community. Furthermore, it is said that the economic level is still low causing that the community has not been able to obtain community services. Farmers' Welfare Level is an analytical calculation of all data in each welfare indicator which are all related to the socioeconomic conditions of the farmer's household.

Demography

Demography is the study of population changes regarding changes in number, distribution and composition, or population measurement tools. These changes are influenced by changes in the main components of population growth, namely, fertility, mortality and migration. Overall
demographics give a picture of the behavior of the population, both in the aggregate and in groups. Population can be grouped according to certain characteristics, such as age groups, socioeconomic characteristics, and distribution or distribution of residence where this grouping is very useful for various purposes and objectives. Demographic characteristics have characteristics including age / age, sex, marital status, number of family members, employment, type of work [9].

**Production Factor**

Agricultural production is the results obtained as a result of the operation of several factors of production at once. From some of the notions put forward by the experts, the authors conclude that production in agriculture, which is a result obtained from agricultural land in a certain time is usually measured in units of weight tons or kg indicates the great potential of agricultural commodities. Factors of production indeed determine the size of the production obtained [10].

**Conceptual Framework**

Based on the existing problems, then a framework can be made about the influence of demographics and factors of production on the productivity and welfare of salt farmers in Tanoh Ane village, Kecamatan sub-district, Bireun-Aceh District.

![Conceptual Framework for Structural Equation Modeling (SEM)](image-url)
The hypothesis is a temporary answer, the truth of which remains to be proven. This temporary answer is still the starting point for further research. Based on the formulation of the problem, the hypothesis of this study is:

1) Demography influences Productivity in Tanoh Anoe Village, Kecamatan Term Bireun-Aceh District.
2) Production Factors affect Productivity in Tanoh Anoe Village, Kecamatan Term Bireun-Aceh District.
3) Demography influences the level of welfare of Salt Farmers in Tanoh Anoe Village, Kecamatan Term Bireun-Aceh District.
4) Production Factors affect the Welfare Level of Salt Farmers in Tanoh Anoe Village, Kecamatan Term Bireun-Aceh District.
5) Productivity affects the level of welfare of Salt Farmers in Tanoh Anoe Village, Kecamatan Term Bireun-Aceh.

2 Research Method

This type of research is causal (causal) research, Umar [11] states that causal design is useful for analyzing how a variable affects other variables, and is also useful in experimental research where the independent variable is treated in a controlled manner by the researcher to see its impact on the dependent variable directly. This research was conducted in the village of Tanoe Anoe, Kecamatan Term Bireun-Aceh district with the time of the study planned from September 2018 to February 2019.

According to Sugiyono [12] "Population is the area of generalization consisting of objects / subjects that have certain qualities and characteristics". According to Sugiyono [12]: "Samples are part of the number and characteristics possessed by the population". The population in this study was 400 families. The sample in this study was Salt Farmers. How to take samples using the Slovin formula in Husein Umar [11], as follows:

\[ n = \frac{N}{1+(N(e)^2)} \]

\( n \) = sample size
\( N \) = population size
\( e \) = error rate.

The error rate is set at 5%.

The following calculation is the sample size:

\[ n = \frac{400}{1+(400 \times 0.0025)} \]
\[
n = \frac{400}{1 + 1} = 200
\]

So from 200 samples can be selected based on criteria as many as 200 families of respondents’ productivity and welfare of salt farmers.

The variables operated in this study are the variables contained in the hypothesis that have been formulated. To provide a clear answer, it is necessary to give a definition of the variables to be examined in order to facilitate the making of the questionnaire as follows:

**Table 1. Operationalization of Variables**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Description</th>
<th>Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demografi (X1)</td>
<td>Social Demography is the dynamics of human population including the size, structure, and distribution of the population, as well as how the population changes every time due to birth, death, migration, and aging.</td>
<td>Likert</td>
</tr>
<tr>
<td>Faktor Produksi (X2)</td>
<td>Production Factors are resources used in the process of producing goods and services.</td>
<td>Likert</td>
</tr>
<tr>
<td>Produktivitas (Y1)</td>
<td>Productivity is the desire and human effort to always improve the quality of life and livelihood in all fields.</td>
<td>Likert</td>
</tr>
<tr>
<td>Tingkat Kesejahteraan (Y2)</td>
<td>Welfare level is a system of life and livelihood of a person both socially material and spiritual which is accompanied by a sense of safety, morality and peace of mind and body, so as to meet the needs jasmaniah, rohaniah dan sosialnya.</td>
<td>Likert</td>
</tr>
</tbody>
</table>

Data collection techniques used in the form of primary data and secondary data. Primary data obtained from interviews directly from respondents with the help of a questionnaire that has been prepared. Besides primary data, secondary data are used as supporting data in this study. Secondary data was obtained from related institutions, such as the District Office, Village Hall, relevant Dinas and other relevant sources. Data collected from the questionnaire was then tested for validity and reliability.

For data analysis from this study Structural Equation Modeling (SEM) was used. SEM is a statistical modeling technique that is very cross-sectional, linear and general. Included in this, SEM is factor analysis (factor analysis), path analysis (path analysis) and regression (regression).
4 Results and Discussion

1) Overview of the Kecamatan District Area

The term sub-district covers an area of 8,118 hectares consisting of 46 villages with a population of 29,084 people and a population density of 358 people. The boundaries of the North Sub-District of the Malacca Strait, South of the Peusangan District, the West of the Kuala District, the East of the Kuta Blang District and the Gandapura District.

<table>
<thead>
<tr>
<th>No</th>
<th>Desa</th>
<th>Luas Lahan (Ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Desa Pulo U</td>
<td>250</td>
</tr>
<tr>
<td>2</td>
<td>Desa Abeuk Jaloh</td>
<td>93</td>
</tr>
<tr>
<td>3</td>
<td>Desa Pulo Seuna</td>
<td>138</td>
</tr>
<tr>
<td>4</td>
<td>Desa Pulo Blang</td>
<td>79</td>
</tr>
<tr>
<td>5</td>
<td>Desa Pulo Iboih</td>
<td>465</td>
</tr>
<tr>
<td>6</td>
<td>Desa Pulo Reudeup</td>
<td>197</td>
</tr>
<tr>
<td>7</td>
<td>Desa Gampong Meulinteung</td>
<td>215</td>
</tr>
<tr>
<td>8</td>
<td>Desa Lamkuta</td>
<td>140</td>
</tr>
<tr>
<td>9</td>
<td>Desa Rusep Ara</td>
<td>265</td>
</tr>
<tr>
<td>10</td>
<td>Desa Lueng</td>
<td>140</td>
</tr>
<tr>
<td>11</td>
<td>Desa Ruseb Dayah</td>
<td>239</td>
</tr>
<tr>
<td>12</td>
<td>Desa Kambuek</td>
<td>98</td>
</tr>
<tr>
<td>13</td>
<td>Desa Bada Timur</td>
<td>100</td>
</tr>
<tr>
<td>14</td>
<td>Desa Bada Barat</td>
<td>95</td>
</tr>
<tr>
<td>15</td>
<td>Desa Barat Lanyan</td>
<td>190</td>
</tr>
<tr>
<td>16</td>
<td>Desa Geundot</td>
<td>85</td>
</tr>
<tr>
<td>17</td>
<td>Desa Meunasah Krueng</td>
<td>230</td>
</tr>
<tr>
<td>18</td>
<td>Desa Paya Bieng</td>
<td>130</td>
</tr>
<tr>
<td>19</td>
<td>Desa Jangka Alue</td>
<td>142</td>
</tr>
<tr>
<td>20</td>
<td>Desa Jangka Keutapang</td>
<td>149</td>
</tr>
<tr>
<td>21</td>
<td>Desa Lampoh Rayeuk</td>
<td>130</td>
</tr>
<tr>
<td>22</td>
<td>Desa Lhok Bugeng</td>
<td>136</td>
</tr>
<tr>
<td>23</td>
<td>Desa Linggong</td>
<td>100</td>
</tr>
<tr>
<td>24</td>
<td>Desa Alue Baya</td>
<td>281</td>
</tr>
<tr>
<td>25</td>
<td>Desa Tanoh Anoe</td>
<td>120</td>
</tr>
<tr>
<td>No</td>
<td>Desa</td>
<td>Luas Lahan (Ha)</td>
</tr>
<tr>
<td>----</td>
<td>-----------------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>26</td>
<td>Desa Tanjong</td>
<td>95</td>
</tr>
<tr>
<td>27</td>
<td>Desa Jangka Alue Bie,</td>
<td>120</td>
</tr>
<tr>
<td>28</td>
<td>Desa Alue Bie Pusong</td>
<td>70</td>
</tr>
<tr>
<td>29</td>
<td>Desa Jangka Mesjid</td>
<td>120</td>
</tr>
<tr>
<td>30</td>
<td>Desa Jangka Alue U</td>
<td>320</td>
</tr>
<tr>
<td>31</td>
<td>Desa Pante Peusangan</td>
<td>213</td>
</tr>
<tr>
<td>32</td>
<td>Desa Bugak Krueng</td>
<td>171</td>
</tr>
<tr>
<td>33</td>
<td>Desa Bugak Mesjid</td>
<td>175</td>
</tr>
<tr>
<td>34</td>
<td>Desa Krueng Mate</td>
<td>186</td>
</tr>
<tr>
<td>35</td>
<td>Desa Bugeng</td>
<td>237</td>
</tr>
<tr>
<td>36</td>
<td>Desa Kuala Ceurape</td>
<td>174</td>
</tr>
<tr>
<td>37</td>
<td>Desa Alue Bayeu Utang</td>
<td>152</td>
</tr>
<tr>
<td>38</td>
<td>Desa Ulee Ceue</td>
<td>159</td>
</tr>
<tr>
<td>39</td>
<td>Desa Alue Kuta</td>
<td>325</td>
</tr>
<tr>
<td>40</td>
<td>Desa Punjot</td>
<td>284</td>
</tr>
<tr>
<td>41</td>
<td>Desa Pulo Pineung Mns. Dua</td>
<td>161</td>
</tr>
<tr>
<td>42</td>
<td>Desa Bugak Blang</td>
<td>114</td>
</tr>
<tr>
<td>43</td>
<td>Desa Pante Sukon</td>
<td>218</td>
</tr>
<tr>
<td>44</td>
<td>Desa Pante Paku</td>
<td>255</td>
</tr>
<tr>
<td>45</td>
<td>Desa Pante Ranub</td>
<td>160</td>
</tr>
<tr>
<td>46</td>
<td>Desa Alue Buya Pasi</td>
<td>202</td>
</tr>
</tbody>
</table>

Source: Central Bureau of Statistics Bireun

From the table above, it can be seen that Tanoh Anoe Village, Kecamatan District which has an area of 120 hectares, when seen Tanoh Anoe Village has an area not too wide and not too small compared to other villages. The village that has a large land area is Pulo Iboih Village with an area of 465 Ha, while the village that has a small land area is Alue Bie Pusong Village with an area of 90 Ha.

To find out the results of hypothesis testing is done by looking at the value of probability (probability) or by looking at the significance of the relationship of each research variable. The criterion is that if $P < 0.05$, the relationship between variables is significant and can be further analyzed, and vice versa. Therefore, by looking at the probability number ($p$) on the output of the overall path shows a significant value at the 5% level or the standardize value must be more greater than 1.96 ($> 1.96$). (If you use the value of the comparison value with $t$ table, it means that
the value of t count is above 1.96 or >1.96 or t count is greater than t table). AMOS 22 can set the following criteria for accepting and rejecting hypotheses:

If P > 0.05 then H0 is accepted (not significant)
If P < 0.05 then H0 is rejected (significant)

The hypothesis in this study is divided into 5 (five) tests, namely:

1) Production factors affect productivity in Tanoh Anoe Village, Kecamatan Term Bireun-Aceh District.
2) Production factors have an impact on the level of welfare in Tanoh Anoe Village, Kecamatan Term Bireun-Aceh Regency.
3) Government policies affect productivity in Tanoh Anoe Village, Kecamatan Term Bireun-Aceh District.
4) Government policies affect the level of welfare in Tanoh Anoe Village, Kecamatan Term Bireun-Aceh District.
5) Productivity influences the level of welfare in Tanoh Anoe Village, Kecamatan Term Bireun-Aceh District.

<table>
<thead>
<tr>
<th>Table 3. Hasil estimasi C.R (Critical Ratio) dan P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimate</td>
</tr>
<tr>
<td>PDV &lt;--- FP</td>
</tr>
<tr>
<td>PDV &lt;--- KP</td>
</tr>
<tr>
<td>TK &lt;--- FP</td>
</tr>
<tr>
<td>TK &lt;--- KP</td>
</tr>
<tr>
<td>TK &lt;--- PDV</td>
</tr>
<tr>
<td>fp3 &lt;--- FP</td>
</tr>
<tr>
<td>fp2 &lt;--- FP</td>
</tr>
<tr>
<td>fp1 &lt;--- FP</td>
</tr>
<tr>
<td>kp3 &lt;--- KP</td>
</tr>
<tr>
<td>kp2 &lt;--- KP</td>
</tr>
<tr>
<td>kp1 &lt;--- KP</td>
</tr>
<tr>
<td>pdv1 &lt;--- PDV</td>
</tr>
<tr>
<td>pdv2 &lt;--- PDV</td>
</tr>
<tr>
<td>pdv3 &lt;--- PDV</td>
</tr>
<tr>
<td>tk1 &lt;--- TK</td>
</tr>
<tr>
<td>tk2 &lt;--- TK</td>
</tr>
<tr>
<td>tk3 &lt;--- TK</td>
</tr>
</tbody>
</table>

Sumber : Lampiran Amos
Discussion

The results of the analysis using structural equation modeling (SEM) with AMOS 22 software prove that there is no significant effect of production factors on productivity in Tanoh Anoe Village, Kecamatan Term Bireun-Aceh District.

The insignificance of production factors on productivity is due to the still poor production factors in Tanoh Anoe Village, for example, lack of labor and the majority are elderly housewives with low education, low education levels are one of the factors inhibiting technological innovation in society. According to Soehardjoe and Patoeng [13] stated that education generally influences farmers' ways and mindset more dynamically. The higher the farmer's level of education, the more efficient he works and the more he participates in training in ways that are more productive and more profitable.

This is supported by the theory, Soehardjoe and Patoeng, Banoewidjoyo [14] suggest that the level of education possessed by the workforce can not only increase productivity and quality of work done, but at the same time accelerate the process of completion of the work undertaken. It is clear that the production factor of productivity is not significant because the salt farmer workforce in Tanoh Anoe Village is still relatively low, thus making productivity in Tanoh Anoe Village also low.

The Influence of Production Factors on the Welfare Level

The results of the analysis using structural equation modeling (SEM) with AMOS 22 software prove that there is no significant influence of production factors on the level of welfare in Tanoh Anoe Village, Kecamatan Term Bireun-Aceh District.

The insignificance of the factor of production on the level of welfare due to high capital with low income will affect the welfare level of farmers. Capital is the most fundamental problem that is often faced by farmers. Capital is often an obstacle for a farmer in conducting farming. Capital limitations also make the quantity and quality of results obtained by farmers not optimal. These capital problems are also the main cause of many farmers living below the poverty line (not yet prosperous). The problem will arise how farmers get capital to restart their farming, to purchase raw materials such as seeds, wood and others.

This is supported by Soeharjo and Patong's theory in Risti Diana Putri [15] stating that income is a remuneration from the cooperation of factors of production, land, capital, labor, and management services. Farm income is used by farmers to meet the needs of his family's life, maintain his farm and even expand it.


The results of the analysis using structural equation modeling (SEM) with AMOS 22 software prove that there is no significant effect of government policy on productivity in Tanoh Anoe Village, Kecamatan Term Bireun-Aceh District.

The insignificance of the government's policy on productivity is due to the lack of counseling and training from the government for salt farmers in Tanoh Anoe Village so that it is still constrained for farmers to develop opportunities to sell their produce, and the lack of capital assistance provided by the government to farmers so that it affects productivity the farmers.
Effect of Government Policy on Welfare Level
The results of the analysis using structural equation modeling (SEM) with AMOS 22 software prove that there is no significant effect of government policies on the level of welfare in Tanoh Anoe Village, Kecamatan Term Bireun-Aceh District.

The insignificance of government policies towards the level of welfare is in line with the opinion of Simatupang, Zin, Salim, Thoyib states that government policies on welfare do not have a significant effect, because government policies on welfare levels cannot affect the farm family economy.

Effect of Productivity on Welfare Level
The results of the analysis using structural equation modeling (SEM) with AMOS 22 software prove that there is a significant effect of productivity on the level of welfare in Tanoh Anoe Village, Kecamatan Term Bireun-Aceh District.

With the significant productivity of the level of welfare of farmers in the village of Tanoh Anoe due to the long experience owned by farmers so as to produce salt is very easy, according to Soekartawi [16] a long experience of farming will make farmers more careful in the decision making process, the intended decision is to make a good product and not a failed product. So that with a good product to be marketed makes farmers' income increases. In line with the opinion of Widnyana [2] productivity is an important factor in realizing the success of increasing farmers' income itself, but it also can produce farm products that are free of chemicals whose impact on natural and environmental damage.

What affects the welfare level of salt farmers is the area of land, according to Sajogyo that the larger the area of farming land, the greater the percentage of production income, thus that land area plays an important role on the income of farmers.

4 Conclusions and Suggestions

Conclusion
The conclusions that can be poured in this study are,

1) Production factor is not a significant effect on the productivity of salt farmers in the village of Tanoh Anoe, the sub-district of Bireun-Aceh District.

2) The production factor is not a significant effect on the level of welfare of salt farmers in Tanoh Anoe village, Bireun-Aceh District.

3) Government policy has insignificant influence on the productivity of salt farmers in Tanoh Anoe village, Bireun-Aceh District.

4) Government policy does not significantly influence the level of welfare of salt farmers in the village of Tanoh Anoe, the sub-district of Bireun-Aceh District.

5) Productivity significant influence on the level of welfare of salt farmers in the village of Tanoh Anoe sub-district of Bireun-Aceh District.
Suggestion

Based on the discussion above it is known that the factors of production and government policies are not significant to affect the productivity and welfare of salt farmers in the village of Tanoh Anoe sub-district, Bireun-Aceh District. Suggestions obtained from the results of this study are:

1) The insignificance of production factors on productivity in Tanoh Anoe village, the district of Bireun-Aceh district, is due to the low labor, capital and raw materials so that the farmers are not yet productive. In order to increase the labor productivity of salt farmers must have formal education and long working experience so as to increase production results with better quality, land area also affects production results and can increase the productivity of farmers.

2) The insignificance of production factors on the level of welfare in the Tanoh Anoe village, the district of Bireun-Aceh district, is due to the low labor, capital and raw materials so that salt farmers are still not yet prosperous. Workers greatly affect the level of welfare the more labor the more the results of production and income are increasing, and the capital spent to buy raw materials can be fulfilled. In addition, farmers must be able to arrange time to rest so that health can be maintained properly.

3) The insignificance of government policies on productivity in Tanoh Anoe village, the district of Bireun-Aceh district, which is caused by the government's lack of attention to salt farmers in Tanoh Anoe village so that the lack of counseling (empowerment), training and capital assistance provided by the government has resulted in the low productivity of salt farmers. Salt farmers in Tanoh Anoe village really need counseling (empowerment) to facilitate the marketing of products, and training for farmers who have less work experience or training for making more modern salt.

4) The insignificance of government policies towards the level of welfare in the village of Tanoh Anoe, the sub-district of Bireun-Aceh District, makes reference to the government to pay more attention in the form of useful extension (empowerment), training to produce higher quality salt so that it is easy to market and farmers really need capital from the government because, capital assistance provided is the right solution in the problem of poverty reduction of salt farmers in the village of Tanoh Anoe.

5) Significant productivity of the level of welfare of salt farmers in Tanoh Anoe village, Bireun-Aceh district-run district to maintain education, work experience and land area in order to increase the level of welfare of salt farmers. With formal education, long work experience and sufficient land area can affect farmers' incomes, not just income and better living conditions. While more income farmers can save for food and clothing needs.

6. References


The Advancement of Demographics Learning Tools

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Abstract. This study is aimed at producing a learning tools to a lecturing program in form of: lectures unit (SAP), Lecturing Text Books (BTPM), and Demography lecturing attendant activity sheet (LKPDM), and the ability assessment of attendant program (PKHPM) it is all in order to ensure demography subject be more valid, practical, and effective with in a learning model aided with Think, Pair and Share (TPS) and data based. The teaching material matter to Demography Techniques subject to develop such as; Introduction, base source of statistics, collecting and data processing of demographic, size population, population distribution of geographic region, population distribution of geographic area, the age composition and gender, composition of race and ethnic, change of population, education and characteristics of economic, mortality, life table, demography of health, birth-rate bases to census and survey, population growth, international migration, internal migration and short-time mobility, and population forecast. The process how to implement perhaps prepare an attending tools component either: to plan an attendant unit (SAP), attendance book of demographic (BBKD), and attendance activity sheet (LKPM), and ability test of Demographic study (TKHPD), and ability assessment of attendant program (PKHPM) to be distributed over all Lecturers Team on Mathematics Department of FMIPA Unimed.

Keywords: advancement

1 Introduction

According to population census of 2010, the Indonesian demography had total population some 237,641,326 million persons, resulted in this nation as the 4th greatest of population over the world. The amount is estimated going to rise up as projected for 2025 the Indonesian population amounting 275 million people, and it may achieve 305 million people for 2035. Java island shall be one of the most crowded regions with more than 107 million people live on the region with width as large as New York. Indonesia has the most variously cultures and local tongues [1].

The planet we live with has 195 nations of total population amounting 7,405,107,650 people (according to CIA World Factbook for 2017). Chine nation is the first with the most population greatest over the world totally own population of 1.38 million people noted preciously 1,379,302,771 people. The amount constitutes of 18.6% of all the world population. Still to the second rate, noted India with total population of 1,281,935,911 people or around 17.3% of whole world population [2]. United States runs to the third rate with total population of 326,625,791 people (around 4.4% of whole world population).
The following is the birth-rate list on variously nations over the world. The information as below refers to a research result of UN and CIA World Factbook. The information below is based on birth-rate per thousand population of interval time, year, or a certain period.

The Purpose and Uses of Demography

The main objective in this matter is to observe the quantity and population distribution in a certain area, also to reveal its growth in the past, got decreased and spreading out properly with data available. Evolving casualty correlation between growing population rate to variously social organization aspects [4]. Forecasting population growth in future and its consequences possibility. The uses of demography is playing a very important role in planning of development, more complete and with data accurate of population available should accelerate and simplify to plan the development as well as [5]

The Formulation of the Problem

- How to assess validity of learning tools of Demographics as improved up on FMIPA Universitas Negeri Medan, Department of Mathematics?
- How to make more practical the learning tools of Demographics as improved up on FMIPA Universitas Negeri Medan, Department of Mathematics?
- How to make more effective the learning tools of Demographics as improved up on FMIPA Universitas Negeri Medan, Department of Mathematics?

As young generation for future leader is worth to submit them the values, cultures, basic knowledge, mainly demography as a development human agent for they shall receive the development relay in leading position, also in middle and in rear part of public, it should be ready to hand-over responsibility to lead this nation for future. How to improve quality of human resources then get a golden generation gained for 2035, noted that a demographics learning should be processed with accurate data and contextual [6].

This is in order to have Bruner cognitive development theory applied and to understand abstract concepts. It is highly required representative that human sense may catch in. There are three representative phases that can be taken by learning in population and environmental, namely:

a) Enactive phase, with a learning stage where information or knowledge must be observed actively by students by using a concrete objects.
b) Econics phase, it is a learning stage where the knowledge might be presented in visual vision (picture, schema, diagram, graphic, table, and etc.) as it may illuminate a concrete situation existed empirically.

c) Symbolical phase, it is a stage whereby knowledge is presented in a symbolic-abstract, either verbal symbols, with mathematics symbols or others abstract symbols.

**Cooperative Learning Type Think Pair and Share**

The uses of cooperative learning with a think pair and share type method by story telling may lead to more attractive and encourage the student attending the class with story telling. The second stage (pair) to use is a paired story-telling technique. The paired Story-telling teaching method has been established as interactive approach among those students, teachers, and material of attendance. With this method, the students can share in paired mainly to solve the difficulties by telling in classroom. By share, every body can show in participation each other. Think-Pair-Share as one of types in a cooperative learning, and it offer opportunity to every student to think, in pair or to work by partner, share, and help each other with it then may enrich variation in a learning model be attractive, to please, to improve activity and to work each other.

Think-Pair Share is one of cooperative learning types invented by Frank Lyman from Maryland University in 1985, and known as one of structures. Think-pair share persistently spare time to all students to think and respond one and another. Think-pair share also give them opportunity to work alone and in cooperative. Another benefit is to give participation optimally to all students.

Several advantages of the learning tools as above indicated that tools is highly important to prepare before starting the learning process. The learning tools may facilitate the students to be actively participating to improve one-self potential become have competence. So, a teacher is obliged to guide all students in conducting variously activities according to own potential as a competence required.

Still existed weakness, this indicated that quality of learning tool available not well yet. And it refers to a reality that tools as had been developed by teacher not been ever test on its validity, its practical or effectiveness, with which this tree points are highly required as criterion.

Validity aspect covering two matters namely validity of content and validity of construct [7. Validity of content is based on theories when arrange its learning tools, while validity of construct is based on interaction in components in a learning tools. Still, aspect of practical in the tools is done to see whether component of tools have been done whole or not. Further, aspect of effectiveness should be viewed from its achievement, since this aspect can be seen from completeness in all result of study, activity of student as long as learning and their capability in Mathematics [8]. The tools of attendance as developed by lecturer is not tested its effectiveness yet.

For the learning tools planned to be executed inside class-room that learning tools as oriented PBM model expected as alternative to generate a learning properly and it should improve their ability of thinking mainly on demographics and push them to study autonomous. Based on above mentioned, the main objective of this study are: (1) how to promote validity and effectiveness of learning tools, (2) how to improve their thinking ability with the result in the demographics study and to their autonomous up there using a learning tools as advancement [9].
The Learning Model Syntax of Think, Pair and Share

The syntax of learning model with think pair, share cooperative type comprising of five stages, in three stages as main phase with its specific characteristics namely think, pair, and share. The following is the stages to have learning model with thin pair share type.

<table>
<thead>
<tr>
<th>The Steps</th>
<th>The Learning Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage-1 : Introduction</td>
<td>Teacher explains the game rule and its time limit to each activity to motivate the student take part in activity of solving problem. Also mention competency point should gain.</td>
</tr>
<tr>
<td>Step-2 Think</td>
<td>Teacher demonstrates simply in order to get a base concept and know better. On this stage, the student is given “Think time” by teacher, mainly to gain respond individually on the question given. While considering, the teacher should understand the students’ basic knowledge while answer the questions given. The students should make own respond individually on LKS sheet</td>
</tr>
<tr>
<td>Step -3 Pair</td>
<td>Process of think pair share started when the student has already pair each. Then, teacher may ask that each student get pair in fellow-chair. The student discuss immediately about the answer to the question has been given.</td>
</tr>
<tr>
<td>Step – 4 Share</td>
<td>A pair of student is asked randomly to share their opinion to all students, the activity should be guided by the teacher.</td>
</tr>
<tr>
<td>Step – 5 Appreciation</td>
<td>The student is assessed individually and in group</td>
</tr>
</tbody>
</table>

3 Research Method

This study is a developmental research adopted 4D Thiagarajan development model. According to 4D Thiagarajan Development Model usually applied to obtain a certain product also possibly to test its effectiveness [10]. This study is oriented to a product development where its improvement is described as accurate as possible and at last the product is evaluated. The development process is correlated with activity on each development stage. Beside have development its instrument and material teaching there is also improved such as : SAP, the questions at once assess its parameter numbers on population and its meaning, activity sheet, observation sheet of activity, observation sheet of teacher’s activity, respond sheet of student, and validity sheet of instrument and a valid and practical learning material.

The subject to this study are those students attendant to Semester VI of Mathematics Department FMIPA Universitas Negeri Medan involved 58 students, still the object such as: learning material, Lecturing Unit (SAP), Score Instrument, Activity sheet of student, assignment sheet of student, it should determine parameter of population and meaning.

The development model to adopt is 4-D model invented by Thiagarajan, Semmel, and Semmel modified already into four steps namely: first step is to define, second is to design, and the third is to develop, and the last is to disseminate. In details of 4-D Thiagarajan development model are as followings:

*To define stage*

The objective of defining is to determine and to define the requirements of study, need to analyze the purpose and limitation of material. On this stage comprising 5 main steps, they are
(a) to analyze a fore-end; (b) analyze the student, (c) to analyze their tasks; (d) to analyze the concept, and (e) to formulate the purpose of study.

**To Design Stage**

The design stage is aimed at designing the learning tools. There are four steps done on this phase, namely: (a) to arrange standard test (constructing criterion-referenced test; (b) media selection refers to the characteristic of material and the purpose of learning, (c) format selection, namely to observe the formats of material available and to decide the format need to develop then, (d) make an initial design refers to the format selected.

**The Development Stage**

The development stage is to generate a development product done in two stages, namely: (1) expert appraisal then its revision, (2) developmental testing. The purpose conducting this development is to generate a final instrument and study material after having revision refers to inputs given by the experts and data result of testing.

**Dissemination Stage**

The dissemination stage constituted the last step of development. Dissemination stage is done to promote a product development to be accepted by user, either individually, in a group or system. Producer and distributor should be selective and cooperated to create a properly material. Dissemination can be done in other classroom aimed at knowing the effectiveness of using the tools of the learning process. The dissemination can be done through a transmission process to the learning practitioners concerned in a certain forum. The dissemination alike aimed at having inputs, corrections, suggestions, evaluation, perhaps in order to improve the last product of development and gain a ready to adopt by others.

**The Technique of Data Collection**

The instruments to use in this research are: (1) validity sheet, (2) sheet to expert appraisal or practitioner about its practical and effectiveness of material; (3) observation sheet; (4) questionnaire sheet of student and teacher; and (5) test of attendance.

In order to indicate validity of learning tools is used a descriptive statistic analysis based on average score of each learning tools that has been validated. To determine this total validity aspect, the following should be done.

1) Make, and recapitulate data appraisal of validity its learning tools into table, comprising of: Aspect ($A_i$), indicator ($I_i$), and Value ($V_{ji}$) of each expert. These aspects can be seen on sheet of validity of tools as attached.

2) To determine its average score from expert to each indicator with formulation:

$$I_i = \frac{\sum_{j=1}^{n} V_{ji}}{n}$$

Notes:
- $V_{ji}$ is data of score by appraiser of the-$j$ over indicator to-$i$;
- n is amount of appraiser (expert and practitioner)

3) To determine average score to each aspect with formulation:
\[
A_i = \frac{\sum_{j=1}^{m} I_{ij}}{m}
\]

Notes:
- \(A_i\) is average score to aspect the-i,
- \(I_{ij}\) is average to aspect the-i indicator the-j,
- \(m\) is the amount of indicator to aspect the-i

4) To determine score \(V_a\) or value in average total of average score to all aspect with the
formulation:

\[
V_a = \frac{\sum_{i=1}^{n} A_i}{n}
\]

Notes:
- \(V_a\) is average score total to all aspect
- \(A_i\) is average score to aspect the-i,
- \(n\) is amount of aspects

Thence, value \(V_a\) or score average this total is referred to interval determination of
validity rate of its learning tools of problem based as developed, as showed in the following
Table 3.

<table>
<thead>
<tr>
<th>No</th>
<th>(V_a) or Average total Score</th>
<th>Criterion Validity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(1 \leq V_a &lt; 2)</td>
<td>Not valid</td>
</tr>
<tr>
<td>2</td>
<td>(2 \leq V_a &lt; 3)</td>
<td>Less Valid</td>
</tr>
<tr>
<td>3</td>
<td>(3 \leq V_a &lt; 4)</td>
<td>Moderate Valid</td>
</tr>
<tr>
<td>4</td>
<td>(4 \leq V_a &lt; 5)</td>
<td>Valid</td>
</tr>
<tr>
<td>5</td>
<td>(V_a = 5)</td>
<td>Very Valid</td>
</tr>
</tbody>
</table>

Criterion indicated that the learning tool as developed in a good validity rate if a minimal
validity rate achieved is in valid rate. If the validity achieved rate under valid, it must need
revision according to correction of expert. Further, required need validity activity. After
having a valid category, perhaps the tool has been reliable to test in field.

The analysis to data of activity is done by calculating percentage of observation by
student, namely with:

\[
\text{Percentage activity of student} = \frac{\text{Frequency each aspect}}{\text{Amount of student all aspect}} \times 100\%
\]

It is given 5% only as tolerated limit to ideal time. Determination of criterion
effectiveness to activity is based on ideal time achievement decided when arranging the plan
of learning problem based.

The respond of student is analyzed by calculating percentage amount of student in
positive reply on each category as in questionnaire. Criterion decided sounding the student
have a positive respond upon the learning tool as developed is whenever the percentage in amount student with positive respond to each category or aspect noted (PRS) ≥ 80%.

Having classical completeness (PKK) is obtained after calculating percentage amount of student got completed individually, for its percentage can be done by formulation:

\[
\text{PKK} = \frac{\text{Amount student completed in studying}}{\text{Total amount of student all}} \times 100\%
\]

Any classroom is classified got completed in studying if PKK ≥ 85% [11]

Acknowledgment to use in autonomous instrument in studying is arranged bases to Likert scale. The result of measuring in autonomous to study is with score. The instrument as already filled then seeking its total score, so each student gets score. Further, to find average score of all students and its standard deviation. The category result of calculation can be seen on Table 4 with its standard.

<table>
<thead>
<tr>
<th>Score</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \bar{X} \geq \bar{X} + SB_\bar{X} )</td>
<td>Very high</td>
</tr>
<tr>
<td>( \bar{X} + SB_\bar{X} &gt; X \geq \bar{X} )</td>
<td>High</td>
</tr>
<tr>
<td>( X &gt; \bar{X} \geq \bar{X} - SB_\bar{X} )</td>
<td>Lower</td>
</tr>
<tr>
<td>( X &lt; \bar{X} - SB_\bar{X} )</td>
<td>Very low</td>
</tr>
</tbody>
</table>

(Source: Mardapi, 2008: 123)

Notes:
- \( \bar{X} \) is average score of student
- \( SB_\bar{X} \) is standard deviation of score in all students in one class room
- \( X \) is score rate obtained by student

4 Results and Discussion

The objective of this study is to develop a learning tool be valid and effective using a learning tool of PMB model oriented. The result of development are Attendance Unit (SAP), book of student (BS), working sheet of student (LKS), thinking ability test in attendance of Demographics (TKBK) and autonomous studying questionnaire (AKB).

The Result of Observation by Student

The result of observation by student on tri-out II is shown on Table 5. On this table can be seen that percentage activity of student on each category for the first session are 27,55%; 12,98%; 37,03%; 13,74%; 7,34% and 1,43%. The percentage activity of student to hear and know explanation of teacher / friend on session 1 noted 26.98% in 100 minutes. This percentage is obtained from the result divided frequency activity of 14 students to category (a), namely 69 to 252 and multiplied 100%. Number of 252 is obtained from the result divided much time used to conduct the attendance on session 1, namely 90 minutes with time unit of observation, namely 5 minutes and multiply to amount of student observed namely 14.
### Table 5. The Summary Result of Observation Activity of Students in Tri-out II

<table>
<thead>
<tr>
<th>Activity</th>
<th>Session 1</th>
<th></th>
<th>Session 2</th>
<th></th>
<th>Session 3</th>
<th></th>
<th>Average (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Freq</td>
<td>Percent (%)</td>
<td>Freq</td>
<td>Percent (%)</td>
<td>Freq</td>
<td>Percent (%)</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>69</td>
<td>27.38</td>
<td>65</td>
<td>26.85</td>
<td>91</td>
<td>28.43</td>
<td>27.55</td>
</tr>
<tr>
<td>B</td>
<td>32</td>
<td>12.69</td>
<td>28</td>
<td>11.57</td>
<td>47</td>
<td>14.68</td>
<td>12.98</td>
</tr>
<tr>
<td>C</td>
<td>97</td>
<td>38.49</td>
<td>91</td>
<td>37.60</td>
<td>112</td>
<td>35.80</td>
<td>37.03</td>
</tr>
<tr>
<td>D</td>
<td>36</td>
<td>14.28</td>
<td>35</td>
<td>14.46</td>
<td>40</td>
<td>12.50</td>
<td>13.74</td>
</tr>
<tr>
<td>E</td>
<td>15</td>
<td>5.95</td>
<td>20</td>
<td>8.26</td>
<td>24</td>
<td>7.81</td>
<td>7.34</td>
</tr>
<tr>
<td>F</td>
<td>3</td>
<td>1.19</td>
<td>3</td>
<td>1.23</td>
<td>6</td>
<td>1.87</td>
<td>1.43</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>252</strong></td>
<td><strong>100</strong></td>
<td><strong>242</strong></td>
<td><strong>100</strong></td>
<td><strong>320</strong></td>
<td><strong>100</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Notes:

a. Pay attention/ hear to explanation of teacher / friend
b. Read/ know problem contextual in book / LKM
c. Solving the problem/ find the way out and how to take over
d. Have Discussion/ ask friend or teacher
e. Take conclusion by procedure or concept and present the result of working
f. Behavior of student as not relevant to TPS model

With the same way obtained percentage of having activity to the learning and teaching on other activity category on each session. The time spent and amount of student observed to each session is not always in same (in this matter is 100 minutes or 150 minutes, while the student to observe in session 1 is amount 14 students, to session 2 noted 13 students, while to session 3 amount 12 students) so determination to percentage of each activity category is also not same, it depends on time of attendance and amount of students to observe in each session. Further, average percentage of time activity of student in each category for three times session are 27.38%, 12.69%, 38.49%; 14.28%, 5.95%, and 1.19%.
The Result of Student’s Respond Questionnaire

The questionnaire of students’ respond is given on last of each session. Tabulation and percentage result of questionnaire on Tri-out II shall yield average percentage result of their respond as displayed on Table 8. Based on data available is obtained average percentage of amount student expressing be pleases on the component and activity of attendance namely 93.52%, 91.38%, 96.55%, 93.1%, and 93.1%. This percentage is also obtained from the result dividing total percentage positive respond on all three sessions to tri-out II with many sessions.

In whole, average percentage respond of student on each aspect are as following: (1) 95.1% students expressing be pleasure on the component and their attendance; (2) 90.85% students expressing the component and the attendance is newly for them; (3) 92.1% students expressing out willingness to attend the class of Demographics with other material; (4) 90.7% expressing out language in use to books and LKM is clear; and (5) 94.1% students expressing out interested with book appearance and to LKM available. The percentage average total respond of student in positive on the tri-out-II noted 92.58%. If the result of this analysis refers to criterion as previously decided may take conclusion that their respond upon the component of activity to attendant of TPS model oriented is positive.

The Result of Test Ability Attending Demographics

The result of test ability attending Demographics on the tri-out II may yield output as Table 6. In this table can be seen average result of ability attending the Demographics as on tri-out II is 3.16 by maximum score 4.0. Percentage of student completed is noted 91.37%. This percentage is obtained by dividing frequency of student completed with 52 to total students namely 58 and multiply 100%. This percentage has fulfilled a classical completeness.
as decided namely \( \geq 85\% \). Therefore, it is concluded that a classical completeness criterion has fulfilled.

| Table 6. Test Ability in Attending Demographics as On Tri-out II |
|---------------------------------|----------------|----------------|
| Category                        | Frequency | Percentage (%) | Average    |
| Completed                       | 52        | 91,37          | 3,16       |
| Not Completed                   | 6         | 8,63           |            |
| Total                           | 58        | 100            |            |

The Result in Questionnaire of Student Autonomous

The result in questionnaire of their autonomous to study as on tri-out II can be seen on the conclusion taken by questionnaire in autonomous to study as obtained, it is shown on Table 7 as following.

| Table 7. The Result in Questionnaire of Their Autonomous on Tri-out II |
|---------------------------------|----------------|----------------|
| Category                        | Frequency | Percentage (%) | Average    |
| Very High                       | 9         | 15,51          |            |
| High                            | 40        | 68,96          | 56,42      |
| Low                             | 6         | 10,34          |            |
| Very Low                        | 3         | 5,17           |            |
| Total                           | 58        | 100            |            |

By the table can be seen that average in autonomous to study of student is noted 56.42 by maximum score 72. Percentage autonomous to study by student with very high category is noted 15.51\%, for this rate is obtained from dividing to many students with very high category namely 9 with many students of totally 58 and to multiply 100\%. The other category rate is also obtained in the same way.

a. Analysis Comparison of Result to Try-out I and II

Following conducted trial in two times, the data obtained on both trials have been analyzed mainly then to see the result of correction done. In this case to show comparison of activity student, their respond, existing of program of attending in Demographics and let see after it.

1) Comparison Activity of Student

Average percentage of times to activity in each category as long as three times session either to trial I or II as shown in Table 8 below.
Table 8. Average Percentage of Activity by Students

<table>
<thead>
<tr>
<th>Activity</th>
<th>Percentage Activity (%)</th>
<th>Trial I</th>
<th>Trial II</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>24.13%</td>
<td>25.86%</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>22.41%</td>
<td>24.13%</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>27.58%</td>
<td>20.68%</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>12.06%</td>
<td>12.06%</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>10.34%</td>
<td>10.34%</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>3.44%</td>
<td>6.89%</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
<td><strong>100</strong></td>
<td></td>
</tr>
</tbody>
</table>

Average activity to each category on Trial I is 24.13%, 22.41%, 27.58%, 12.06%, 10.34% and 3.44%. This average percentage is obtained by the result of dividing total percentage activity to each category with the amount sessions, namely 3 sessions. For instance, average activity (a) on trial I namely 24.13% obtained by total percentage of activity (a) on the three sessions namely 22.41%, 27.58%, 12.06% and divided by 3. Average to other activity can be obtained by the same way.

Average percentage of time spend by student in conducting activity can be represented as in Figure 2. The greatest time percentage spent by student as long as having learning – studying is noted category (c) namely solving the problem / find its way and reply to the problem. The percentage of this category on Trial I is 27.58% and on trial II is noted 27.55%. This indicated during conducting the attending, those students dominantly spend time for solving or find resolution problem as on LKM.

![Figure 3. Diagram Percentage of Time Activity by Student](image-url)
The average percentage of time as student conducting activity of watching/listening the attendance is noted 24.13% on the trial I and 25.86% on Trial II of the times provided on each session. Percentage times of this activity on ideal time tolerated interval as previously decided. Average percentage of times as student conducting of reading/understand contextual problem in books/LKPM is noted 22.41% as on Trial I and 24.13% on trial II. This percentage is also yet on ideal time tolerated interval as decided. Average percentage of activity by student to discuss/ask question to friend or teacher, namely 27.58% on trial I and got 20.68% on trial II. Percentage times of this activity also on ideal times tolerated interval decided. Average percentage activity by student taking conclusion in procedure or concept and present the results are 12.06% on trial I, and 12.06% on trial II. Percentage times of this activity on ideal time tolerated interval as decided. While average percentage of times by student conducting not relevant activity with attending is 3.44% on trial I, and 6.89% on trial II. This indicated that as long as attending to each session is always available student conducted activity is not relevant with attending. Meanwhile, this percentage is still on ideal time tolerated interval as decided.

In addition, if average percentage of time to conduct activity is referred to criterion of achieving percentage ideal time in activity by student as decided is concluded that percentage time in activity of student has already fulfilled criterion gaining percentage of time in ideal as decided.

2) Comparison Respond of Student

Average percentage respond of students on trials is presented on Table 9. By this table can be seen that by five aspects as student ask got increasing positive respond. For instance, aspect of pleasure on the component of attending got increased 93.1% up to 94.82%.

<table>
<thead>
<tr>
<th>No.</th>
<th>Aspect</th>
<th>Trial I (%)</th>
<th>Trial II (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Pleasure on Component of Attending</td>
<td>93.10</td>
<td>94.82</td>
</tr>
<tr>
<td>2.</td>
<td>Newly on component of attending</td>
<td>91.37</td>
<td>93.10</td>
</tr>
<tr>
<td>3.</td>
<td>Willingly to attend another class</td>
<td>96.55</td>
<td>96.37</td>
</tr>
<tr>
<td>4.</td>
<td>Certainly in language</td>
<td>94.83</td>
<td>96.55</td>
</tr>
<tr>
<td>5.</td>
<td>Legibility of appearance</td>
<td>91.37</td>
<td>89.65</td>
</tr>
</tbody>
</table>

Average percentage in respond by student on the tool and atmosphere of attending can be represented as Figure 3 as following, from thence can be seen that average percentage respond of student on both trials is over 80%. In refers to Chapter III, this percentage has fulfilled criterion as decided. The greatest increase is on second aspect (updated on component of attending) and on fifth (interested with appearance). This occurred on draft III as correction to draft II, it means found weaknesses on draft II has been corrected bases the result on trial I.
3) **Comparison Ability of Result Attending on Demographics**

Comparison result of test ability after attending in Demographics is presented on Table 10. By this table seen that average ability of thinking in high rate as on trial I is 2.98, while on trial II is 3.25 point. Percentage of student completed on trial I is 86.20% and not completed is 13.80%. Refers to criterion of completeness, percentage of completeness noted 87.93% and this not fulfilled to classical completeness as decided of ≥ 85%, whereas to trial II, percentage of student with complete is noted 87.93% and not complete 12.07%. Percentage completeness of 86.57% and this fulfilled a classical completeness as decided.

<table>
<thead>
<tr>
<th>Remarks</th>
<th>Trial I</th>
<th>Trial II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>2.98</td>
<td>3.25</td>
</tr>
<tr>
<td>Percentage of Student with complete</td>
<td>86.20</td>
<td>87.93</td>
</tr>
<tr>
<td>Percentage student not completed</td>
<td>13.80</td>
<td>12.07</td>
</tr>
</tbody>
</table>
Fig 5. Representation of Classical Complete On Trial I and II

Comparison result of ability of program attending the Demographics is represented in Figure 5. By this figure is seen that got increasing in high on percentage to student completed in studying. The increasing percentage of complete to trial I to Trial II is noted 1.73%. If seen by average as obtained by student, the increasing occurrence in 0.27 point from maximum score of 4.

4) Comparison in Autonomous to Study

Summary in autonomous by student to study obtained is shown on Table 11. By this table seen average autonomous by student in studying as on trial I is noted 46.26, whereas on trial II is 56.42. The average is obtained by dividing total score of all students to the amount of student. Percentage of student on trial I with autonomous category in very high to study is 18.18%, with high is 21.05%, lower 45.45% and very low 9.09%. Percentage of student in category very high noted 18.18% is obtained from amount of student included category autonomous to study with very high (in this case 6) is divided amount students namely 33 and to multiply 100%. Whereas, percentage of student to trial II with category in autonomous to study in very high 21.05%, high 23.68%, lower 47.37% and very low 5.17%.

<table>
<thead>
<tr>
<th>Remarks</th>
<th>Trial I</th>
<th>Trial II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>46.26</td>
<td>56.42</td>
</tr>
<tr>
<td>Percentage student in category very high (%)</td>
<td>18.18</td>
<td>21.05</td>
</tr>
<tr>
<td>Percentage student in category high (%)</td>
<td>27.27</td>
<td>23.68</td>
</tr>
<tr>
<td>Percentage student in category lower (%)</td>
<td>45.45</td>
<td>47.37</td>
</tr>
<tr>
<td>Percentage student in very low (%)</td>
<td>9.09</td>
<td>5.17</td>
</tr>
</tbody>
</table>
Representative in category autonomous to student in studying is shown on Figure 5.5. By this program seen that on trial II occurrence increasing up to category very high and lower. The increasing up however is obtained by reducing percentage of student in category high and very low. Having increased on category very high is 2.87% and on category lower is 3.92%.

On the last stage of development is obtained a field trial there is gained a final attending tool. This final tool comprising of SAP, LKPM, books, test ability of thinking in very high and with questionnaire autonomous to student by student. This final tool is presented successively already booked.

![Percentage Category in Autonomous to Study](chart.png)

Refers to result of research in validity, practical, and effectiveness of learning tool on Demographics as developed and finding as long as conducting the activity, is obtained some conclusions as the answer to formulation of problems as submitted. The conclusions as obtained are as followings:

1) The learning tool as developed data based with a learning model of TPS on subject Demographics to Mathematics Study Program in FMIPA Unimed has fulfilled criterion of validity. The experts urged average score total validity to a plan of learning implementation (RPP) is noted 4.36 with criterion valid, guidance book of teacher (BPG) noted 4.13 with criterion valid. Book to attendant (BPD) noted 4.16 with criterion valid, activity sheet of student (LKPD) noted 4.38 with criterion valid and test ability of solving problem (TKPM) noted 4 with criterion valid. Whereas, based instrument trial also included the four points of test ability to solving problem with category valid.

2) Upon the learning tool as developed in data based with a learning model TPS on Demographics on Study Program Mathematics FMIPA Unimed has fulfilled criterion be practical. Bases to aspect of practical on the result of trial in field, average score to administer the learning tool is on category implemented very good (4≤R≤5) namely 4.33. In respond of student upon the learning tool as developed is in category very
positive \((R_{TP}\geq 85\%)\) namely 89.31%; and respond of teacher upon the learning tool as developed is in category very good \((4\leq R_{C} < 5)\) namely 4.13.

3) Upon the learning tool as developed in data based with a learning model TPS on Demographics on Study Program FMIPA Unimed has fulfilled criterion validity there is fulfilling already criterion effectiveness. The effectiveness of learning tool is mentioned as the followings:

a) On the result of first field trial, based on effectiveness aspect: (1) average score post-test is 81.31, with percentage achieving 76.92% with total attendant completed is 20 students. Achieving classically on result of test ability on solving in mathematics by those students is noted 76.92% \(\leq 85\%\) (KKM), so achievement the result in ability on solving to mathematics not achieved classically; (2) capability of teacher to manage the learning as long as three sessions average score by two observer namely 2.96 is on category “not good” \((2 \leq N_{KG} < 3)\), bases criterion of effectiveness, is noted effective if average ability of teacher to all session achieved criterion minimal is good \((3 \leq N_{KG} < 4)\), so capability of teacher to manage the learning is noted not yet effective; (3) activity of students is on criterion limited effectiveness of learning due to percentage of activity to each category of observation and each session is on criterion limited effectiveness in learning, so the learning tool not got any revision bases the result of observation in activity. By the three indicator of effectiveness on the field trial as first is concluded that the learning tool is not effective yet and need revision and also should be done field trial in second.

b) On the result as second trial, bases to effectiveness aspect: (1) average score post-test is noted 94.38, with percentage achieved of 96.15% with total attendants in completed is 25 students. Achieving classically on result of test ability of solving problem on mathematics is noted 96.15% \(\geq 85\%\) (KKM), so the achievement result of studying mainly solving the problem in mathematics has already achieved classically; (2) ability of teacher to manage the learning as long as three sessions average score by two observers namely 3.67 is noted category “good enough” \((3 \leq N_{KG} < 4)\), bases criterion effectiveness, is considered effective if average ability of teacher to all sessions achieving minimum criterion of good \((3 \leq N_{KG} < 4)\), so ability of teacher to manage the learning is already effective, (3) activity of student is on criterion limited effective to learning due to percentage of activity on each category of observation and each session is on criterion limited effectiveness in learning, so the learning tool got no any revision. By the three category of effectiveness on field trial in secondly concluded that the learning tool is already effective.

c) Improving result of ability in attending Demographics data based with learning model TPS as on study program Mathematics of FMIPA Unimed is seen from the average score of achieving ability as result of attending Demographic, percentage classical achievement of \(\geq 85\%\), and average each indicator of ability on solving problem. On the first field trial, with result of post-test ability to solving problem on Mathematics is obtained the average score noted 81.31. Whereas on the trial in field secondly, by the result post-test ability of solving problem on Mathematics is obtained average score noted 94.38. It is noted increased result in post-test as field trial in first to the second field trial is noted 13.07 points. Further, on the first trial percentage classical achievement ability of solving problems on mathematics is obtained its percentage of 76.92%, whereas on second field trial, percentage ability
in solving problem is obtained its percentage of 96.15. It means, increased up percentage achievement classical on first field trial to the second is 19.23%. The last, on the first field trial, average score upon the four indicators, namely understanding the problem, arrange the solution, administer to solving problem, and check-recheck namely noted 90.00; 81.89; 72.40; and 70.91. Whereas on the second field trial, average score upon the four indicators, namely to understand, arrange the solving problem, administer the solving, and recheck namely each of 95.38; 94.95; 91.15; and 93.75. Still, there is increasing average score upon the four indicators on the first field trial to the second field trial namely each 5.38; 13.06; 18.75; and 22.84 points.

Suggestions

The learning tool as obtained still need to trial yet mainly to other students of Semester VI Study Program Mathematics FMIPA Unimed with various conditions in order to obtain a Demographic is truly qualified on the learning tool. In the learning as designed by team, with teacher and other stakeholder must conform to the students involved within one group so the process of discussion can process maximally. In conducting revision to an attending unit (SAP), text book of student (BTPM), and activity sheet of attendant on Demographic (LKPDM) and activity sheet of attendants (PKHPM), by the trial I to another trial, the research should never reject complexity of problem. But, still need revision anyway, see guidance of solving the problem, and it must be conducted according to field condition well.

5 References


The Effectiveness Of Local Culture-Based Video In Improving Listening Ability Of French Students Unimed

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Abstract. This research aims to obtain data on the effectiveness of local culture-based learning video in improving the listening ability of Unimed students. The method used in this research is an experimental study using the Pre Test - Post Test questions. This research used two classes, namely the experimental class that used local culture-based video and the control class that did not used local culture-based video. The sample in this research is 23 students in experimental class. The result of the study is concluded that the control class had an average pre-test score of 66% and an average post-test score of 70%, compared to the experimental class which had an average pre-test score of 60% and an average post-test score of 78% after receiving treatment that is by using local culture-based video. These results indicate that the average post test score in the experimental class is higher because it increased as 18% while the control class has increased by only 4%. The conclusion is learning media of local culture-based video is more effective used on Reception Orale course.

Key words: video learning media, local culture, reception orale

1 Introduction

Learning language from the secondary school level or at the university level is expected not only to master language skills but also to help students getting to know themselves, their culture and other culture. The influence of technological progress on the development of education in Indonesia is very big so that educational institutions try to support the learning process by using existing technology. The use of media is one of the supporting in the learning process. Arsyad [1] said that the media is an inseparable part of the teaching and learning process for the achievement of educational goals. Learning video media is an assisting tool in the delivery of material to support the learning process in order to achieve active learning. Presentation of information through this media is in the form of a living document, can be seen through the monitor screen and can be seen its moving and heard its sounds and movements. The media aims to present information in a form which is fun, interesting, easy to understand and clear, information will be easy to be understood because as many senses as possible, especially the ears and eyes, are used to absorb that information [1].

This research uses learning media local culture-based video with La Famille, faire des achats, and presentation materials. Learning media Local culture-based video is expected to be able to improve students' ability in listening competency in French. According to an education expert, Sinaga [2] said that culture-based education is one of the learning strategies
that needs to be developed in schools because it is considered to be able to motivate learners to learn more actively to provide positive values for them. This is based on person’s way of thinking, perceiving and acts are influenced by the culture, environment and others around him. The cultural approach can increase interest in learning because students can more easily understand the material sourced from their own culture. Referring to the explanation above, the researcher integrates local culture into the video that will be used as a medium for learning *Reception Orale* in French.

2 Research Method

This research is a type of quantitative research with experimental methods where the regular class A 2019 as the experimental class and the regular B 2019 as the control class. Learning media local culture-based video is used in the experimental class while in control class uses video that is not based on local culture [3]. Data collection techniques used in the research of the effectiveness of the media use of local culture-based video are:

The test is carried out to measure basic skills and achievement in *Reception Orale* course with presentation material by using learning media, which are local culture-based videos. Tests and questions in the form of multiple choices are used to measure initial knowledge through pre-test and post-test to determine the final results after students are treated using local culture-based videos and then with control class that use learning media in the form of videos that are not based on local culture [4].

Documentation is a data collection technique in the form of photos and information taken during the research process to strengthen the data obtained by researchers while in the field [5]. Observation is carried out to determine the learning process by using learning media in the form of local culture-based videos with presentation material in experimental class [6]

3 Result and Discussion

Learning Outcome in Control Class

The recapitulation result obtained from B 2019 regular students were made into the control class with an average pre-test score of 66% and an average post-test score of 70%, the results indicate that there was an increase of 4% using learning media local culture-non-based video.

Learning Outcome in Experimental Class

Based on the recapitulation of the pre-test and post-test average score in Regular class A 2019 that was used as the experimental class showed that there was an increase of 18%. In the pre-test the average score was only 60% and in the post-test it became 78%. This increase shows that the experimental class increased more than the control class that increased 4%. In conclusion, local culture-based videos are more effective for increasing the listening ability to French students.

Comparison between Experiment and Control Class

Based on the results of the data obtained from the control class and the experimental class, it is known the comparison between learning outcomes of regular students 2019 on the
presentation material. From both classes, the results of the Man-Whitney test are obtained significance level 0.002 <0.05 means that the significance score is less than 0.05 then H0 is rejected, so there is a significant difference between the pre-test on control class and the pre-test on experimental class, and when the statistical test uses Mann Whitney in the post-test of the control class and the experimental obtained significance score of 0.000 <0.05. Because the significance level is less than 0.05 then Ho is rejected, the conclusion is that there is a significant difference between the post-test on control class and the post-test on experimental class. While the result of calculation using the Wilcoxon test mentioned x that significant score of p-value 0,000 <0.05 then Ho was rejected. The conclusion was that there was a significant difference of score between the pre-test on experimental class and post-test on experimental class.

The result of an increase in the experimental class from 60% to 78% means an increase as 18%, while the control class from 65% to 70% an increase as 4%. In conclusion, using local culture-based video media is more effective and can increase students’ success in learning process compared to local culture-non-based video media, this is evidenced from the increase of average scores in the experimental and control classes.

4 Conclusion

Based on the results of data analysis and discussion that has been described then conclusions can be drawn:

1) Learning objectives in the Reception Orale course on presentation material in the experimental class by using learning media in the form of local culture-based videos can be achieved with an increase of learning outcomes by 18%. The results before the use of local culture-based video media were carried out (pre-test) by 60%, increasing to 78% results after the implementation of local culture-based video media in the experimental class (post-test).

2) The results of the assessment from two classes show that the use of local culture-based video media with presentation material is more effective than using videos that are not based on local culture, as evidenced when the teaching and learning process in the classroom using local culture-based video media is easier for students to understand the contents of the video because it is motivated by their own culture.

5 References

Development of Work Sheets Based On Character Integrated Problems In Improving Learning Outcomes In Basic Chemical Eyes In The Education In Higher Education

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Abstract. KKNI guides every lecturer to be able to deliver material according to students' needs, but it does not occur in the Faculty of Agriculture, UISU Medan Agrotechnology Study Program, has not been able to apply learning well and the results are still not good basic chemistry courses, this is because there are no appropriate teaching materials. The purpose of this study was to analyze the validity and practicality, effectiveness and improvement of learning outcomes of student worksheets that were developed based on the problem of integrating characters in the acid-base material of the Agriculture Semester Study Program (AGT) of the Faculty of Agriculture UISU Medan 2019/2020 Academic Year. The method of this research is Research and Development (R&D) with ADDIE model, samples were taken by purposive sampling of 60 students. Data collection techniques are tests of learning outcomes and Likert scale questionnaires. The research results obtained were (a) Integrated problem-based Student Worksheet (LKM) developed which was declared valid and practical; (b) the integrated problem-based MFI developed was declared effective and (c) the integrated problem-based MFI developed could improve the acid-base learning outcomes of the 1st Semester Agriculture Faculty (AGT) Agrotechnology Study Program (AGT) of the Faculty of Agriculture, UISU Medan, Academic Year 2019/2020

Keywords: LKM, Problem Based, Character Value, Acid Base Solution

1 Introduction

KKNI is given to Higher Education to be able to produce graduates in accordance with the given achievements. In the Higher Education Law Number 12 of 2012 in article 35, it stresses that the Higher Education Curriculum as referred to in paragraph (1) is developed by each Higher Education Institution with reference to the National Higher Education Standards for each Study Program which includes the development of intellectual intelligence, noble character, and skills. Thus, it is clear that each university is given the freedom to determine the courses to be given to students according to their respective Study Programs.

One of the Private Universities that has implemented KKNI is the Islamic University of North Sumatra (UISU). The results of the interview are also known to the new courses at the AGT Study Program currently are basic chemistry courses (inorganic and organic), the needs of chemistry courses are based on the many contents and processes chemistry in agriculture,
this case it is also known that the curriculum in KBK is not applied to chemical learning, the final result in writing a thesis is known that many students (± 80%) are not right in giving answers to the chemical process even some students like to mention the name of the element in fertilizer or other processes

Furthermore, interviews with lecturer lecturers are known, learning is still focused on understanding, not being involved in learning, limitations in equalizing learning are caused by the number of students in the class ± 45 students and the size of the class is quite large and the white board is very minimal in size. Lack of interaction in learning results in poor learning outcomes, only 35% of students have activeness in each class, The characteristics of acid-base material are concepts, calculations (representative symbols) and applications of daily life. Based on the data of acid-base learning outcomes, it is known that 65% of students just sit, stay and write an explanation from the lecturer, even the task given is done by picking up answers to peers, so the process of solving the problem of calculation (symbol representation to give the final answer). Thus, based on the needs and guidance of KKNI by developing Student Worksheets (LKM) on acid-base material. LKM is intended to explain a concept or understanding so that LK / LT is more felt as 'practice questions' or even as 'test questions' on the concepts that have been explained, thus students are expected to understand a concept, through experience in learning. Developing Worksheets has contributed to learning. Sari [1] asserts that the development of laboratory worksheets based on problem based learning is feasible, gets positive responses from users and can improve student learning outcomes, so that it can be used in the chemistry learning process Furthermore Siregar and Amini [3] emphasized that Worksheets based on an integrated model were able to streamline learning even able to activate positive activities in and improve learning outcomes for students. Student Worksheets are a task that characterizes KKNI by including the value of attitude in the learning process, attitude is closely related to the value of character.

Student Worksheets become a task that characterizes KKNI is to include the value of attitude in the learning process, attitude is closely related to the value of character. To produce an assessment of attitudes in learning. AGT Study Program applied 11 attitudes in the assessment including discipline, appearance, politeness, ability to work together, communication skills, commitment, availability, enthusiasm, empathy, responsibility and Islam.

From interviews with lecturers it was found that the given assignment was divided into two namely group work and independent work. Group assignments and mandates are said to be successful if students are able to understand problems, analyze problems, discuss scientific publications and mini research.

However, the lecturer admitted that he did not cause attitude assessment (character) in the learning process, so that attitude assessment has not been applied in the assessment.

This has been confirmed by Munandar and Syam's research [3] asserting that by applying a problem-based learning model to acid-base material the character of students develops, this is indicated by increasing student character outcomes through observation and questionnaires, reaffirmed by Sudarman and Silaban [4] it is known that there are differences in the value of students' chemical character (tolerance, communicative, self-confidence, achievement and respect for the spread of democracy) between students learning with the internet-integrated PBL model and the Internet-integrated DI model on chemical solution materials.

The purpose of this study is to:

a. Analyzing the validity and practicality of student worksheets that were developed based on problems integrated in improving the learning outcomes of acid-base
students of the Agrotechnology Study Program (AGT) Semester Faculty of Agriculture UISU Medan Academic Year 2019/2020;

b. Analyzing the effectiveness of problem-based student worksheets integrating character values in improving acid-base learning outcomes of Agrotechnology Study Program Students (AGT) Semester Faculty of Agriculture UISU Medan Academic Year 2019/2020;

c. Analyzing the improvement of acid-base learning outcomes developed by the problem-based Student Worksheet integrating the character of the 1st Semester Agrotechnology Study Program (AGT) Faculty of Agriculture UISU Medan Academic Year 2019/2020;

2 Research Methods

The research location will be conducted by two Medan City Private Universities, namely the Islamic University of North Sumatra (UISU), located on Jalan Karya Wisata, Johor Medan Building. Population is a generalization area consisting of objects or subjects that have certain qualities and characteristics determined by researchers to be studied and then drawn conclusions. Thus the sample taken was 150 students at the Faculty of Agriculture. The sample used by some students who took the basic Chemistry course in the first semester of the 2019/2020 Academic Year was 60. In this case the method used is the Research and Development method by producing a product in the form of a problem-based worksheet that integrates characters to be developed in the learning process to measure the effectiveness of the use of problem-based worksheets in overcoming misconceptions on acid-base material [5]. The development model referred to in the Analysis, Design, Development, Implementation and Evaluation (ADDIE) development model. ADDIE is a continuous and systematic framework for organizing a series of design and development research activities. Schematically, the development model of learning products by developing problem-based student worksheets integrates the value of character in improving student acid-base learning outcomes [6].

The first stage of the analysis, carried out several activities to facilitate the process of development in learning, including the analysis of product development needs is an important thing to do to ensure that the product to be developed in accordance with user needs. In this case based on the analysis needed for schools in the form of assessment applications on the IQF. Especially in the process of student graduation standards on the assessment of learning outcomes and attitudes. It is known that students still experience failures in acid-base learning outcomes, by completing in each symbol or calculation, concepts and applications of daily life in acid-base so that learning objectives have not been reached to the maximum

Design Stage. In the second stage, namely the design stage, by carrying out several stages is determining the Development Team. Design and development research is a group research with a membership that involves many people according to their respective roles. The development team consists of the main developer, expert validator, practitioner validator and user. Prototypes are the initial forms of products that are designed, built and become a true standard product example [7]. The prototype is also a mini version of the final product that was developed by considering the product to be produced, by designing covers, contents and evaluations to be assessed.
The product development stage of the prototype that has been produced can be done through several stages, namely expert assessment or validation, the prototype that has been designed by the developer and his team requires input of improvements conceptually and practically. Conceptual improvement input is obtained through expert validation. In developing products whose purpose is to educate users, validated conceptual aspects include aspects of learning design, pedagogical or andragogical or heutagogical aspects, principles of product development and physical concepts of products, teaching materials and messages to be conveyed through the product and practical validation. The product developed can be validated by practitioners to get input in a practical perspective. Development of learning products conducted for basic chemistry lecturers (inorganic and organic) at UISU AGT Study Program 2018/2019.

The Implementation and Evaluation Phase is the final stage in the development process, by connecting designers and users directly. The implementation phase contains elements of formative evaluation in the form of one-on-one evaluations, small group evaluations, and field trials [7]. By evaluating small groups, small group trials, in order to obtain the effectiveness of changes in the results of one-on-one evaluations and identify other problems faced by students and make sure whether users can use the product without interacting with the instructor. In the small group evaluation to see the impact of learning done through pretest and post test. Pretest shows the student's initial ability and the post test shows the ability after using the developed learning product. So the trial design that will be carried out in this study is Posttest - Only Control design.

Teaching material is declared practical and effective if it meets the following indicators: a) The level of acid-base learning outcomes of at least 80% of students who participate in learning are able to achieve a value of ≥ 70 in the category of good grades; b) Achievement of the implementation of learning, namely the ability of lecturers to manage learning at every stage is at least in good criteria; c) At least 80% of the subjects studied provide a practical response to the MFI component based on integrated character problems; and d) Testing with Problem Based Worksheets [8,9]. Data obtained from the results of the post-test of the two classes at the time of the product trial, will then be conducted several analyzes: 1) Testing the learning outcomes to find out the improvement after being given a problem-based worksheet integrating characters by using gain calculation and further analyzing by using t test (paired sample t test) using IBM SPSS 22 for windows; 2) Testing the increase in learning outcomes by differentiating the N-gain results of each class; 3) Effectiveness is used to indicate the level of achievement of an objective an effort is said to be effective if the effort reaches its goal [10]. Ideally, effectiveness can be stated in rather definite measures. Effectiveness is measured through several results, including: a) student activity, process skills, and student gain; b) student activity can affect student gain. Learning outcomes from the experimental group were better than the control group.

3 Results and Discussion

The results of this study will describe each stage of the study, in accordance with the exposure in CHAPTER III, the ADDIE development model goes through several activities to finally obtain results, the following results are obtained:
Stages of Research Analysis (Analyze).

Analysis is the initial stage carried out in research, by knowing in advance the condition of the Agrotechnology Study Program (AGT), the needs and objectives of achieving samples in KKNI-based learning, since the application of the KKNI for the past 2 years, courses have been raised again in the syllabus of learning, with the aim of providing knowledge and understanding of chemistry in agriculture and the importance of chemical knowledge in every agricultural or plantation process.

The results of interviews with several students in the classroom, it is known that students need material in accordance with the assignments, so that not only teach theory but also be able to solve any problems that are in accordance with agriculture. The same thing was said by the lecturer, based on the experience of the lecturer he admitted not using teaching materials, worksheets. The material is only delivered using power point media then students look for material on the internet, to do assignments, so students are involved with explanatory assignments, so KKNI learning has not been maximally achieved. The experience of the lecturer becomes a benchmark, the learning environment provided, curiosity and critical thinking abilities of students also become the occurrence of interaction in learning, but unfortunately in this case it has not been achieved well.

Weaknesses in the Teaching and Learning Process (PBM) and the readiness of teaching materials are interpreted as the unpreparedness of lecturers to manage learning based on KKNI by prioritizing findings to solving problems and exercises that are able to improve student character values in teaching and learning. Thus, each learning activity based on KKNI must dominate a lot by students, lecturers provide assignments in accordance with the learning objectives so that not only cognitive aspects are assessed but also other aspects such as character values.

From the needs analysis stage, students, prerequisite abilities, initial abilities and learning environments, can be completed by producing student worksheets, according to the steps of active activities namely problem solving integrating character values, thus students are able to apply KKNI-based learning, directly involved in finding to solve cognitive problems and attitudes (character values) of students in learning.

Based on the analysis of the needs and weaknesses in achieving the learning objectives of acid-base solution using KKNI learning. To solve these problems and adjust the needs of lecturers or students, the Student Worksheet on learning acid base solution should be adjusted to the needs of AGT Study Program students, so students are expected to be able to understand the importance of acid base products in the world of agriculture/plantations.

In the design stage,

Will be carried out several stages that have been carried out by researchers, including. Design and development research is a group research with membership that involves many people according to their respective roles. The development team consists of: 1) The main developers are researchers. Researchers are tasked with designing learning, starting with determining the material, learning objectives, activity steps in the form of Semester Learning Plans (RPS), Student Worksheets (LKM), determining steps in LKM and determining the assessment of student character values; and 2) Expert validator is an assessment conducted to measure the success of teaching materials to be used. Validator practitioners and users are lecturers of Basic Chemistry and Student courses who will directly use LKM that have been appropriate to use by adopting the results of the response of lecturers and students.

These resources were analyzed for semester I students in the 2019/2020 Academic Year to test LKM based on integrated character problems to improve learning outcomes. Next
Develop a Development Schedule Design research and development is the process of creating products with good quality objectives. The quality of the products produced in the context of Research and Development (R & D) is carried out within a period of 7 months until the trials are conducted.

From initial data collection to testing the success of MFIs that have been adapted to learning environment problems and student needs. Selecting and Determining the Scope, Structure and Order of Materials or Learning Messages. Products related to learning are developed that contain teaching materials (content) that are unique to each other. The product has learning messages that will accompany it, with a source of printed material, namely problem-based MFIs, that integrates character.

Development Stages (Development)

Stages of development (Development) aims to evaluate the product of the prototype that has been produced can be done, the development is carried out by several stages, namely the assessment or validation of experts. The prototype that has been designed by the developer really needs input improvements in a conceptual and practical. Conceptual product improvements are obtained through expert validation. In product development aims to educate users, conceptual aspects that are validated include aspects of content worthiness, language feasibility, feasibility of presentation, feasibility of adapted graphics from BSNP, 2014, with the provisions Eligible to be used without revision, if the mean assessment score is greater than 2.75 and Eligible used with revisions if the mean rating score is less than or equal to 2.75. Thus the integrated problem-based MFI product character value is valid (feasible) without revision in accordance with the BSNP provisions, the average acquisition rating of the three expert validators for each content, language, presentation and graphic worthiness is 3.49; 3.42; 3.54 and 3.33, furthermore the validation of the practitioner also states that it is feasible to show that the learning process is going well / very well and the product is also stated to be practically shown to obtain an average of every aspect of 86.19% with a very practical category.

Stages of Implementation and Evaluation

The next assessment is the effectiveness of the problem-based MFI product integrated character values. Effectiveness is the success of a particular action or in other words the achievement of learning objectives. Product effectiveness test is carried out to determine the effect of the product developed on learning outcomes. Based on the results of the pretest and posttest the gain score is 0.73. The gain score obtained shows that there is an increase in learning outcomes of acidic and alkaline solutions with a high category, 10% of students are categorized very well and 30% of students are categorized as good, the accuracy of the use of teaching materials in accordance with the characteristics of the material to the needs of students makes learning objectives achieved correctly and correctly.

Assisted by LKM based on problems integrating character can provide assistance to students in understanding each acid-base material, students are involved and integrate well, each step of problem solving can be resolved correctly and appropriately, the results are also shown the completion steps that have been completed by Students, the following results are as follows:
Furthermore, the character values obtained are the conclusions obtained:

**Table 1. Differences in the Integration of Student Character Values**

<table>
<thead>
<tr>
<th>Character Value</th>
<th>Integration</th>
<th>Experiment Class I</th>
<th>Category</th>
<th>Experiment Class II</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spirit</td>
<td></td>
<td>100</td>
<td>Very good</td>
<td>100</td>
<td>Very good</td>
</tr>
<tr>
<td>Empathy</td>
<td></td>
<td>92.2</td>
<td>Very good</td>
<td>81.1</td>
<td>Very good</td>
</tr>
<tr>
<td>Critical Thinking</td>
<td></td>
<td>75.6</td>
<td>Good</td>
<td>53.3</td>
<td>Enough</td>
</tr>
<tr>
<td>Communicate</td>
<td></td>
<td>72.2</td>
<td>Good</td>
<td>71.1</td>
<td>Good</td>
</tr>
<tr>
<td>Responsibility</td>
<td></td>
<td>88.9</td>
<td>Very good</td>
<td>93.3</td>
<td>Very good</td>
</tr>
<tr>
<td>Team Work</td>
<td></td>
<td>90</td>
<td>Very good</td>
<td>93.6</td>
<td>Very good</td>
</tr>
</tbody>
</table>

Table 1 above, confirms that the character value that is very different from using an integrated problem-based MFI is the ability to think critically, the experimental class I is able to think well the steps in determining each problem solving, in this case also confirms that students easily analyze the problem logically, reflective, systematic and so that helps make, evaluate and make decisions about success in solving a problem at hand. The experimental class I character values that differ by acquisition value are empathy and communication skills, meaning students are able to build a sense of simplicity in completing, understanding each other and finding together.

The last assessment is to find out the increase in student chemistry learning outcomes in the acid-base solution material. Through the empirical stage by using paired sample t-test, comparing the two classes of experiment I (using products) with experimental class II (without using products), the acquisition of Sig. (2-tailed) of 0.000, meaning that problem-based MFIs that integrate character can improve learning outcomes of acid-base solutions. The assessment indicates that the experimental class I using the product is able to provide students the ability to carry out learning activities. Students improve the way they learn and understand each material to be completed.
4 Conclusion

Based on the results of research and discussion, it can be concluded:

1) Integrated problem-based Student Worksheets (MFIs) developed to improve the learning outcomes of acid-base students of the 1st Semester Agrotechnology Study Program (AGT) of the Faculty of Agriculture UISU Medan Academic Year 2019/2020 are declared valid and practical. This is indicated by the average validation of the three validators is the content aspect 3.49; aspects of language 3.42; the presentation aspect 3.54 and the graphic aspect 3.33 and the practicality obtained an average value of each aspect 86.19 very practical categories.

2) Integrated problem-based Student Worksheets (MFIs) developed to improve the learning outcomes of acid-base students of the Semester Agrotechnology Study Program (AGT) of the Faculty of Agriculture of UISU Medan in the 2019/2020 Academic Year declared effective, confirmed by the results of obtaining an N-gain value of 0, 83 high categories and learning outcomes obtained 36.67% of students excellent category and 63.33% declared good.

3) The integrated problem-based Student Worksheet (LKM) can improve the learning outcomes of acid-base students in the Semester I Agriculture Program (Semester I) of the Faculty of Agriculture, UISU Medan, Academic Year 2019/2020, this is shown by the results of the Sig. (2-tailed) of 0,000 (sig <0.05).

5 References


Model of Knowledge for Students Prospective

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Abstract. Various attempts have been made to make teachers a profession that is on par
with other professions in the world. LPTK as a teacher producing institution is the party
responsible for preparing teacher candidates. This article aims to introduce a learning
model that can improve the professionalism of prospective teacher students. The learning
model developed refers to the criteria of the model developed by Joyce & Weil. AJARI
learning model is a learning model that in learning has natural characteristics, describe /
articulation, reflection and my ideas. In this learning model students are expected to
experience the experience of a scientist at the same time get the opportunity to design
learning according to their creative ideas. Through this learning model, it is expected to
be a unique learning model for prospective teacher students.

Keywords: learning model, prospective teacher students

1 Introduction

History records, in 1875 in America requires an Elementary School teacher to have 20
competencies, namely: writing arithmetic, mental arithmetic, writing grammar, grammatical
speaking, geography, United States history, theory and practice of teaching, algebra, sports,
physics, legislation American and California invitations, California school law, handwriting,
biology, composition, reading, defining (word and vocabulary analysis), vocal music and
industrial images¹. Based on this information it appears that so many competencies that must
be possessed by an Elementary School teacher. Through this set of knowledge, elementary
school teachers are expected to be able to teach well. But there is no information on how a set
of knowledge is utilized in an effort to educate the students they teach.

In 1986 and 1987 Lee Shulman studied the standard of knowledge that must be
possessed by a teacher because he felt there was "something missing" and he tried to find
"something different" from teacher education. Since then, Shulman has fought for the equality
of the teaching profession so that he is recognized as equal to other professions such as the
doctor, lawyer and other professions. The teacher must have specific knowledge that
distinguishes it from other professions so that with this knowledge not everyone can become a
teacher [1,2].

Policymakers and teacher education institutions at that time required teachers to have
three competencies, namely: basic skills, content knowledge, and general pedagogical skills.
Basic skills are the ability to read, write, spell, calculate, and solve arithmetic problems.
Content knowledge is the ability related to mastery of material related to subjects, such as
mathematics, language, Natural Sciences or other subjects. Whereas, general pedagogic skills
are skills that must be possessed by someone who wants to be a teacher. In other languages, general pedagogical skills can be interpreted as the science of educating.

The scientist who has explored the basic knowledge of teachers is Joseph Schwab [1], he discusses the structure of knowledge related to the mastery of the knowledge of teacher subjects. He distinguished the structure of subject knowledge into substantive and syntactic structures. The substantive structure is a concept that forms the basis of content, whereas the syntactic structure is a structure that is related to scientific acquisition procedures.

Shulman identified seven components of knowledge-base that teachers must have, namely: content knowledge; general pedagogical knowledge; curriculum knowledge, pedagogical content knowledge; knowledge of learners and their characteristics; knowledge of educational contexts; knowledge of educational ends purposes and values; and their philosophical and historical grounds [2]. Ball D. L, et al. [3] looked at the seven basic components of Shulman's teacher knowledge into two categories based on general knowledge and knowledge related to specific content, namely: general dimensions of teacher knowledge (general pedagogical knowledge, knowledge of learners and their characteristics, knowledge of educational contexts, knowledge of educational contexts, knowledge of educational ends, purposes, and values, and their philosophical and historical grounds) and content-specific dimensions (content knowledge, pedagogical content knowledge, curriculum knowledge). The general dimension is the knowledge that is absolutely possessed by all who bear the teaching profession. The special dimension of content is knowledge related to the specific ability of the subject teacher, which is related to the mastery of teaching material.

Based on the opinion of Ball et al. [4] the basic ability of a teacher could not be separated from the specific mastery of teacher content on subjects. He thought that a teacher might not develop a methodology of learning if teachers do not have much knowledge related to the subject matter to be taught. Teacher creativity will not develop if the mastery of the material they have is too narrow. The possibility of finding alternatives to the delivery of material is more than just the transfer of knowledge to be small. The specific mastery of content referred to by Ball is Pedagogical Content Knowledge referred to by Shulman.

There is a difference between the subject matter and teaching material. When a student learns so that students gain real knowledge he is learning course material and this process is lived as a scientist. When students learn how to teach well, students are actually learning teaching material. This process is carried out in the context of mastery of knowledge as a provision of teaching a teacher. According to Brousseau [5] based on several studies in mathematics say the following:

"A mathematician will not communicate the results of their research by the way they find, they will rearrange, give in a general form. The form of didactic practices carried out by mathematicians by placing the knowledge they have into forms that can be communicated, de-contextualized (eliminating context), depersonalized (eliminating personal perspective), and de-temporal (not bound by time). Whereas the teacher takes the opposite action, namely re-contextualization (providing context) and personalized (giving a personal perspective). The teacher looks for situations that can give meaning to the knowledge to be taught. When students have responded to the situation proposed by students de-contextualized (eliminating the context) and depersonalized (eliminating again the personal perspective), the knowledge students have gained so that students can see that the material they understand has a universal character and that is cultural knowledge that can be reused ".

Referring to the opinion of Brousseau [5] and Ball et al. [4] about the mastery of content that must be owned by a teacher, which states learning for a prospective student-teacher is not like learning by a scientist. So the provision of knowledge for a prospective teacher-student
needs to be done in preparation for the student when becoming a teacher. The teacher will be able to contextualize the material he masters for students to learn. Good mastery of knowledge will affect the ability to contextualize the material.

2 Analysis and Discussion

a. Teacher knowledge

Teachers are one of the oldest professions in the world. The teacher profession is considered noble because through teacher children can open their horizons to see the world. Minister of Research and Technology Regulation No. 55 of 2017 [6] concerning Teacher Education Standards that govern the administration of higher education in order to produce teachers as professional educators is a juridical foundation for the organization of education for prospective teachers.

Teachers are academically successful end products of education systems throughout the world, having memorized techniques, memorizing, experimenting, and solving well-developed problems. As such, prospective teachers tend to perform well in school and university exams, but their education does not eradicate, challenge or change strongly held ideas or wrong thoughts about science concepts.

There are two categories in the educational research paradigm, namely theory and practice. The theory prepares well, while the experience belongs to practitioners. So the competency formulation owned by the teacher is not on the same track. Based on this problem, the government prepares teachers through teacher preparation education. A good teacher is prepared through lectures at the LPTK (Educational Personnel Educational Institution). Prospective teacher students are prepared through theory so they can practice well based on the teacher's experience. Good debriefing through lectures is expected to produce professional teachers.

According to Brousseau [5] based on several studies in the field of mathematics, a scientist will not communicate the results of their research by the way they find the knowledge they have acquired, they will rearrange, give in a general form. Forms of didactic practice carried out by scientists by placing the knowledge they have into forms that can be communicated, eliminate context, eliminate personal perspective and are not bound by time. Whereas the teacher takes the opposite action, namely providing context to the knowledge to be taught and providing a personal perspective. The teacher looks for situations that can give meaning to the knowledge to be taught. When students have responded to the proposed situation, students again eliminate the context that the teacher has added and also eliminate the personal perspective. Students return the knowledge delivered by the teacher to a universal form that can be understood by everyone.

Based on the opinion above, there are differences in lecture material conducted in LPTK that are spread over courses that must be passed by prospective teacher students. As a result of lectures, a prospective student teacher has knowledge of the learning process that makes him have knowledge as a scientist. Prospective teacher students also have to teach knowledge, that is the knowledge possessed as provisions when he is a teacher.

Government Regulation No. 74 of 2008 [7] article 7 paragraph a mandates: Professional competence as referred to in paragraph (2) is the ability of the Master to master the knowledge of the fields of science, technology, and/or arts and culture that he may be professing at least covering a broad and deep mastery of subject matter in accordance with the standard content
of the education unit program, subjects, and/or groups of subjects to be supported. Based on this government regulation, to meet the qualifications as a professional teacher, the teacher must master the material based on the standard content of the education unit curriculum.

The process of forming good teachers must be prepared from the education process of prospective teachers. Prospective teacher knowledge is essential for teachers to be able to teach effectively [8,9]. Prospective teacher knowledge factors in mastering Subject Matter in-depth also play a role in supporting learning [1,3].

The National Higher Education Standards (SN Dikti) regulated in the Minister of Education and Culture Regulation 2014 is a standard unit that includes the National Education Standards, which set minimum criteria for learning at tertiary levels in tertiary institutions throughout the jurisdiction of the Unitary Republic of Indonesia. The National Education Standards include regulating graduate competency standards, learning content standards, learning process standards and learning assessment standards that are directly related to the learning process plus other standards relating to administration. Graduate Competency Standard (SKL) is a minimum criterion regarding the qualifications of graduates' abilities that includes attitudes, knowledge, and skills expressed in the formulation of learning outcomes. In the SKL it is stated that the learning achievements of graduates must refer to the description of KKNI learning outcomes (Indonesian National Qualification Framework). Learning Content Standards are minimum criteria for the level of depth and breadth of learning material, and must refer to graduate learning outcomes. Four elements of learning outcomes include attitudes and values, workability, mastery of knowledge, and authority and responsibility. Elements of learning outcomes in graduate competency standards include attitudes, knowledge, and skills.

Regulation of the Minister of Research, Technology and Higher Education of the Republic of Indonesia Number 55 the Year 2017 Concerning Teacher Education Standards Part One Competency Standards Article 7 paragraph (3) which states the formulation of learning outcomes must contain academic aspects of education and fields of science and/or expertise. Furthermore, paragraph (4) is explained further about the aspects referred to include: a) the competency of understanding students; b) educational competencies that educate; c) competency in mastering scientific fields and/or expertise; and 4) attitude and personality competencies.

In the attachment to the copy of the regulation is explained about the formulation of the Learning Achievement of Graduates of Education Undergraduate Program that contains four competencies of Teacher Education Standards. One of the four competencies is mastery of scientific fields and/or expertise. In more detail this competency is described as a) mastering the objectives, content, learning experiences, and assessments in the curriculum of the education unit; b) master the scientific concepts and methods that overshadow the substance of the field of study; c) deepening the field of study in accordance with the environment and changing times; d) mastering the integration of technology, pedagogy, scientific content of funds / or expertise, and communication; e) develop curriculum in accordance with the field of work; f) manage educational unit level curricula; g) disseminating academic work in the form of publications uploaded in reputable college pages and/or journals; and h) applying information technology knowledge and skills in the context of scientific development and implementation of the area of expertise.

b. Subject Matter Knowledge in the education of prospective teachers

Shulman [2] defines Content Knowledge in reference to the amount and organization of knowledge per se in the teacher. It is a way of thinking correctly about the knowledge that
goes beyond knowledge of facts or concepts. Content Knowledge is also known as the Subject Matter Knowledge [2], covering the theories, principles, and concepts of certain disciplines that must be learned taught. Subject Matter Knowledge requires independent knowledge and understanding of facts and constructions, and the relationship between facts and the construction of a discipline. Teachers' Subject Matter Knowledge strengths and weaknesses have an impact on their classroom practice [10]. Compared to teachers with strong science Subject Matter Knowledge, teachers with weak Subject Matter Knowledge teach less science and choose paper and pencil exercises more often than didactic science-based inquiry.

Subject Matter Knowledge is the heart of teaching [11] and teachers must know the material being taught. Subject Matter Knowledge includes didactic schools [5,12] and Pedagogical Content Knowledge perspectives [1]. Carl sen [13] states, when teaching unfamiliar topics (showing low Subject Matter Knowledge mastery), teachers talk more often and for longer, often ask questions, and questions are at a low cognitive level. Teach is dominated by a one-way conversation is a way of overseeing the discussions. When the teacher is less familiar with the topic being taught, the teacher tends to ask more questions to control the discussion. When the teacher is more familiar with the topic, students are more engaged in conversation. Questions asked by students are not common.

Subject Matter Knowledge is basic to core teaching activities and influences teachers in making decisions about specific learning, such as designing assignments or asking questions that are meaningful for student exploration [14]. A teacher's ability to choose the right way to convey mathematical ideas depends on what Ma (1999) calls "a deep understanding of subject knowledge" (p.120), also referred to as "flexible subject understanding" [3]. Some special elements in Subject Matter Knowledge facilitate mathematics teachers to teach mathematical content more meaningfully [14].

Based on the opinions of some experts above, Subject Matter Knowledge is knowledge about the material that must be mastered by a teacher. Subject Matter Knowledge is needed by a teacher as a condition of mastery of the material to be taught to students. Subject Matter Knowledge is a prerequisite for developing Pedagogical Content Knowledge. Pedagogical Content Knowledge is a way for teachers to present subject matter to their students.

c. Development of Subject Matter Knowledge Theory

Ball, Thames, and Phelps [4] stated: "Teachers need to know the material they teach, they must recognize when their students give incorrect answers or when textbooks provide inaccurate definitions. "(P. 399). Ball et al. [4] about teacher knowledge as shown in the figure 1 the following:
Subject Matter Knowledge can be broken down into Common Content Knowledge (CCK) and Specialized Content Knowledge (SCK). CCK is a general knowledge about very basic subjects and its nature is very general. This knowledge is owned by someone who has learned a subject without special emphasis on mastery of a particular material. In contrast to CCK, SCK is special knowledge "that allows teachers to be specifically involved in teaching assignments, including how to accurately represent ideas of subjects, provide explanations for general rules and procedures, and examine and understand methods of unusual solutions to problems" [4].


Grossman explained that Subject Matter Knowledge includes facts, concepts, rules, and relationships between concepts, rules, and relationships between concepts that are still one family in the discipline. In Subject Matter Knowledge there is certainly content that is the subject of discussion in the form of certain material relating to certain subjects. The content in
The question is related to the study material that will be taught on the subject matter. The syntactic structure is knowledge about processing facts, methods of proving and manipulating it so that it is useful in solving problems. This is seen as knowledge about how to obtain true knowledge. Substantive structures are the way a person processes information. This difference in viewpoints requires substantial knowledge in understanding a concept contained in a material. This component of substantive structures is very important because it determines whether someone is able to understand and develop material facts or not. Syntactic structures and substance structures affect as well as possible.

![Diagram](image)

**Fig 3.** Teacher Knowledge by Carlsen

The Subject Matter Knowledge model developed by Carlsen [13] is 3: Syntactic structure of science, the substantive structure of science and the nature of science and technology. Subject Matter Knowledge models Carlsen different from the one developed by Grossman, if Grossman add content other than syntactic structure and substantive structure which is the way and the content subjects, Carlsen added nature of science and technology (the characteristics of science and technology) are considered Carlsen as the nature of the inherent when the process is undertaken in a content discovery effort.

John Dewey [17] in his book entitled "The Supreme Intellectual Obligation" said the importance of scientific skills and attitudes in teaching science. According to DeBoer, Paul DeHart Hurd [18] in his book entitled "Science Literacy: Its meaning for American School", defines scientific literacy as being used to explain the understanding of science and its application in social experience. DeBoer [18] defines scientific literacy as an understanding of science and its application in life. Science literacy is the ability to use scientific knowledge to identify problems and draw conclusions based on evidence in order to understand and make decisions about nature and changes made to nature through human activities [19]. Based on some of the opinions above, that the orientation of learning science (science) must experience changes.
Subject Matter Knowledge according to Schwab consists of substantive and syntactic structures, and if analyzing the scientific literacy above, it is considered necessary to make changes to the structure of knowledge. If in one knowledge, it is deemed necessary to stakes to form substantive, then it is deemed necessary to know how the application of the substantive structure formed is. The application of the knowledge formed is needed in order to ensure that the knowledge obtained can be known for its benefits in real life. Based on the opinion above, this application is called literacy.

d. The aspect of Subject Matter Knowledge

According to Schwab [16], knowledge structures include substantive and syntactic structures. The substantive structure is the variety of ways in which the scientific principles and basic principles are arranged to include the facts. The syntactic structure of knowledge is a set of ways in which truth is taught. A set of rules to determine what is legitimate to say in the disciplined domain and what is in violation. The knowledge content is defined as "concepts, principles, relationships, processes, and applications that students must know in certain academic subjects, appropriate for themselves and the organization of knowledge [20]."

According to Grauer [21], Subject Matter Knowledge is not recitational knowledge (repetition of knowledge and facts). A teacher should not only rely on the knowledge he has learned while he is in school and even up to college. Beeby [22] categorizes teachers into four, namely: 1) Dame Schools, namely untrained and uneducated teachers, memorized and meaningless knowledge; 2) Formalism, teachers who are not educated but are trained. Teachers are organized, uni-dimensional, and memorized by knowledge. Teachers at this level find it difficult to keep up with curriculum changes. 3) Transition, better educated and trained, so that the learning delivered is meaningful, less tied to textbooks and syllabus; 4) Meaning, well educated and trained. Teachers at this level are able to insert meaning and understanding into their teaching, understand individual differences and use resources more productively. Based on the opinion of Grauer and Beeby, the subject matter learning must be able to shape the teacher's meaning, so that the learning experienced by students is also more meaningful.

e. Learning Design Model

Gustafron and Branch explain the model is: "a simple form of representation of a complex. The model contains the processes and functions of physical phenomena or ideas ". Next Snelbecker explained that: "the model is a concretization of the theory that aims to mediate the processes and variables contained in the theory".

According to Richey, Klein, and Tracey [23], the model is: "a representation of reality presented with a level of structure and order and the model is a simplified idea of reality". Furthermore Personal explains the model is: "something that describes a pattern of thinking". In this case, the model can be seen as an effort to concretize a theory as well as an analogy and representation of the variables contained in the theory.

The definition stated by the Association for Education Communication and Technology (AECT) that the model is: Form that is conceptually the same as the original form, the form can be physical, a verbal description, or graphic form that is the same as actually or should be, and the model is a form of imitation.

Prawiradiaga [24] explains the model can be interpreted as: "graphical display, work procedures that are organized or systematic and contain thought in the nature of a description or explanation of suggestions. Whereas Sagala explains the model is: "the conceptual framework used as a guide in carrying out activities."
Based on the description of the concept of the model above, it can be interpreted that the model is designed to represent the real reality, even though the model itself is not the reality of the real world. In this case, the model is: (1) a description needed to help the visualization process that cannot be observed directly; (2) a system of assumptions and data used to logically and systematically describe an object or event; and (3) procedures that must be followed in carrying out an activity so that the series of activities becomes a system.

In a component model, there are (1) components; (2) rules that connect between components so that they become one system; and (3) interactions between components into a single unit that can deliver messages. Understanding of the models is important for learning developers, as explained by Personal that: "A learning program design needs to have a good understanding of learning system design models. This is done in order to be able to implement these models to create learning programs that have effectiveness, efficiency, and attractiveness. Learning design models, usually used in the form of flowcharts or whose implementation needs to be done systematically and systematically."

Furthermore, related to the benefits of using the model described by Seels and Glasgow, namely: (1) the model visualizes a systematic process that allows for concentration in the process undertaken; (2) the model is a tool for managing processes and projects; (3) through the model it is possible to test theories in an integrated and practical way to be applied; and (4) through the model, the tasks set by the designer become good design criteria.

Soekamto explained the benefits of the model for learning designers, namely: (1) tools for communicating between themselves and also with clients; (2) instructions on planning activities to be carried out on management; and (3) a number of prescription rules for decision-making.

f. Prospective Teacher Student Knowledge Model

The MPRA model (Model of Pedagogical Reasoning and Action) developed by Shulman [1] and Salazar [25] explains that most teaching begins with some form of "text", textbooks, scripts or other material that the teacher wants to understand or student. This collection of knowledge is contained in cycles through activities of understanding, transformation, instruction, assessment, and reflection. The process on the MPRA Model of teacher knowledge at the beginning of I and at the end of I with the act of understanding Because of its procedural nature, MPRA requires a teacher reasoning process about content for teaching that is under continuous restructuring. Their dynamics are enriched by the context in which it occurs as a result of social interaction that implies different educational activities and periods that characterize teaching practice. The MPRA model is a dynamic and cycle model of teacher reflection and action. This model seeks to embrace the teacher's knowledge about the subject matter and methodological approaches that develop in certain subjects. At each step, a series of knowledge and skills are needed. Thus, in the MPRA model, Shulman represents the steps that occur in the development of teacher professional practice, especially using certain content. Shulman's contribution was to restore the "lost paradigm" and bring to the knowledge content of teachers' specific content. However, he is bound to the pedagogical dimension. And the transformation of this content into a powerful way pedagogy is what Shulman calls knowledge pedagogical content.

Referring to the MPRA model that explains the teacher knowledge model that represents the steps that occur in the development of teacher professional practice, then the knowledge model for student-teacher candidates is developed. There are differences in learning orientations between teacher and student-teacher candidates. For in-service training teachers, learning outcomes can immediately be applied, whereas for prospective teacher students (pre-
service training) tend to learn to have the abilities that will be needed when becoming a teacher. Based on these different paradigms, the model is developed as presented in the figure 4 the following:

Fig 4. Model of prospective teacher knowledge
This model was developed referring to the MPRA (Model of Pedagogical Reasoning and Action) model developed by Shulman [1] and Salazar [25]. The MPRA model developed by Shulman represents the steps that occur in the development of teacher professional practice, especially using certain content. The MPRA model begins and ends with understanding. The knowledge model for prospective teacher-students is developed beginning with understanding and ending the new transformation by prospective teacher students. The new transformations knowledge required by student-teacher candidates as a form of understanding beyond the teacher candidate knowledge gained from the learning content that follows. Through learning, student-teacher candidates are expected to be able to obtain the substance of their knowledge that is fulfilled at the new comprehension step. Furthermore, students are able to demonstrate the ability to transform their understanding in the new transformation step as a form of understanding of the substance of the material being studied.

3 Conclusion

The conclusions in this article include: 1) The process of forming good teachers must be prepared from the education process of prospective teachers. Prospective teacher's knowledge is an essential thing that teachers must have to be able to teach effectively. 2) Subject Matter Knowledge is needed by a teacher as a condition of mastery of the material to be taught to students. 3) learning models that can improve the professionalism of prospective teacher students, namely the AJARI Model, the AJARI learning model is a learning model that has natural characteristics, describes / articulates, reflects and my ideas. In this learning model students are expected to experience the experience of a scientist at the same time get the opportunity to design learning according to their creative ideas. Through this learning model it is expected to be a unique learning model for prospective teacher students.

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Developing Teaching Materials in English for Biology
Incorporating the KKNI-based Assignments at the Biology Department of the Universitas Negeri Medan

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Abstract. This study aims to develop the teaching materials of English for Biology (a module) at Biology Department as a response to the difficulty of students to deal with the KKNI assignments at Department Biology Universitas Negeri Medan. The research and development design is used refers to the Cunningham’s (Borg & Gall, 2003) and consists of stages: 1) Studying relevant literatures; 2) Planning the proposed purpose; 3) Developing early stages for the teaching material (product); 4) Evaluating the early product; 5) Correcting the product based on the evaluated stage; 6) Field assessment towards the examined product. Qualitative and quantitative methods were used to deal with the data. The instrument used to determine the feasibility of the module is questionnaires, both for students and validators. The effectiveness of the module was tested using the pre-experiment design with a one-group pre and post-test model. There is an increased value of 21.09. The validation shows that the teaching material and design is considered “very” valid as the scores are 3.00 and 3.24 (respectively). The responses about the practicality of the module are considered as positive as the score is 3.07 and 76.92%. The module is considerably good as teaching material and is effectively improving the students’ achievements in examination.

Keywords: teaching materials, module, KKNI, student’s achievement

1 Introduction

There are two situations when it comes to teach the subject of English for Biology at Biology Department Universitas Negeri Medan. Some of students are considered as the ESL (English as a second Language) or preferably are more confident as LEP (Limited English Proficiency) students. The department certainly is not ready as the lecturers are not prepared in pre-service university classes to do and have not encountered in the educational experiences. This will leave us many questions. What strategies meet the needs of students who have limited English? What learning strategies will the department need to foster in these students who have limited English? How do we assess their learning?

The subject of English for Biology is intended to give students more experience and access to English as it will improve the students capability to enhance the quality of their scientific papers and insight [1]. In addition, the more global view that a scientifically-literate public is the easier the country enhances its market position [2]. In relevance, the education reform in EFL Indonesia is beginning to target the foundational levels of learning such as
primary education. But for those who were not included anymore in the government reform target, who are those attending the university level of English will certainly experience a difficult time. On the hand, lecturers must recognize and respond positively to student’s diversity and encourage students to participate fully in learning.

When science education and English literacy development are the core elements in EFL pre-service teacher education [3] the class should have specialist teachers who can focus on science education using English as the Medium of Instruction (EMI). Meanwhile, the Biology department depends on those who have been abroad to teach this subject. The strategies to teach the subject must be addressed as the students’ level of English must also be taken into consideration. They come at various stages of language development, they may have difficulties understanding some idioms, figures of speech, and words with multiple meanings. They may have difficulty with complex structures and abstract academic concepts [4]. Some students may understand more complex speech still require repetition. They have acquired a vocabulary of key words or phrases covering many common situations. They use English spontaneously and most of them have difficulty expressing all their thoughts due to restricted English-speaking ability. It is very rare to find students at any group have adequate language skills for most day to day communication.

Owing to the difficulty of deciding strategies that suit the variability of the students’ level of English, to have teachings material that can fit to any stage of difficulty offers a solution. Several researchers have questioned about knowledge of the learners’ field of study the ESP teacher needs to have to be able to select, adapt, simplify authentic texts and develop the manual that would meet the requirements of Biology, and then teach learners [5,6]. Another problem is that the lecturers having no similar technical background relatively close to the field of study. Some of them are struggling to comprehend materials they require the students to master. But since the target in this subject is to facilitate students with adequate scientific English in their biology education journey, a good module may deal with the problem of having no standardized teaching materials for this subject.

The strategies may start from understanding the students need to attend in the class. The time-consuming activities of the curriculum must be the first priority to deal with. There are six types of assignments of the KKNI curriculum that have had the profound effects on the students’ time allocation. When every subject is required to these compulsory types of assignments, it is urgently needed that the material teachings must fit to this time limitation scenario. One of the possible choices is developing module that suits the variety of students’ English competences and time. The main aim of this module is to tackle the gap between students’ deficient (second) language competencies and their capacities in science. Understanding the role of language in science, and become aware of difficulties the students are facing with language in science are also important matter to deal with. The module have lecturers work with case scenarios of classrooms with students that either do not speak the language, or have limited knowledge of it and will design lesson plans to work around these issues.

There are six areas of competences students are expected to learn in the subject of Bahasa Inggris Biology or English for Biology. The language used in the module is Indonesian as it is going to be easier for the students to study. Using English is considerably inefficient in term of time. Students with serious difficulty in English may find this is an impossible task to do.

The first concern about the students’ capability of attending this class is the grammar. The part of speech indicates how the word functions in meaning as well as grammatically within the sentence. Every single word we use belongs to one of eight word groups or parts of
speech (noun, pronoun, verb, adjective, adverb, preposition, conjunction, and interjection). The module offers recalling information about all the parts of speech as it is assumed that students must be aware about what they have missed in the past and try to catch up with the current topic the subject is being delivered.

This part is the most important part of the module. Attending the class of English is undeniable that students must have a certain level of grammar confidence. Grammar is important because it is the language that makes it possible for us to talk about language. Awareness and understanding that parts of speech can be divided into sub-classes, prepositions can be divided into prepositions of time, prepositions of place etc. nouns can be divided into proper nouns, common nouns, and concrete nouns should be something they are aware about. It is important for students to know that a word can sometimes be in more than one part of speech. For example, with the word increase.

Increase can be a verb e.g. Prices increased and increase can also be a noun e.g. There was an increase in the quality of medicine. In response, the materials in this part are dealing with the ability to identify only some of the grammar, which are noun, verb, and adjective.

The second concern is that students are not familiar with affixes in English, making new words by adding all sorts of bits to the front and back of existing terms. Activities in this part of the module consist of producing sentences using affixes (adding the bits to the base or stem of a word). Students learn using affixes, suffix and prefix. The assignments for grammar and affixes topic will together be considered to be the Routine Task (Tugas Rutin), the first assignment in the KKNI curricula. Here, the students have to do the assignments for four weeks in a row and will be submitted every week.

A sentence in English language can be divided into various parts and this is important for students to master. Writing and reading competences are based on this skill. Each part of a sentence serves its relative purpose and has some specific characteristics. Most of the students have a lot of confusion about what so called clause and phrase. Teaching them with clear differences between the clause and phrase may help them to write and read more efficient. The assignment for this part is to practice using the concept of clause and phrase, producing sentences for both concepts and will be considered to be engineering idea (Rekayasa Ide) task.

The fourth topic is the active and passive voices in English. Since the students have had the idea about these types of sentence in Bahasa Indonesia, it is suggested that students know about the types of sentence found in the scientific text-book or journals. The use of active voice in English is preferable as it promotes simple and straight-forward writing. As such, most scientific journals encourage the use of the active over the passive voice [7]. Students must realize that a well-written scientific manuscript worthy of publication is the use of appropriate verb tenses in the different sections of the manuscript. The assignment in this part of the module is considered as Critical Book Report. Students will experience finding the types of sentence in most scientific papers.

Reading a scientific paper is requiring a large amount of class time. A dedicated course specific to reading the literature may not be available in normal undergraduate course or curriculum. Reading a single paper may take students a very long time that they do not have. The ability to read is actually a process for them to evaluate and gather information from the scientific literature. The module provides information how they can gather information through understanding what the paragraphs are. The topic sentence will be the most important part to learn as it gives students understanding how a paragraph is organized. The activity for this topic is considered as Critical Journal Review. Students learn how to extract information provided by several journals and will be able to identify topic sentences which in turn can be a valuable skill to deal with composing their essays.
The studying activity 6 is the following stage to previous journal and other textbooks reading comprehension. Here, the module is helping students to learn the well-known steps of reading comprehension, the SQ4R. This method of reading textbooks is an excellent strategy for both understanding and remembering information. It allows students to actively engage with learning, by translating the text they are reading into their own words.

Using module is considered practical for both students as it focuses on student-centered learning activities and culminates in a project for students to demonstrate understanding. The KKNI curricula will work together with the idea that students are able to develop a project to illustrate what they have learned, such as mini dictionary. Since modules use active rather than passive learning experiences, students may be more engaged, understand real-world applications of the concepts and further develop higher-order cognitive abilities. The ability to create data and meet problem in the topic of English for Biology subject is promoted by conducting a mini research, the relationship between the SKHUN (the letter of National Examination) scores and the result of the mid semester examination.

Traditionally ESP courses were typically designed for intermediate or advanced adult learners but now many students can start to learn academic or vocational English at an earlier age and at a lower level of proficiency. Unimed is on the way of responding the increasing numbers of learners are taught in English medium schools using approaches such as CLIL (Content and Language Integrated Learning). This subject is taught using the KKNI curricula will provide solution to the gap between the students’ level of English and the curricula of the Bahasa Inggris Biologi or English for Biology subject.

When students combines subject matter and English language teaching the combination is intended to apply what the students learn in their English classes to their main field of study. Being able to use the vocabulary and structures that they learn in a meaningful context reinforces what is taught and increases their motivation. The students' abilities in their subject-matter fields, in turn, improve their ability to acquire English. Subject-matter knowledge gives them the context they need to understand the English of the classroom. In the ESP (English for specific purposes) class, students are shown how the subject-matter content is expressed in English. The teacher can make the most of the students' knowledge of the subject matter, thus helping them learn English faster.

2 Research Method

Literature research is used to collect information to develop this module by examining the use of it in teaching English for specific purpose, using literature to choose part of the scientific English for this specific need and the KKNI, and using literature to refer the cognitive competence as an empirical and theoretical relevance to the research being conducted. In order to produce a module as a teaching material the aim of the study is developed from the learning outcomes of English for Biology subject.

The initial module and the formative evaluation as an instrument were developed and both were evaluated. The results were then used as a base for improving the quality of the initial module and for indicating the improvement of the student’s achievement. The proposed module consists of: introduction (cover, preface, content list, figure list, and table list); content design (mapping concept, material, assignments, conclusion and evaluation); and closure (references and biography). The module prototype was then submitted to validators, the English content and instructional design experts.
The field test for the initial module was conducted in order to obtain responses from the future users of the module, they are students and the lecturers. The module was then evaluated and fixed based on the negative responses and suggestion given by the respondents. The second field test was conducted to follow up all the responses given by the respondents and the pre-test was administered to obtain the student’s initial score. The post-test was used to obtain data about the change that students may experience after using the modul.

The module evaluation sheets are used by the validators to evaluate the prototype of the module and the responses were then examined. The questionnaires from both lecturers and students were used to collect data for the field test of the initial module. The pre-test and post-test were used to evaluate the student’s achievement before and after the use of module in the teaching and learning process.

Qualitative data (the validators’ evaluation results) were analyzed to obtain the total average score of the validity aspect (Va) and all the learning strategy of the module. The result obtained is categorized into not valid (0 ≤ Va < 1), less valid (1 ≤ Va < 2), valid (2 ≤ Va < 3), very valid (3 ≤ Va = 4) (adapted from Hobri, 2009). The module needs to be revised when the value of Va is less valid and not valid. The process to obtain the Va is conducted several times until the result reach the value of valid.

The responses from lecturers and students were re-organized to obtain the value of response by calculating the numbers and convert it into five categories. If the value of responses (R) if more than 80% then the module receives a positive response classically. The categories are: R< 25 (very negative), 25 ≥ R< 44 (negative), 44 ≥ R< 63 (ok), 63 ≥ R< 81 (positive), 81 ≥ R< 100 (very positive) (Adapted from Maimunah, 2016). The student’s achievement provides data for the module effectiveness.

### 3 Results and Discussion

#### The Validation of the Module

The module was validated and there are three indicators of the material aspect/content of the module were examined. Each value was calculated and referred to the value of validity indicated. The indicators are all fallen into valid and very valid, which indicate that the module validity value is between the 2.89 to 3.14 and the average is 3.00. The aspect of design was examined for three aspects, the size, cover, and content of the module.

<table>
<thead>
<tr>
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<th>Indicator</th>
<th>Average</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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</tr>
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<td>2</td>
<td>Performance</td>
<td>3.00</td>
<td>Very valid</td>
</tr>
<tr>
<td>3</td>
<td>Language</td>
<td>3.14</td>
<td>Very valid</td>
</tr>
<tr>
<td></td>
<td>Score for the Content</td>
<td>3.00</td>
<td>Very valid</td>
</tr>
</tbody>
</table>
Table 2. The Design Aspect of the Module

<table>
<thead>
<tr>
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<th>Average</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Size</td>
<td>3.84</td>
<td>Very valid</td>
</tr>
<tr>
<td>2</td>
<td>Cover</td>
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</tr>
<tr>
<td>3</td>
<td>Content</td>
<td>2.99</td>
<td>Valid</td>
</tr>
<tr>
<td></td>
<td><strong>Score for the Design</strong></td>
<td><strong>3.20</strong></td>
<td><strong>Very valid</strong></td>
</tr>
</tbody>
</table>

These indicators fall into only two categories, valid and very valid (average value is 3.24). Each of the result is summarized in Table 1 and 2.

The Practicality of the Module

The responses from students were used to see the value of practicality of the module. There are 147 students involved in the activity and come from five groups of students who are attending the subject of English for Biology. The students were asked to respond the module and fill the questionnaire’s sheets for the aspects of visual, eye catching, language, content, and usefulness. All aspects were responded positive as the percentage of each of them are also in the positive category (see Table 3).

Table 3. Student’s Responses

<table>
<thead>
<tr>
<th>No</th>
<th>Aspect</th>
<th>Average</th>
<th>Percentage (%)</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Visual</td>
<td>3.10</td>
<td>77.53</td>
<td>Positive</td>
</tr>
<tr>
<td>2</td>
<td>Eye catching</td>
<td>2.68</td>
<td>71.2</td>
<td>Positive</td>
</tr>
<tr>
<td>3</td>
<td>Language</td>
<td>2.98</td>
<td>79.11</td>
<td>Positive</td>
</tr>
<tr>
<td>4</td>
<td>Content</td>
<td>2.95</td>
<td>78.05</td>
<td>Positive</td>
</tr>
<tr>
<td>5</td>
<td>Usefulness</td>
<td>2.93</td>
<td>76.16</td>
<td>Positive</td>
</tr>
</tbody>
</table>

The Effectiveness of the Module

The average scores of students’ multiple choices questions were calculated and the Figure 3 shows the differences among the results. There were 100 multiple choices questions for the topic of Parts of speech and vocabulary and 20 for the Reading comprehension. The lowest and highest score were 26 and 80 respectively with the average score is 55.35 (stand.dev = 13.528). The results show that the Chi-squared count (14.558) < the Chi-squared table (15.50), the sample is homogeneous and normally distributed. The number of students who were included for the test was 46 from two groups only as some of them were declared as having no competence in English at all. These students were taken as samples and were considered to have confidence to take the test (Table 4).

The post-test result shows that the lowest and highest scores were 46 and 100 respectively with the average score is 76.44. (sd = 13.417), the increased average value is 21.09 (Figure 1).
Table 4. The Description of the pre and post-test.

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Min</th>
<th>Max</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>43</td>
<td>26</td>
<td>80</td>
<td>55.35</td>
<td>13.528</td>
<td>2.063</td>
</tr>
<tr>
<td>Posttest</td>
<td>43</td>
<td>46</td>
<td>100</td>
<td>76.44</td>
<td>13.417</td>
<td>2.046</td>
</tr>
<tr>
<td>Valid N (leastwise)</td>
<td>43</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Fig. 1. Mean score before and after applying developed module

Discussion

Teaching and learning process for English for Biology requires more adaptable teaching materials in its approach to determine the module’s effectiveness. Innovation and a variety of approaches are needed to make teaching and learning can deal with the complexity of the nature of students in English proficiency. The lecturer’s role is crucial in determining what and how the subject is delivered considering all aspects of both material and strategy.

The Research and Development must go through four steps of activities, the Planning, Designing, Validating, and Field Testing. The module has been validated and tested for both the practicality and effectiveness and assumed it has the expected quality as the teaching material for the English for Biology subject. A product is good when it has been validated, and tested for its practicality and effectiveness [9]. In each step evaluation is part of the processes, the validation and tests are the most important as the output of the module is going to be developed at this stage. That’s why the validation indicators are designed accurately in order to have a good result.

The validation tests for the content and design shows a good sign for the module to be used as the teaching material, there are some parts of it need to be revised. From the research point of view the use of students and lecturers should not be the only source of information or responses about the module. Using students as the respondents give the researcher the doubt about their dedication and time to answer the questionnaires. On top of these two fairly doubting situation, the students should not become the representative of the students as they do not have a standardized level of English (Figure 2). This figure just to make an example of the variability of the score based on the examination run by the government alone. Variability score of their SKHUN suggested that they are not eligible to assess the module [10]. Half way
of the process, between the pre and post-test more than half of the students left the activity with the statement that they just cannot do the test. There were only 46 of them who declared worthy to do the test. It was assumed that a more confident and representative students, more eligible candidates, will make a difference conclusion to the result.

The other problem about the sample is that the lecturers do not have enough time to recall what the students have learnt in the past. As English is categorized as a skill, it was much better when the sample consists of students who have been taught and chosen to fill the questionnaires and the pre and post-test. Considering their condition the total sample was not the best choice, purposive sampling is recommended. The material for the test was only part of the module and this may result in insufficient data to claim about the whole module. The module consists of six topic, they are grammar/parts of speech (verb, noun, and adjective only), affixes, types of sentence, active and passive voices, paragraph, and reading comprehension.

The test did not include the material of affixes, active and passive voices, types of sentence and paragraph. The test about the later material is practically time consuming and is better to have different time allocation. The result from the test did not cover all about the module and it has not touch the core of the syllabus.

The result also dictates us about the fact that teaching skills must be done in a regular basis. The teaching material for the Parts of speech has the allocation of two meetings and the next topic is the affixes. The students were doing the assignment for this topic that is the routine assignments or Tugas Rutin, and they have to submit the task for four weeks in a row. The identification process of noun, verb and adjective in sentences together with the effort to build up vocabulary while doing the exercise seemed to have not really helping the students with low confident in grammar. A limited vocabulary and time are factors which probably responsible for the unsuccessful result. It was also found that the students who were good in the pre-test were exactly the same students who were doing well in the post-test. Statistically, the module has shown the significant implication of the module on the student’s achievement in the test. The research also revealed that the module did not really depict the improvement in personal achievement. The vocabulary were only written as a home work and submitted on time for four weeks but the tests shows similar trend that students have a great deal of problem. The assumption can be clearly stated that the module is practically helpful and useful but time limitation was hindering the goal.

The test was only part of the module and this may result in insufficient data to claim about the whole module. The module consists of six topic, they are grammar/parts of speech (verb, noun, and adjective only), affixes, types of sentence, active and passive voices, paragraph, and reading comprehension.

![Fig 2. Student’s Score based on the SKHUN](image)
Although attitude is not part of the research but it was found that most of students were not ready in term of content comprehension. The research also found that some students were not confident about the terminology and words and process used in the area of Biology. The question about when do they “learn to comprehend” is another issue to deal with. Some of them were not very sure about their knowledge in Biology on top of their weakness in English’s grammar and vocabulary.

The rest of the topics such as paragraph and reading comprehension are related to the higher level cognitive skills. Students in this research have very little skill to study and practice the topic of paragraphing and reading. Research has identified a number of cognitive processes involved in reading comprehension [11,12], and a research focus on the shared knowledge required to complete reading has to be proposed to accompany this research.

In general, the topic of paragraph is one of the most difficult tasks to teach. Lack of knowledge about topic, sentence, words, and a paragraph itself has made the learning activity quite slow and uncertain. Students do not have knowledge about how a paragraph is building up. The information about a good paragraph that support or develop a single controlling idea was new for most of them. They are also not aware about that a single controlling idea is called the topic sentence. Activity to identify the topic sentence in the paragraph was well-known to be the longest time.

The module does not come alone, it has other strategies such as puzzle and games attach to it. There are several reasons for doing this. First of all, young learners have endless energy but all schedule for every group of students, for this subject are mostly after 1.00 pm. Time that is not really promising. Secondly, the classes are considered big, and it is difficult to organize a group of 20-30 students. Another reason is that they do not have many words. Their vocabulary is not rich even in Bahasa Indonesia. It is unlikely we succeed in explaining them something difficult in English, which is why playing language games is the best way to work with students.

The failure to successfully learning the paragraph leads to have more difficult in writing. The module does not include the activity of writing and it is believed that students must have a specific course or time to be able to study it. This needs attention as writing is a critical part of the scientific process. It is often taught secondarily to scientific concepts and becomes an afterthought to students. Although it is also believed that scientific writing is often difficult and arduous task for many students [13].

The overall findings indicate that the students with high level of confident in English, grammar and vocabulary, have more ability to study the rest of the module. Factors such as lecturer, dictionary, and other strategy such as games and puzzle, playing cards, and the project of mini dictionary, seemed have no real impact on their achievement in the tests. The real problem is the lack of knowledge in biology and low confident in English proficiency of most of the students. The real and important is to suggest the University to adjust this demand with having more credits, SKS, if the quality of student’s English proficiency is the real problem. Lecturers are also the important part of the process and to put more resources to enhance their capability to deal with the students’ various level of English proficiency.
4 References


Molecular Performance of Oil Palm (*Elaeis Guineensis* Jacq.) Origin Based on Microsatellite Marker for Low Lipase Trait

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Abstract. Oil palms are one of the most increased expansion commercial crops in the tropics area other than the other plantation. As a leading of producers palm oil in the world, Indonesia produce 40.5 metric million tons of oil palm in 2018 and the most problem in CPO quality is free fatty acid content. The quality of palm oil is strongly influenced by the level of fruit maturity and free fatty acid content. Incomplete hydrolysis of lipases is in the release of monoacylglycerols (MAG) and diacylglycerols (DAG) in addition to free fatty acids (FFA). This study aimed to determine the genetic diversity and molecular performance of 15 *Elaeis guineensis* origin were analyzed using microsatellite marker. Results showed that mEgCIR_LIP 03 was the informative marker based on polymorphic informative content (PIC) value is 1,00 and supported by electroporegram depicted 15 *Elaeis guineensis* origin were amplified with low lipase specific marker (190 bp-253 bp). The observed heterozigosity (Ho) 0,00 was lower than expected heterozigosity (He) 0,916, indicating this population had high similarity. Relationship between genotype was exhibited by dendogram, it was divided in to 2 clusters in 0,54 similarity coefficient.

Keywords: allele, low lipase, microsatellite marker, molecular, oil palm

1 Introduction

Indonesia is the first palm oil producer in the world with 36,5 million metric tons of palm oil production in 2017 and increased to 40,5 million metric tons that is 5.5 million tons of it is for domestic consumption in the food industry [1] In fact, post harvesting and transportation processes is currently injure the fresh fruit bunch and affect the content in crude palm (CPO) quality within the increasing of free fatty acid (FFA) content [2]. The high oil content in the mesocarp makes it a rich substrate for lipase activity [3]. According to [4] post-harvest handling and processing of oil-rich palm fruit will increase contact between lipase and fat substrate, resulting in an increase in the hydrolysis of Triacylglycerol to free fatty acids. The higher FFA in CPO >5% is inappropriate for human consumption without properly purification [5].

However in the past, an effort for oil palm breeding improvement process could take from 8 to 10 years by determine the descendant of parents crosses, this time period has been
reduce by using biotechnology tools [6]. The genetic diversity of *E. guineensis* has been reported using any difference marker depend on DNA target [7,8]. Microsatellite QTL mapping of lipase activity in oil palm has been studied [9] and the three lipases gene had high homology to demonstrated triacylglycerol lipases. The advantages of microsatellite marker are high information content, co-dominance and preferred for mapping, genetic analyses and marker assisted plant improvement program [10]. Successfully determining genotypes with low lipase activity allows the longer storage period for fruit bunch, increase the oil production and improve the quality of CPO. This study aimed to determine the genetic diversity and molecular performance of *Elaeis guineensis* to low lipase activity.

2 **Research Method**

2.1 **Plant material and DNA extraction**

Total 15 materials genetic of *Elaeis guineensis* were collected from Aek loba Estate Asahan, North Sumatera belong to PT. Socfin Indonesia are listed in Table 1. Total genomic DNA was extracted from leaves using modified cetyltrimethyl ammonium bromide (CTAB) procedure [11].

<table>
<thead>
<tr>
<th>Accession</th>
<th>Family</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>SL A1</td>
</tr>
<tr>
<td>4</td>
<td>SL A2</td>
</tr>
<tr>
<td>9</td>
<td>SL A3</td>
</tr>
<tr>
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<td>40</td>
<td>SL A14</td>
</tr>
<tr>
<td>45</td>
<td>SL A15</td>
</tr>
</tbody>
</table>

2.2 **PCR and Visualization of DNA Amplification**

The DNA region was amplified by PCR using microsatellite marker, mEgCIR_LIP03, see Table 2, it had a QTL mapping [9]. The DNA amplification were running at initial denaturation 95°C for 10 min, followed by 35 cycles of denaturation at 94°C for 30s, annealing at 55°C for 1min 15s, extension at 72°C and final elongation step at 72°C for 30 min. The extracted DNA amplification banding profile was visualized by 2% agarose gel within 1x TBE buffer system. Electrophoresis is carried out with 70 volts electricity for 1h 10 min. The presence or absence of each DNA band was visualized by UV-transilluminator (UV Doc-its) and Gel Doc (U Doc its) and alleles were identified according to base pair size.
Table 2. Microsatellite marker information

<table>
<thead>
<tr>
<th>Microsatellite marker</th>
<th>Forward Primer</th>
<th>Reverse Primer</th>
<th>Time Melting</th>
</tr>
</thead>
<tbody>
<tr>
<td>mEgCIR_LIP03</td>
<td>TCAAGAAACTTGAGCATATA</td>
<td>CATCCAGTAAGCTAACAC</td>
<td>55°C</td>
</tr>
</tbody>
</table>

2.3. Data Analysis

Each band that amplified by microsatellite marker was scored manually as a binary data with presence (1) and absence (0) band and to figure it out the alleles size was done by semi-quantitative with standard curves using UVITEC Cambridge software [12]. The banding pattern is purpose to determine the presence of low lipase gene in each oil palm.

3 Results and Discussion

3.1 DNA Amplification

The result of amplification is to confirm the presence of low lipase gene within the plant tested using specific marker, mEgCIR_LIP03. All DNA samples were amplified and the banding pattern visible to one band as described in Figure 1. The length range amplified bands in this study were about 192 bp – 253 bp. Unfortunately, these narrow length of alleles generate difficulty to ensure that it was low lipase gene. According to previously study [13], this primer does not only validate the low lipase gene but also the high lipase activity. The high lipase activity was detected in two marker alleles (267bp-269bp) and the low lipase activity detected in one single marker allele 267 bp. However, this population has a potential gene to be candidates for low lipase genotype.

Fig 1. DNA Band Pattern result of amplification with mEgCIR_LIP03 specific primer M=Ladeer; 3,4,45 = DNA samples number according to accession number, bp = base pair
3.2 Genetic diversity structure

Alleles frequencies was conducted according to [14] who defines two types of allele, high PIC value > 0.5 and low PIC value < 0.05 and this finding indicated the mEgCIRLIP_03 had a high PIC (1.00) in the other word that is has potential primer to be used as molecular marker for low lipase breeding selection program, it was mentioned in [13] that mEgCIR_LIP03 was useful marker for introgression of low lipase trait in to other elite palm genotype. According to Table 3 observed heterozigosity (0.00) was lower than expected heterozigosity (0.916) indicated this population exhibited low diversity. In the previous study [15] dissimilarity of genotype reflected in higher Ho value.

Table 3. Microsatellice loci profile of oil palm. N = number of samples in population; Na=number of different alel; Number of effective alleles; Ho=observed heterozigosity; He=expected heterozigosity; 
PIC = polymorphic information content

<table>
<thead>
<tr>
<th>Locus</th>
<th>N</th>
<th>Na</th>
<th>Ne</th>
<th>Ho</th>
<th>He</th>
<th>PIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>mEgCIR_LIP03</td>
<td>45</td>
<td>13,000</td>
<td>11,842</td>
<td>0.00</td>
<td>0.916</td>
<td>1.00</td>
</tr>
</tbody>
</table>

The genetic analyses of 15 origin of oil palm using Gower General Similarity Coefficient [16] detected 2 main clusters in 0.54 similarity coefficient, see Figure 2, which were “A” cluster and “B” cluster. The B cluster was brached in to two sub cluster “A” cluster has 45,15,40,16,10,9 origin accession number as its group member, and “B” cluster has 28,39,27,21,3,4,22,33, 4 as its group member. Cluster was formed according to base pair size so that indicate the members in the same group has a closer base pair size (allele length). The cluster was not formed by the family, although there were family difference among the population. Selection program in each generation cause the decrease of genetic bases of oil palm population that leaving the gen sources that has closer relationship [17]. However there is a little variability in this population.

![Fig 2. Dendogram of 15 Elaeis guineensis origin by UPGMA program based on base pair size using the Gower General Similarity Coefficient 1971](image-url)


4 Conclusion

The mEgCIR_LIP03 are informative marker to detected lipase gene activity in oil palm and the availability of the other specific marker of low lipase activity was suggested. The 15 oil palm were evaluated a potential genotype to be a low lipase genotype. There is a little variability within the population even the oil palm through any crossing selection.

5 Acknowledgment

The authors are grateful to PT. Socfin Indonesia for support on this study and the Universitas Sumatera Utara

6 References


Effect of Sucrose And Atonic Against Tunas Culture Potatoes (Solanum tuberosum L.) Through Tissue Culture Technique

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Abstract. This study Aimed to Obtain information about the effects of sucrose and atonic cultures potato shoots. This research is complied with the basic pattern of completely randomized design (CRD) factors two items, namely sucrose (60 g / l, 120 g / l, 180 g / l) and atonic (without tonic, 1 ml / l, 1.2 ml / l, 1.3 ml / l), was conducted in laboratory tissue culture UPT. Horticulture Seeds Medan Johor building, room mates. Began in May 2019 and July 2019. The results Showed that sucrose administration potato shoots obtained best in culture at a concentration of 120 g / l, giving the best atonic potato shoots Obtained cultured at a concentration of 1 ml / l.

Keywords: Culture shoots, potatoes, sucrose, atonic

1 Introduction

Potato (Solanum tuberosum L.) is a plant tubers and classified as old plants are shrubby and creeping short. It has a four square shape. Its stems and leaves are green or reddish purple colored. Its root originated from side branches that go into the ground, which serves as a store of carbohydrates so that the shape swell [1]. In 2014 the production of potatoes experienced up to 1,347,818 tons, but in 2017 the production of potatoes has decreased approximately to 1,164,743 tons, with an area of 75 611 ha of the crop [2].

Granola cultivars currently very much cultivated by farmers. The advantages of the cultivar Granola is early duration (90 days), high yield, resistant to pests and diseases. The disadvantage is the high water content reaches 85% [3]. Today, the effort to improve the quality of potatoes in Indonesia have been conducted with several programs, one of which tissue culture methods. This method is a good way to generate production-free potato pests and diseases and can do without knowing the plant-breeding season [4].

The main factor that most determines the formation of micro-potato tuber is the type of media, sucrose concentration, type and concentration of growth regulators, as well as temperature and photoperiodic. Induction of micro-tubers can be carried out on MS medium with irradiation length of 10-16 hours [5]. This study aimed to determine the effect of sucrose and the culture of potato shoots atonic.
2 Research Method

2.1. Sterilization Equipment
Glass tools and dissecting set (scalpel, tweezers, scissors) wash with detergent, then soaked for 24 hours ± 1 × teepol. After submerged in the solution for 1 day, the tools are washed with running water and then in the autoclave. Then all of these tools in sterilized in an autoclave at temperatures of 121 ° C, 17.5 psi for 60 minutes.

2.2. Preparation of Solid Growing Media
Media used in this study is Murashige and Skoog (MS), where the process of making this medium with a pipette Stock Murashige and Skoog solution into the flask, then dissolved into a solution of distilled water and added to the media. Volume media entirely determined by adding 3 liters of distilled water.

Acidity is measured by pH meter is 5.8 (using 1 N NaOH and HCL 1 N) to raise and lower the pH. As a compactor is used in order to 7 g / l and heated over a hot plate up so that it dissolves and homogeneous with other components, then poured into culture bottles, each bottle culture media filled 30 ml / bottle is then closed.

2.3. Media Sterilized
Media in the culture bottles sterilized using an autoclave using 17.5 psi pressure autoclave at a temperature of 121ºC for 20 minutes. Furthermore, it can be stored in the culture room with a temperature of 24ºC before use.

2.4. Making explants
The explants used were books potatoes originating from potato cultivar Granola Kembang. Explant subculture is then taken and cut to a size of 0.5 cm using a knife over a petri dish.

2.5. Investment Explant
Planting explants do in LAF (Laminar Air Flow) that have been sterilized with 70% alcohol. Explant is already placed in the cup petri. The sterile bottle media and in bonding with Bunsen flame and then the explants were planted in accordance with the treatment media bottles, each bottle contained media 1 explant. After the media bottles are closed and returned to the culture room.

2.6. Maintenance
Bottles that have been planted with explants placed on the shelves of culture in a culture room, every day was sprayed with 70% alcohol to be free of organisms that cause contamination.

3 Results and Discussion

3.1 Long Branch
Bud long observational data on BST and finger manifold 2 in Annex 1 and 2 showed that sucrose and atonic and their interaction significantly. Shoot length between 2 BST on sucrose administration and atonic treatment can be seen in Table 1.
Table 1. Length sprout age 2 BST on sucrose administration and atonic treatment.

<table>
<thead>
<tr>
<th></th>
<th>A0 (0)</th>
<th>A1 (1)</th>
<th>A2 (2)</th>
<th>A3 (3)</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>S0 (60)</td>
<td>20.67 c</td>
<td>21.67 c</td>
<td>21.33 c</td>
<td>22:00 bc</td>
<td>21:42</td>
</tr>
<tr>
<td>S1 (120)</td>
<td>22:33 bc</td>
<td>22.00 bc</td>
<td>23.67 ab</td>
<td>23.67 ab</td>
<td>22.92</td>
</tr>
<tr>
<td>S2 (180)</td>
<td>22:00 bc</td>
<td>24.67 a</td>
<td>21:33 c</td>
<td>23.67 ab</td>
<td>22.92</td>
</tr>
<tr>
<td>Mean</td>
<td>21.67</td>
<td>22.78</td>
<td>22:11</td>
<td>22:42</td>
<td></td>
</tr>
</tbody>
</table>

Description: The figure followed by the same letters in the same column indicate no significant according to Duncan's Multiple Range Test at the level of α = 5%.

Table 1 shows the highest shoot length at 2 BST obtained at the administration of sucrose 180 g / l (S2) and atonic 1 ml / l (A1) that is different unreal 24.67 with S1A2, S1A3 and S2A3 and significantly different from the S0A0, S0A1, S0A2, S0A3, S1A0, S1A1, S2A0 and S2A2.

Statistical analysis of the results showed that administration of sucrose in the culture of potato shoots real effect on shoot length parameters with the best concentration of 180 g / l (S2) while the parameter number of shoot and root length best results obtained at a concentration of 120 g / l (S1). The less the concentration of sucrose used to a certain extent will lead to the increasing number of shoot and root length. Sucrose effects on bud formation in vitro. Giving of sucrose at lower concentrations (20 g / l) shows the number of shoots Magnolia × soulangiana 'Coates' most [6].

3.2. Total Tunas

Observational data on the number of shoots BST and finger manifold 2 in Annex 3 and 4 showed that sucrose significant effect while giving atonic not significant but the interactions are both significant effect on the number of buds. The number of shoots the age of 2 BST on sucrose administration and atonic treatment can be seen in Table 2.

Table 2. Number of shoots between 2 BST on sucrose administration and atonic treatment.

<table>
<thead>
<tr>
<th></th>
<th>A0 (0)</th>
<th>A1 (1)</th>
<th>A2 (2)</th>
<th>A3 (3)</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>S0 (60)</td>
<td>10.67 d</td>
<td>11.67 cd</td>
<td>10:33 e</td>
<td>11:33 d</td>
<td>11:00</td>
</tr>
<tr>
<td>S1 (120)</td>
<td>11.67 cd</td>
<td>ab 13:33</td>
<td>14:33 a</td>
<td>13:00 b</td>
<td>13:08</td>
</tr>
<tr>
<td>S2 (180)</td>
<td>13.67 ab</td>
<td>12.67 bc</td>
<td>11:33 d</td>
<td>11.67 cd</td>
<td>12:33</td>
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<tr>
<td>Mean</td>
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<td>12:56</td>
<td>12:00</td>
<td>12:00</td>
<td>12:14</td>
</tr>
</tbody>
</table>

Description: The figure followed by the same letters in the same column indicate no significant according to Duncan's Multiple Range Test at the level of α = 5%.
Table 2 shows the highest number of shoots on 2 BST obtained at giving sucrose 120 g/l (S1) and atonic 2 ml/l (A2) that is different unreal 14.33 with S1A1 and S2A0 and significantly different from the S0A0, S0A1, S0A2, S0A3, S1A0, S1A3, S2A1, S2A2 and S2A3.

Statistical analysis of the results showed that administration of sucrose in the culture of potato shoots real effect on shoot length parameters with the best concentration of 180 g/l (S2) while the parameter number of shoot and root length best results obtained at a concentration of 120 g/l (S1). The less the concentration of sucrose used to a certain extent will lead to the increasing number of shoot and root length. Sucrose effects on bud formation in vitro. Giving of sucrose at lower concentrations (20 g/l) shows the number of shoots Magnolia × soulangiana 'Coates' most [6].

Giving atonic in cultures of potato shoots influential not evident on the parameters of the number of shoots, initial weight and final weight where the highest data on each - each of these parameters tend to be obtained on administration atonic with a concentration of 1 ml/l (A1), 3 ml/l (A3) and 2 ml/l (A2). Atonic is a growth regulator that serves to stimulate the growth of plants. Atonic absorbed by the plant will accelerate the flow protoplasmik and activate cell metabolism [7].

3.3 Number of Roots

Observational data on the number of roots BST and finger manifold 2 in Annex 9 and 10 which showed that sucrose and atonic significant effect whereas the second interaction effect no significant effect on the amount of roots. Total root age 2 BST on sucrose administration and atonic treatment can be seen in Table 5.

Table 5 shows the highest number of roots on 2 BST obtained at the administration of sucrose 120 g/l (S1) and 180 g/l is 5.57 significantly different fruits by giving sucrose 60 g/l (S0). The highest number of roots was obtained at giving atonic 1 ml/l (A1) is 6.89 significantly different fruits to other treatments.

<table>
<thead>
<tr>
<th>Atonic (ml/l)</th>
<th>Mean</th>
<th>A0 (0)</th>
<th>A1 (1)</th>
<th>A2 (2)</th>
<th>A3 (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>S0 (60)</td>
<td>4.58 b</td>
<td>3.00</td>
<td>5.33</td>
<td>4.67</td>
<td>5.33</td>
</tr>
<tr>
<td>S1 (120)</td>
<td>5.75 a</td>
<td>4.33</td>
<td>7.67</td>
<td>5.33</td>
<td>5.67</td>
</tr>
<tr>
<td>S2 (180)</td>
<td>5.75 a</td>
<td>3.67</td>
<td>7.67</td>
<td>5.33</td>
<td>6.33</td>
</tr>
</tbody>
</table>

Mean 5.36

Description: The figure followed by the same letters in the same column indicate no significant according to Duncan's Multiple Range Test at the level of α = 5%.

Table 5 shows the highest number of roots on 2 BST obtained at the administration of sucrose 120 g/l (S1) and 180 g/l is 5.57 significantly different fruits by giving sucrose 60 g/l (S0). The highest number of roots was obtained at giving atonic 1 ml/l (A1) is 6.89 significantly different fruits to other treatments.

Statistical analysis of the results showed that administration of sucrose in the culture of potato shoots real effect on shoot length parameters with the best concentration of 180 g/l (S2) while the parameter number of shoot and root length best results obtained at a
concentration of 120 g / l (S1). The less the concentration of sucrose used to a certain extent will lead to the increasing number of shoot and root length. Sucrose effects on bud formation in vitro. Giving of sucrose at lower concentrations (20 g / l) shows the number of shoots Magnolia × soulangiana 'Coates' most [6].

Statistical analysis of the results showed that administration of sucrose in the culture of potato shoots real effect on the best length parameter shoots with the data obtained at a concentration of 3 ml / l (A3) and the number of roots with the best concentration of 1 ml / l (A1). Atonic higher concentration may increase the length of the shoot but can inhibit the growth of roots, root length where the best results simply by administering 1 ml / l atonic. In the way it works, atonic quickly absorbed by the plant and stimulates cell protoplasmatic flow and speed of germination and rooting but when the concentration is excessive, it can inhibit the growth [8].

4 Conclusion

Giving the best sucrose in the culture of potato shoots obtained at a concentration of 120 g / l. Giving the best atonic cultured potato shoots obtained at a concentration of 1 ml / l. Best shoot length, diameter obtained in the administration of sucrose 180 g / l and atonic 1 ml / l (S2A1) while the parameter number of shoots the best results obtained in pembrian sucrose 120 g / l and atonic 2 ml / l (S1A2).

5 References

Increasing Capacity Of Production And Innovation Of High Nutrition Of Black Meatball Products In Dolok Malela, Simalungun

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Abstract. Community service activities with 2018 DRPM funds have been carried out in 3 stages. It started from licensing arrangements, handover of equipment and mentoring stage. This activity was carried out with the "Ubay" Meatball Milling Business Partner in Dolok Malela, Gunung Malela District. The need for meatball molding machines, meat grinding machines, and airtight plastic presses fulfilled. Besides, the meatball printing machine makes the meatballs produced the same size and the meatballs produced are smoother in texture. Furthermore, the provision of the airtight plastic press oriented to the stage of business expansion to preparing meatballs in the form of frozen meatballs. The method used to achieve the objectives of this service is the method of education, outreach and product standardization assistance. The output is grinding machines, meatball molding machines with standard size meatballs, knowledge of healthy and hygienic meatball-making procedures. Innovation is in making black meatballs and preparing meatballs for frozen food.

Keywords: black meatball, nutrition, frozen food

1 Introduction

One food source of animal protein that quickly found on the market is beef. Beef processing is usually like satay, soup or soup. Today, beef processing is extraordinary and is of interest to all age groups, namely meatballs. Making meatballs is not tricky, and its complementary ingredients are also natural to find.

Meatball processing requires the main ingredients in the form of fresh meat and other additives such as starch, salt, ice cubes, and other seasonings [1]. Fresh beef, flour and bamboo will be ground to form ground meat. Mixing the meat emulsion with starch flour, storage of the formed dough, molding the mixture into meatballs then cooking it in hot water to produce meatballs that are ready for consumption [2].

There are two kinds of techniques in making meatballs; the first technique is mixing all the ingredients and then destroying them (mixing and chopping) until a mixture formed — the second technique, crushing the meat and then mixing it with other ingredients. The purpose of the destruction of meat is to break down the cell wall of muscle fiber in the flesh so that it makes protein soluble and the salt extracted out [3].
Storage of the dough in the refrigerator for 10 minutes before being moulded into meatballs aims to increase the amount of soluble protein in the emulsion or meatball mixture to improve the physical properties of the resulting meatballs [4]. After making the dough, the moulding of the meatballs works by forming the dough into dots the size of marbles or more by using a hand or meatballs printing tool.

Besides, in cooking meatballs, two stages must be done. First, soaking the meatballs at a temperature of 50-60°C that aims to form the meatballs. Furthermore, the second stage, boiling the meatballs in water with a temperature of 100°C, that aims to ripen the meatballs [3]. Cooking meatballs are done by boiling in boiling water or can also steam [5].

The cooking of meat must pay attention to the balance between high temperature and length of heating because the use of high heat with an extended period can cause changes in taste and thermal degradation of chemical components of food which can ultimately cause a decrease in quality. The fat melts, followed by the formation of volatile compounds during the heating process. In addition to that, there is also a reaction between the protein and the reducing sugars in the meat [6].

Innovations continue to be made continuously in the provision of these meatballs. Provision of meatballs with variations in a wide variety of stuffing, then giant size meatballs and phenomena with lambing meatballs. Currently, there are innovations in meatball products using color as an enchantment, namely black meatballs. The black color of meatballs can come from Japanese bamboo charcoal; our bamboo charcoal contains carbon that has been through the purification stage, making it safe for consumption and also suitable for health, for detoxification in the body [7].

Also, there is a black color, which comes from squid ink. The black color on squid ink is a natural black dye for various food dishes. Squid ink contains melanin compounds with very high concentrations and iron. Melanin is an amino acid that functions to activate our body's enzymes. The content of iron (Fe) in squid ink is beneficial in terms of nutrition and health. Iron is an essential mineral for our body, which makes up red blood cells (hemoglobin). Also, iron functions to help the function of muscles and brain, through its role to distribute oxygen in our body. One of the problems faced by the Ubay meatball mill is the small capacity of the meat grinding machine and the absence of a meatball printing machine. With the presence of a giant meat grinder and meatball molding machine, the Ubay meatball business can increase its production. One of the problems faced by the Ubay meatball mill is the small capacity of the meat grinding machine and the absence of a meatball printing machine. With the presence of a giant meat grinder and meatball molding machine, the Ubay meatball business can increase its production. The solutions offered to partners in the implementation of the Community Service Program are agreed to answer the main problems faced by partners in carrying out their business activities so that later an economically independent business will be formed. Justification for proposing partners explained as follows:

The solution to the supply of meatball grinding machines with higher capacity or more urgent needs is the meatballs forming machine so it will be seeking the supply of meatball forming machines.

The solution to the limited knowledge on the standardization process of the meatball processing will be held socialization and assistance on proper meatball processing procedures starting from the selection of raw materials used, the arrangement of production space, work standards and excellent and hygienic processing processes.

Solutions for diversifying meatball products and packaging design will be carried out with socialization and assistance in the process of producing black meatballs to increase the nutritional value of ordinary meatballs.
2 Methodology

The method of implementation offered to partners to overcome the problems faced by partners is the method of education, training, outreach and assistance, including 1. Solutions for the supply of meatball molding machines and meatball grinding machines for higher capacity, efforts will be made to provide devices, 2. Solutions for the limited knowledge on the standardization process of the meatball processing, socialization and assistance will be held on right meatball processing procedures starting with the selection of raw materials used, the arrangement of production space, work standards and excellent and hygienic processing processes. 3. Solutions for the innovation of black meatball products and packaging design will be carried out with socialization and assistance in the process of producing black meatballs.

2.1 Approach Method for Resolving Partner Issues

Based on the problems that have been put forward, in this community service approach, the method used is the method of education, training, outreach and assistance. The purpose of the strategy offered to solve the problem operationally is as follows:

- Observe a partner's business conditions to identify the issues faced regarding product standardization and certification; packaging used financial management and marketing systems. Provision of meatballs forming machines and meatballs primary grinding machines with larger capacities needed by partners.
- Carry out socialization and assistance in the application of standardization in the production process by taking into account reasonable procedures for processing meatballs starting from the selection of raw materials used arrangement of production space, work standards and excellent and hygienic processing processes.

The several methods of the approach taken are in the first stage by surveying to find out the business conditions of partners with the technique of direct observation to the partner's location and conducting question and answer. This effort is carried out to find out the profile of partners and identify problems of partners. At this stage, partners play a role in preparing the data requested by the service team — furthermore, the approach method in processing practice. The processing process of providing meatball forming machines and grinding machines Basic ingredients of meatballs are available. The target to be achieved in this stage is the standard size of the meatballs and also the production of more meatballs. The role of partners in this stage seeks to prepare the required image of the meatball forming machine and grinding machine. The innovation of black meatball.

3 Results and Discussion

Activity Results

The condition of the "Ubay" meat grinder partners, partners want to develop this simple business by optimizing the manufacturing process and packaging of products that are more attractive, through effective and efficient innovation and appropriate technology so that the results of this meatball production can be an added value for the income of the general family and the people in this Dolok Malela-Simalungun in particular.
Activities that apply innovation and appropriate technology in the process of printing meatballs. This meatball molding machine will produce meatballs of the same size and softer texture with greater production capacity. The machine is able to print meatballs in various sizes with the number of 280 seeds per minute for a standard size meatball (Figure 1a). Efficiency in terms of printing meatballs is very helpful for partners because it can save time when compared to printing meatballs manually by hand.

The effort to separate the meat grinder from the dough mixer for this micro-business also had a positive impact on partners. The use of the previous machine was less effective because the stages of making meatballs could not be done at once. So if the grinding machine is running, the mixer is running by itself. Meanwhile, the meat must be ground first and then put into the dough machine. If a grinding machine is available (Figure 1b), the meat can be ground immediately and then put into a mixer. It is an opportunity to develop entrepreneurship together because the business opportunity for developing the meatball business is still wide open.

The provision of a vacuum sealer or an airtight plastic press (Figure 1c) has much helped the development of this meatball business. Bearing in mind, partners have only been selling meat grind and meatball dough directly without further development. This airtight press serves to package the product by exposing air in the packaging. So that making meatballs will remain safe, durable (durable), fresh, clean, and attractive within a few days if stored at room temperature and will be more durable if stored in the refrigerator. They are giving a sticker on the meatball packaging as an effort to increase the selling value of the meatballs.

On this occasion, the team introduced the making of black meatballs. Squid ink is rich in natural glutamic acid, so it tastes savory umami just like truffle and parmesan cheese. This squid ink can prevent fat oxidation that can reduce the risk of heart disease in humans. This black liquid is also found to be rich in iron. Iron is essential for producing hemoglobin and myoglobin, two proteins found in red blood cells to help deliver oxygen throughout the body.
Giving squid ink does not produce fishy odor and also does not change the taste of the meatballs. Most of the people who have tasted the taste of black meatballs say that black meatballs taste more savory and delicious.

The activity which has been going on for approximately 6 (six) months starting in Dolok Malela-Simalungun involves 15 people, having various impacts felt by the Unimed LPPM team and the participants. The impact of activities can be in the form of direct impacts felt by the participants as well as indirect impacts.

The next stage of the process of implementing activities in community service activities is assistance. Assistance is carried out by meeting in person, also by communication via cell phones. Assistance 1 was carried out, where the head of the activity returned to the service location. It did in the process of mentoring as well as an evaluation. The review of the use of the equipment is carried out.

For the instructors (State University of Medan dedication team), this activity is part of the tri dharma of higher education that is community service. Lecturers, as one of the strategic components of the nation, also have a role in improving the quality of education, skills of citizens in the country. Also, the research conducted by the lecturers, the application of the research is in the form of community service. This form of dedication is the result of research.
conducted by previous lecturers. Thus, all material presented is the scientific result of the scientific thinking of the researchers.

The other impact from this activity for lecturers is a form and role by bringing the name of the State University of Medan. The midst of the community increasingly recognized and felt for its benefits. One strategy in introducing institutions to the world outside of campus is through community service activities because this activity is directly confronting the target community. For partners and meatballs traders, the impact is felt the efficiency at the stage of producing the meatballs which do not need a long time to form the meatballs. Furthermore, there is new knowledge about the innovation of making highly nutritious black meatballs.

4 Conclusions

Partners have given a meatball molding machine, a meat grinder and an airtight plastic press. Meatball product innovation with the addition of squid ink in the form of highly nutritious black meatballs. Knowledge and production skills of "frozen food" with the presence of an airtight plastic press. Packaging design to increase the selling value of black meatball products.

5 Acknowledgement

Thank you to Directorate of Research and Community Service (DRPM), Directorate General of Research and Development Strengthening of Indonesia. It is for providing funds so that this dedication can be carried out.

6 References


Analysis of Inequality in Economic Development District / City in North Sumatra

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Abstract. Development planning in Indonesia is directed to create a society that is more prosperous, prosperous and equitable. Policy development is implemented to achieve high economic growth potential and by utilizing existing resources. But the fruits of development have not been felt evenly and sometimes there are regional disparities. This study aims to identify and analyze the influence of PDB, population, development expenditure and unemployment rate on the imbalance of economic development between districts / cities in North Sumatra. The data used is panel data from the year 2011 - 2018 on 25 districts / cities in the province of North Sumatra. Sources of data from the Central Statistics Agency of North Sumatra Province with method Fixed Effect, with testing conducted by classical assumption test and statistical tests. With the help of Eviews 6.0 program data processing, data analysis results showed that the PDB variable is negative and significant effect at $\alpha = 10\%$, variables of population and development expenditure has positive and significant at $\alpha = 10\%$ while the unemployment rate did not significantly influence the disparity of economic development in North Sumatra. Regression results on the model is $R^2 = 0.994995$, which means that the independent variables affect the dependent variable was 99.49% and the remaining 0.52% is influenced other variables outside the model are analyzed.

Keywords: Disparities, GDP, Population, Development Spending, Unemployment Rate

1 Introduction

National development in an area is focused on economic development through efforts to economic growth. Where the goal of economic development creates growth and changes in economic structure, social change, reducing or eliminating poverty, reducing disparity (disparity), and unemployment [1]. The main cause of inequality is differences in socioeconomic structure and other factors.

Development planning in North Sumatra is directed towards realizing a more prosperous, prosperous and just society in accordance with Nawacita item 3 to develop Indonesia from the periphery by strengthening regions and villages within the framework of a unitary State. Policies development is carried out to achieve high economic growth by means of utilize the potential and available resources. But the results of development are sometimes not felt evenly and there are still gaps between regions.

Regional development can enable the region to manage its economic resources to be useful and successful for the advancement of the region and the welfare of the community. To
advance Regional development the most important concerns the process of growth and equitable development. Promoting the regional economy is the main objective of the implementation of Regional Autonomy. The policy of providing regional autonomy is a strategic step. First, regional autonomy and decentralization are answers to local problems in the form of the threat of national disintegration, poverty, inequality of development, low quality of life of the people, and problems of human resource development. Second, regional autonomy and decentralization are regional strategic steps to welcome the era of economic globalization by strengthening the regional economic base. This is very important for the Regional Government in determining the efforts that can be made to encourage economic growth in the region [2].

One way to assess the achievement of economic growth is through the calculation of Gross Domestic Product (PDB) according to prices valid in the base year. The value obtained is called PDB according to a fixed price that is the price in force in effect in the base year. At the regional level it is called Gross Regional Domestic Product (PDRB). This is enough to prove that the regional autonomy imposed by North Sumatra has positive results because it can increase the economic growth of North Sumatra from year to year and of course this will impact on other sectors and it is hoped that conditions like this will continue in the long term. Long and followed by other developments that will further improve the economic and political situation.

From Figure 1, it explains the economic growth during 2011 to 2018 although it fluctuates but shows a positive direction. Recorded economic growth in 2011 of 5.48 percent to 6.90 percent in 2012. But in 2012 economic growth had dropped to the level of 6.39 percent to the level of 5.07 percent in 2015. The economy rose again in 2016 it reached 6.35 percent until 2018 economic growth reached 6.22 percent.

Generally economic growth is often used as a measure for the success of economic development and is often interpreted as a series of businesses in an economy to develop its economic activities so that more infrastructure is available, more and more companies are growing, higher levels of education, technology is increasing. Regional economic development also requires cooperation between the government, private sector and the community in managing the resources owned by the region in order to increase economic growth and employment as much as possible. Indicators of development success are shown by economic growth and reduced inequality both in the distribution of population income and
between regions. Inequality of development in principle is an economic inequality that implies poverty and inequality.

The approach in conducting this research using the Williamson Index approach with the reason this index is quite able to explain the extent of inequality that occurs between regions, it is quite easy to interpret the number of inequality obtained, practical and quite commonly used in measuring inter-regional development inequality. If the index is smaller, the regional inequality is also smaller and vice versa, if the index is greater, the greater inequality between regions will occur.

The Williamson Index calculation uses PDRB per capita in relation to population per region. Basically the Williamson Index is the coefficient of variation of the average distribution value calculated based on estimates of the values of PDRB and population in districts / cities in North Sumatra.

**Formulation of the problem**

Based on the description above, the formulation of the problem that can be taken as a basis in this study is, "How does the effect of PDRB, population, development spending and unemployment rate on inequality of economic development between districts / cities in North Sumatra?"

**Research purposes**

The purpose of this paper is to determine and analyze the effect of PDRB, population, development expenditure and unemployment rate on economic development disparities between districts / cities in North Sumatra.

**Benefits of research**

The expected benefits of this research are:

1) Adding, completing as well as comparing existing research results concerning the same topic.
2) As information and reference material for further studies on the same topic.
3) It is expected that the results of this study can be a contribution of thought for students of the faculty of economics, especially students with Development Economics study programs.
4) As an additional insight for the authors to find out how the imbalance of economic development between districts / cities in North Sumatra.

**Framework**

Basically, development is a change in variables such as population, PDRB, per capita income, development expenditure, investment, and labor and so on for a certain period of time in an area that is clearly limited. But in the process of economic development the problem of accelerating economic growth between regions is different, resulting in regional inequalities that cannot be avoided given the differences in the wealth of different resources between regions and the basis for the implementation of development itself and different concentrations. Based on the causes of regional inequality and the level of disparity in income between regions, it tends to widen from year to year so a research framework can be drawn that is income inequality that is affected by PDRB, population, government development expenditure and labor force.

PDRB is a measure for economic development can negatively affect the income inequality of districts / cities in North Sumatra. This means that with an increase in PDRB will lead to economic activity and increased prosperity of the population so that income inequality in the district of the city will decrease. Large population and continues to increase will be a
burden on the economy, especially areas that have large populations but are relatively small in absorbing labor. This will be a problem of inequality between residents who have significant income differences.

Development that uses large and directed funds will be maximized in implementing equitable development and reduce gaps or disparities between residents and between regions. A more efficient, effective and equitable government development expenditure will have an impact on the level of the gap itself. The number of workforce that exists can affect the level of inequality, with an increase in the workforce means there is an increase in economic activity and the level of prosperity, so that inequality has decreased. The number of the workforce has a negative influence on income inequality between districts / cities. It means that increasing labor force will reduce disparity in income between districts / cities in North Sumatra Province. Opening new jobs will certainly absorb new workers so that the number of the workforce has increased. With the increase in the number of this workforce will increase people's income which in turn will increase people's purchasing power so that demand for goods and services is greater which then encourages producers to produce more and so on, thus economic activity will run well and economic disparity will decrease.

Based on the description of the framework of thought, the relationship between the independent variable (independent) with the dependent variable (bound) can be seen in Figure 2, namely:

2 Research Method

The research location was carried out in the administrative region of the North Sumatra Provincial Government from 2011 to 2018. The type of data in this research is quantitative data and the source of the data used is secondary data. The source of the data used in this study was sourced from the Central Statistics Agency of North Sumatra Province in several publications. In this study panel data analysis was used to determine the effect of GRDP variable (GRDP), Population Number (POP), Development Expenditure (GE), and labor force variable (AK) on inequality of economic development between Regencies / Cities (VW) in Sumatra Province North.
3 Results and Discussion

3.1 Development of Gross Regional Domestic Product (PDRB)

The success of the development of an area or region can be seen from one aspect of the economy, in this case seen from the aspect of the development of the Gross Regional Domestic Product (PDRB) of the region itself. The higher PDRB of a region shows the ability of the region to manage regional finances and shows the regional economic security. PDRB based on constant prices in 2000 North Sumatra province based on BPS data tends to increase. In 2011 the North Sumatra PDRB reached Rp. 87,889 trillion, relatively increased significantly in 2018 amounting to Rp. 134,460 trillion. Figure 3. The following provides an explanation of the increase in PDB at constant 2000 prices from 2011 to 2018.

![Figure 3. Increase in PDB from 2011-2018](image)

Source: BPS, North Sumatra in Figures for 2011-2018

It can be seen that in 2011 the PDRB based on the highest constant 2000 prices in Medan was Rp. 22,272.42, - billion, while the lowest PDRB in Pakpak Bharat Regency is Rp. 123.12, -. billion. From 2012 to 2018 from the table it appears that the highest PDRB during the period of 8 (eight) years was still dominated by Medan City respectively from 2012 amounting to Rp. 27,234.45 billion; in 2013 amounting to Rp. 29,352.92, - billion; in 2014 amounting to Rp. 31,334.34 billion; in 2015 amounting to Rp. 33,430.05 billion ;-; in 2016 amounting to Rp. 35,822.22 billion -; in 2017 amounting to Rp. 38,576.23 billion - and in 2018 Rp. 41,519.32 billion.


Population (Demographics)

Suseno states that large population growth does not automatically become capital development. It can even become a burden on other residents. Population growth every year will have an impact on working age that affects the growth and number of the workforce. Employment development is intended to expand productive employment, both in quantity and...
Through employment development, it is expected that an additional absorption of new labor force will occur, reducing the number of unemployed.

Based on BPS data the total population of North Sumatra in 2011 was 12,326,678 people, increasing to 13,215,401 people in 2018. To see the development of the population from 2011 - 2018 can be seen in Fig 4.

**Development Expenditures**

Development Expenditures in this study are government expenditures used to finance development in all sectors. The development expenditure used comes from regional government revenues from the tax sector, PAD and other revenues.

Therefore, to ensure the implementation of development in accordance with its objectives, namely the welfare of the community, the government must be more creative and wise in finding and creating new sources of revenue and managing these revenues according to the rules.

Based on the financial statements of each regency / city government in Sumatra province, data on development expenditure for each regency / city is obtained in the following 4.3 table. Table 4.3 explains the amount of development spending of the district / city government of North Sumatra province from 2011 to 2018 continues to increase in all these districts / cities. The biggest development expenditure is the city of Medan where in 2011 Rp. 1,135.90 billion increased to Rp. 3,825.13 billion. While the lowest development expenditure
is the Pakpak Bharat district of Rp. 78.50 billion in 2011 increased in 2018 to Rp. 328.12 billion.

**Unemployment Rate**

The unemployment rate in North Sumatra fluctuated from 2011 to 2018 but in general there was a decline. Noted in 2011 the unemployment rate in North Sumatra was 10.98 percent, in 2012 there was an increase to 11.51 percent, in 2013 to 2018 there was a decrease where in 2013 it was 10.10 percent, while in 2014 it was 9.10 percent, in 2015 amounted to 8.45 percent, in 2016 it was 7.43 percent, and in 2017 it was 6.37 percent and 6.20 percent in 2018.

![Graph: Development of North Sumatra Unemployment Rate 2011-2018](image)

**Source:** BPS, *North Sumatra in Figures for 2011-2018*

**Fig 5.** Development of North Sumatra Unemployment Rate
Year 2011 - 2018

**Model Estimation Results.**

From the results of calculations using the Williamson index method, it can be seen that disparities in the province of North Sumatra during 2011 to 2018 tended to fluctuate. In 2011 the North Sumatra Williamson index of 0.0523 decreased relatively small in 2018 of 0.0503. The following table 1 presents the Williamson district / city index in the province of North Sumatra during 2011-2018.

**Table 1.** Williamson Index of Regency / City of North Sumatra
Year 2011 - 2018

<table>
<thead>
<tr>
<th>No</th>
<th>Kab/ Kota</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Nias</td>
<td>0.0957</td>
<td>0.0936</td>
<td>0.0918</td>
<td>0.0953</td>
<td>0.1062</td>
<td>0.0578</td>
<td>0.0578</td>
<td>0.0573</td>
</tr>
<tr>
<td>2</td>
<td>Madina</td>
<td>0.0811</td>
<td>0.0871</td>
<td>0.0867</td>
<td>0.0830</td>
<td>0.0815</td>
<td>0.0797</td>
<td>0.0799</td>
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<tr>
<td>3</td>
<td>Tapsel</td>
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<td>0.0918</td>
<td>0.0945</td>
<td>0.0377</td>
<td>0.0370</td>
<td>0.0371</td>
<td>0.0385</td>
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<td>0.0897</td>
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<td>0.0898</td>
<td>0.0905</td>
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<td>0.0549</td>
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</tr>
<tr>
<td>No</td>
<td>Kab/ Kota</td>
<td>2011</td>
<td>2012</td>
<td>2013</td>
<td>2014</td>
<td>2015</td>
<td>2016</td>
<td>2017</td>
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<td>-------</td>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td>7</td>
<td>Labuhan Batu</td>
<td>0.0092</td>
<td>0.0037</td>
<td>0.0017</td>
<td>0.0221</td>
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<td>8</td>
<td>Asahan</td>
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<td>0.0249</td>
<td>0.0266</td>
<td>0.0291</td>
<td>0.0296</td>
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<td>9</td>
<td>Simalungun</td>
<td>0.0667</td>
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<td>10</td>
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<td>11</td>
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<td>0.0082</td>
<td>0.0068</td>
<td>0.0075</td>
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<tr>
<td>12</td>
<td>Deli Serdang</td>
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<td>0.0139</td>
<td>0.0234</td>
<td>0.0304</td>
<td>0.0350</td>
<td>0.0419</td>
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<td>0.0489</td>
</tr>
<tr>
<td>13</td>
<td>Langkat</td>
<td>0.0485</td>
<td>0.0604</td>
<td>0.0641</td>
<td>0.0540</td>
<td>0.0524</td>
<td>0.0504</td>
<td>0.0523</td>
<td>0.0515</td>
</tr>
<tr>
<td>14</td>
<td>Nias Selatan</td>
<td>0.0785</td>
<td>0.0703</td>
<td>0.0705</td>
<td>0.0755</td>
<td>0.0756</td>
<td>0.0799</td>
<td>0.0814</td>
<td>0.0813</td>
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<tr>
<td>15</td>
<td>Humbang Has</td>
<td>0.0334</td>
<td>0.0312</td>
<td>0.0311</td>
<td>0.0384</td>
<td>0.0384</td>
<td>0.0412</td>
<td>0.0417</td>
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<tr>
<td>16</td>
<td>Pakpak Barat</td>
<td>0.0265</td>
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<td>0.0309</td>
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<td>0.0310</td>
<td>0.0311</td>
<td>0.0314</td>
</tr>
<tr>
<td>17</td>
<td>Samosir</td>
<td>0.0106</td>
<td>0.0101</td>
<td>0.0111</td>
<td>0.0058</td>
<td>0.0041</td>
<td>0.0031</td>
<td>0.0037</td>
<td>0.0037</td>
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<td>18</td>
<td>Sergei</td>
<td>0.0424</td>
<td>0.0431</td>
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<td>0.0407</td>
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<tr>
<td>19</td>
<td>Sibolga</td>
<td>0.0095</td>
<td>0.0110</td>
<td>0.0119</td>
<td>0.0055</td>
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<td>0.0033</td>
<td>0.0129</td>
<td>0.0050</td>
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<tr>
<td>20</td>
<td>Tanjung Balai</td>
<td>0.0053</td>
<td>0.0026</td>
<td>0.0013</td>
<td>0.0016</td>
<td>0.0005</td>
<td>0.0011</td>
<td>0.0030</td>
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<tr>
<td>21</td>
<td>Pematang Siantar</td>
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<td>0.0073</td>
<td>0.0082</td>
<td>0.0082</td>
<td>0.0069</td>
<td>0.0066</td>
<td>0.0074</td>
<td>0.0070</td>
</tr>
<tr>
<td>22</td>
<td>Tebing Tinggi</td>
<td>0.0099</td>
<td>0.0098</td>
<td>0.0101</td>
<td>0.0130</td>
<td>0.0123</td>
<td>0.0129</td>
<td>0.0129</td>
<td>0.0124</td>
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<td>23</td>
<td>Medan</td>
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<td>0.3492</td>
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<td>24</td>
<td>Binjai</td>
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<td>0.0138</td>
<td>0.0140</td>
<td>0.0145</td>
<td>0.0142</td>
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<tr>
<td>25</td>
<td>Padang Sidimpuan</td>
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<td>0.0049</td>
<td>0.0541</td>
<td>0.0565</td>
<td>0.0570</td>
<td>0.0588</td>
</tr>
</tbody>
</table>

**Source:** Self-processed

Estimation using the fixed effect method is based on the chow test results and the haussman test results, where the chow test results are shown in table 2 the following:
Table 2. Chow Test Results

Redundant Fixed Effects Tests
Pool: Untitled
Test cross-section fixed effects

<table>
<thead>
<tr>
<th>Effects Test</th>
<th>Statistic</th>
<th>d.f.</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cross-section F</td>
<td>503.940360</td>
<td>(24,146)</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

Determination of the use between the common effect and fixed effect methods using the chow test, where if the probability is> 0.10, 0.05, 0.01 then the common effect method is better used. Conversely, if the probability <0.10, 0.05, 0.01, then the use of the fixed effect method is better used.

From the estimation results with the chow test obtained probability <0.10, 0.05, 0.01 so that the fixed effect method is better to use.

The next step is conducting a Haussman test to determine whether the fixed effect or random effect method is better used. Haussman test results can be seen in the table 3 follows:

Table 3. Haussman Test Results

Correlated Random Effects - Haussman Test
Pool: Untitled
Test cross-section random effects

<table>
<thead>
<tr>
<th>Test Summary</th>
<th>Chi-Sq. Statistic</th>
<th>Chi-Sq. d.f.</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cross-section random</td>
<td>37.562195</td>
<td>4</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

Penent

Determination of the use between the fixed effect and random effect methods using the Haussman test, where if the probability is> 0.10, 0.05, 0.01 then the random effect method is better used. Conversely, if the probability <0.10, 0.05, 0.01, then the use of the fixed effect method is better used.

From the estimation results with the haussman test obtained probability <0.10, 0.05, 0.01 so that the fixed effect method is better to use.
Table 4. Estimation Results of Fixed Effect Method

Dependent Variable: LOG(VW?) Method: Pooled EGLS (Cross-section weights); Sample: 2011 2018

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>-9.782287</td>
<td>1.919361</td>
<td>-5.096637</td>
<td>0.0000</td>
</tr>
<tr>
<td>LOG(PDRB?)</td>
<td>-0.177096</td>
<td>0.050583</td>
<td>-3.501086</td>
<td>0.0006</td>
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<tr>
<td>LOG(POP?)</td>
<td>0.573420</td>
<td>0.140704</td>
<td>4.075369</td>
<td>0.0001</td>
</tr>
<tr>
<td>LOG(GE?)</td>
<td>0.036701</td>
<td>0.019571</td>
<td>1.875256</td>
<td>0.0628</td>
</tr>
<tr>
<td>LOG(TPT?)</td>
<td>0.014832</td>
<td>0.016386</td>
<td>0.905152</td>
<td>0.3669</td>
</tr>
</tbody>
</table>

Fixed Effects (Cross)

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<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>_NIAS—C</td>
<td>1.028671</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>_MADINA—C</td>
<td>0.947268</td>
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<tr>
<td>_TAPSEL—C</td>
<td>0.553278</td>
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</tr>
<tr>
<td>_TAPTENG—C</td>
<td>1.103665</td>
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<tr>
<td>_TAPUT—C</td>
<td>0.687944</td>
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<tr>
<td>_TOBASA—C</td>
<td>-0.384188</td>
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<tr>
<td>_LBATU—C</td>
<td>-1.292764</td>
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<tr>
<td>_ASAHAN—C</td>
<td>-0.107045</td>
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<tr>
<td>_SIMALUNGUN—C</td>
<td>0.483473</td>
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<tr>
<td>_DAIRI—C</td>
<td>-0.057431</td>
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<tr>
<td>_KARO—C</td>
<td>-1.074170</td>
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<tr>
<td>_DSERDANG—C</td>
<td>-0.527060</td>
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<tr>
<td>_LANGKAT—C</td>
<td>0.231886</td>
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<td>_NISEL—C</td>
<td>1.031321</td>
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<tr>
<td>_HUMBAHAS—C</td>
<td>0.602904</td>
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<tr>
<td>_PAKPAKB—C</td>
<td>0.876519</td>
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<td>_SAMOSIR—C</td>
<td>-1.205839</td>
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<td>_SERGAI—C</td>
<td>0.111041</td>
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<td></td>
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</tr>
<tr>
<td>_SIBOLGA—C</td>
<td>-0.857669</td>
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<td></td>
</tr>
<tr>
<td>_TBALAI—C</td>
<td>-2.453909</td>
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<td>_PSIANTAR—C</td>
<td>-1.148807</td>
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<td>_TTINGGI—C</td>
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<td>1.881713</td>
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<td>_BINJAI—C</td>
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<td>_PSIDEMPUAN—C</td>
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</table>

Effects Specification

<p>| | | | | |</p>
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<th></th>
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<th></th>
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</thead>
<tbody>
<tr>
<td>R-squared</td>
<td>0.994995</td>
<td>Mean dependent var</td>
<td>-15.30609</td>
<td></td>
</tr>
<tr>
<td>Adjusted R-squared</td>
<td>0.994035</td>
<td>S.D. dependent var</td>
<td>16.64737</td>
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</tr>
<tr>
<td>S.E. of regression</td>
<td>0.389273</td>
<td>Sum squared resid</td>
<td>22.12385</td>
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</tr>
<tr>
<td>F-statistic</td>
<td>1036.513</td>
<td>Durbin-Watson stat</td>
<td>1.221867</td>
<td></td>
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<tr>
<td>Prob(F-statistic)</td>
<td>0.000000</td>
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<td></td>
</tr>
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</table>

Source: Regression results, processed by yourself
Regression results for the independent variables produce the coefficient of determination (R2) as follows: R2PDRB (POP, GE, TPT) equals 0.988; R2POP (PDRBP, GE, TPT) equals 0.984; R2GE (PDRB, POP, TPT) equals 0.857; R2TPT (GRDP, POP, GE) is equal to 0.705 (Table 4.9). Compared with R2VW (PDRBP, POP, GE, TPT) of 0.994, the coefficient of determination of PDRBP, POP, GE and TPT independent variables is smaller than that. This means that the model used is good and can be analyzed.

Analysis of Estimation Results for Variables Affecting Economic Development Disparity in North Sumatra.

Estimation experiments are conducted on variables that are considered to influence income disparity, such as PDRB, population, development spending and unemployment rate. Significant estimation results are given PDRB variable, population and development expenditure.

Estimation results in all districts / cities in North Sumatra province based on the amount of income disparity intercept (VW) results of the above estimation can also be seen that the average increase in regional income disparity is constant without being influenced by other factors is the largest compared to income disparity the other region (VW) is Tanjung Balai City, which is -2.453909. While the increase in regional income disparity (VW) in the second place is Medan's income disparity (VW), which amounted to 1.881713. In the third place the increase in regional income disparity (VW) is Labuhan Batu district, which is equal to -1.292764. The lowest increase in regional income disparity (VW) was in Dairi Regency by 0.057431 followed by Asahan Regency by -0.107045 and Serdang Bedagai District by 0.111041.

PDRB

The PDRB regression coefficient is equal to -0.177096. This means that if the PDRB increases by 100 percent, the income disparity (VW) will decrease by 17.71 percent. Conversely, if the PDRB falls by 100 percent, the income disparity will increase by 17.71 percent. The effect of this PDRB variable is relatively low and significant at a 90 percent confidence level. This shows that the PDRB has a negative and significant effect on income disparity in North Sumatra.

This proves that the estimation results of this study are in accordance with the research hypothesis.

Total population

The POP variable regression coefficient is 0.573420 which means that if POP increases 100 percent it will increase economic development (VW) disparity by 57.34 percent. The influence of POP on VW is relatively the highest of other independent variables and has a positive and significant effect on the 90 percent confidence level of economic development disparity in North Sumatra.

Development Expenditures

Estimation results show the GE variable regression coefficient of 0.036701. It means that each increase of GE by 100 percent, the disparity in economic development (VW) will increase by 3.67 percent. The influence of GE variables on VW is positive and significant at the 95 percent confidence level.

Unemployment Rate

Estimation results show the coefficient of TPT variable of 0.014832. This means that every 100 percent increase in unemployment will increase disparity in economic development
by 1.48 percent. The effect of TPT variable on VW was not significant at the 90 percent confidence level. But the direction is positive and is in accordance with the hypothesis of this study.

**Model Suitability Test Results**

**Concurrent test results (F-statistics)**

The F-count value is equal to 1036.513 with the F-statistic probability of 0.00000 that means that simultaneously (independent) independent variables (PDRBP, POP, GE, and TPT) affect the dependent variable (VW). Estimation results have met the suitability of the model for concurrent test, so the estimation results can be used for analysis.

**Results coefficient of determination (R2)**

R2 lies between 0 and 1. R2 equals 1. It means that the independent variables explain 100 percent of the variation of the dependent variable. Conversely, R2 equals 0, meaning that the independent variables in the model do not explain the slightest variation in the dependent variable. The model is said to be better if R2 gets closer to 1 (Gujarati: 99). The estimated model yields R2 of 0.9949. The presence of independent variables (PDRBP, POP, GE and TPT) are able to explain the dependent variable (VW) by 99.49 percent, the remaining 0.51 percent is explained by other variables outside the model. With R2 0.9949, the estimation results meet the suitability test from the aspect of the coefficient of determination. Estimation results are worth analyzing.

**Partial Test Result (t-test)**

A partial test is also called a test of significance. PDRBP t-value is equal to -3.501086 with a probability of 0.0006 smaller than $\alpha = 0.05$ which means that the PDRBP variable significantly affects VW negatively, the t-statistic POP value is equal to 4.075369 with a probability of 0.0001 smaller $\alpha = 0.05$ which means that the POP variable significantly affects VW positively, the GE variable with a t-statistic value of 1.875256 with a probability of 0.0628 smaller $\alpha = 0.05$ which means that the GE variable significantly affects VW significantly positive. While the TPT variable t-statistic value of 0.905152 with a probability of 0.3669 greater than $\alpha = 0.05$ which means that the TPT variable does not significantly affect VW. So, the estimation results of the model have met the suitability test from the aspect of partial test. The estimation results of the model can be analyzed.

**Classic Deviation Test Results**

Ragnar Frisch states that a regression model is affected by Multicollinearity if there is a perfect linear relationship between some or all independent variables of a regression model. How to detect Multicollinearity problems can be done in 2 (two) ways, namely:

1. Correlation between variables
2. Using partial correlation

In this study the Multicollinearity test uses the partial correlation method, the results of the partial correlation test can be seen in Appendix 7. The results of the test can be displayed as follows:
Table 5. Coefficient of Determination among Independent Variables

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Independent Variable</th>
<th>$R^2$</th>
<th>Keterangan</th>
</tr>
</thead>
<tbody>
<tr>
<td>PDRBP</td>
<td>POP, GE, TPT</td>
<td>0.988</td>
<td>Trouble-free Multicollinearity</td>
</tr>
<tr>
<td>POP</td>
<td>PDRBP, GE, TPT</td>
<td>0.984</td>
<td>Trouble-free Multicollinearity</td>
</tr>
<tr>
<td>GE</td>
<td>PDRBP, POP, TPT</td>
<td>0.857</td>
<td>Trouble-free Multicollinearity</td>
</tr>
<tr>
<td>TPT</td>
<td>PDRBP, POP, GE</td>
<td>0.705</td>
<td>Trouble-free Multicollinearity</td>
</tr>
</tbody>
</table>

Source: Regression results, processed by yourself

Regression results for the independent variables produce the coefficient of determination ($R^2$) as follows: $R^2_{PDRB}$ (POP, GE, TPT) equals 0.988; $R^2_{POP}$ (PDRBP, GE, TPT) equals 0.984; $R^2_{GE}$ (PDRB, POP, TPT) equals 0.857; $R^2_{TPT}$ (PDRB, POP, GE) is equal to 0.705 (Table 4.9). Compared with $R^2_{VW}$ (PDRBP, POP, GE, TPT) of 0.994, the coefficient of determination of PDRBP, POP, GE and TPT independent variables is smaller than that. This means that the model used is good and can be analyzed.

4 Conclusions and Suggestions

Conclusion
1) The coefficient of determination on the estimated results of economic development disparity in North Sumatra can be explained by the GRDP variables, population, expenditure and unemployment rate with the model used.
2) The variables used to explain the disparity of economic development variables indicate the direction of influence in accordance with the hypothesis. GRDP has a negative and significant effect. The number of population influences and development spending has a positive and significant effect on the disparity in economic development while the unemployment rate has no significant effect on economic development in North Sumatra.
3) Patient coefficient variables are variables that explain the economic development disparity variable, the largest is the population number variable, followed successively by the GRDP variable, Development expenditure, and unemployment rate.

Suggestion
1) To reduce inequality or disparity in economic development, the government should continue to improve economic performance by looking for new sources of revenue and budget efficiency that can be utilized for development in each sector.
2) The government should open more new jobs by making it easier for investors to invest in the region by issuing regulations and policies that encourage the growth of these investments. With the growth of investment in the region will absorb a lot of labor that in turn will reduce unemployment.
3) It is better for the government to socialize more about the importance of family planning in regulating birth rates by providing cheap and free contraception to
new partners, providing counseling and making health facilities comfortable and easily accessible to the community.

4. There should be more research on inequality with broader and more complex coverage and methods as well as with a variety of supporting variables so that they will add and enrich the treasury of knowledge.

5 References

Isolation, Purification and Potential Test of Actinomycetes in Increasing Phosphate Availability

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Abstract. High phosphate retention in andisol soils causes low P-Availability in the soil. Nutrient phosphate has a very important role in plant growth. Actinomycetes can be used to dissolve phosphates that are bound to the soil. This research aims to obtain Actinomycetes and tests their effect on increasing the availability of phosphate. This research was carried out in the Soil Biology Laboratory with 2 stages, namely: 1. Isolation and Purification and 2. Test potential of Actinomycetes on Pykovskaya media with several phosphate sources (Ca₃(PO₄)₂; AlPO₄ and FePO₄). The results obtained showed that there were 17 Actinomycetes isolates isolated from andisol soil at various locations. Some Actinomycetes obtained have the ability to dissolve P-not available into P available on solid pykovskaya media with various phosphate sources (Ca₃(PO₄)₂; AlPO₄ and FePO₄) but with different abilities.

Keywords: Actinomycetes, Andisol and P-Available

1 Introduction

Andisols are fertile soils that have suitable physical and chemical characteristics for growing agricultural crops [1]. However, high phosphate retention in Andisols (> 85%) causes most of the P in Andisols not available to be used by plants [2,3,4,5].

Although Andisols is said to be fertile, the main problem found in Andisols is to have high P retention and low P-Availability. Andisols can be formed from volcanic ash which is dominated by amorphous minerals [6]. One special feature of soils containing amorphous mineral materials is high P retention (> 85%). This causes Andisols soil has a high retention of phosphate hence the availability of phosphorus (P) in the soil is reduced due to P adsorption on the surface of the soil colloid which causes P nutrients in the soil not available to plants.

The element of phosphorus is an essential macronutrient that has a very important role for the process of plant growth, such as photosynthesis, assimilation and respiration [7]. Not all phosphorus can be absorbed by plants, plants absorb phosphorus available in the form of orthophosphate ions (H₂PO₄⁻) and secondary orthophosphate ions (HPO₄²⁻). The nature of phosphorus is mobile or easily move between plant tissues [8].
Actinomycetes are soil microorganisms that are commonly found in various types of soil. Actinomycetes live as saprotrophs and actively decompose organic matter, hence it can increase soil fertility and life in plant rhizosphere [9].

Actinomycetes can dissolve phosphates that are bound in the soil, but not all Actinomycetes species can dissolve phosphates in the soil. Actinomycetes of the genus Micromonospora sp., Nocardia sp., Actinomadura sp., Rhodococcus sp., Actinoplanes sp., Microbispora sp., and Streptosporangium sp., can produce the phosphatase enzyme hence it can dissolve the phosphorus that is bound in the acidic or basic soil conditions [10].

2 Research Method

2.1 Materials. This research used Andisols from Kutarayat Village, Namanteran District at different sample locations. The research was conducted from May - October 2019 at the Faculty of Agriculture Soil Biology Laboratory – Universitas Sumatera Utara. The material used in this research was Starch Casein Agar Medium (10 g of Starch soluble, 2 g K2HPO4, 2 g KNO3, 0.3 g Casein, 0.05 g MgSO4.7 H2O, 0.02 g, CaCO3, 0.01 g FeSO4 .7 H2O, 2 g NaCl, 18 g agar, and aquadest 1000 mL) for isolation. Actinomycetes were tested for potency on pikovskaya media (10 g glucose, 5 g Ca3(PO4)2/AlPO4/FePO4, 0.1 g MgSO4 , 0.5 g (NH4)2SO4, 0.1 g FeSO4, 0.1 g MnSO4, 0.5 g yeast extract, 15g agar and 1000 mL aquadest).

2.2 Methods. This research was carried out in 2 stages: Stage 1. Isolation and Purification. At this stage, Actinomycetes was isolated from sample soils that were in the rhizosphere of plants or around a homogeneous rhizosphere on Starch Casein Agar (SCA) media by diluting 10 g of soil into 90 mL of Physiological NaCl solution (10⁻¹), then taken 1 mL of the solution before it and put into 9 mL of physiological NaCl solution (10⁻²) is carried out again until a dilution of 10⁻³, 10⁻⁴ and 10⁻⁵ is obtained and the result of dilution is put into the growth medium. After incubating for 3-5 days at 30°C, purification was carried out by separating the colonies on sterile SCA media in order to purify the isolates. After obtaining pure Actinomycetes then proceed to the next stage. Stage 2. Actinomycetes Potential Test on solid pykovskaya media. At this stage Actinomycetes isolates obtained will be grown on pykovskaya media (source of P: Ca3(PO4)2, FePO4 dan AlPO4) to test the ability of Actinomycetes in dissolving phosphate based on clear zones. The calculation of the phosphate dissolving index can be seen in formula (1).

\[
\text{PSI} = \frac{a-b}{b} \quad (1)
\]

Description:
PSI : Phosphate Solubilization Index
a : Clear Zone Diameter + Colony Diameter
b : Colony Diameter
3 Result and Discussion

Sampling of andisols and litter above andisol soil surface from 5 coordinate points can be seen on the soil sampling map. Look at Figure 1.

![Soil sampling map](image)

**Fig. 1. Maps of soil type and andisol soil sampling**

Based on the research results, it was obtained the results of Actinomycetes isolation which was isolated from Andisol soil or litter that was above Andisol soil from several soil sampling points that were believed to be able to dissolve phosphate.

Table 1. Isolation and purification of Actinomycetes from Andisol and Litter Above Andisol

<table>
<thead>
<tr>
<th>Isolate</th>
<th>Coordinate</th>
<th>Code of Save Isolate</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>98.3621° S 3.2659° E</td>
<td>A132</td>
<td>Vegetation: Cabbage, Corn, Chili</td>
</tr>
<tr>
<td>2</td>
<td>98.3700° S 3.2613° E</td>
<td>A468</td>
<td>Forest Plants, Litter</td>
</tr>
<tr>
<td>3</td>
<td>98.3796° S 3.2369° E</td>
<td>A458</td>
<td>Forest Plants, Litter</td>
</tr>
<tr>
<td>4</td>
<td>98.3714° S 3.2497° E</td>
<td>A471</td>
<td>The dominant vegetation is coffee plants</td>
</tr>
<tr>
<td>5</td>
<td>98.3796° S 3.2369° E</td>
<td>A459</td>
<td>Forest Plants, Litter</td>
</tr>
</tbody>
</table>
Based on Table 1, it can be seen that there are 17 Actinomycetes isolates from 5 different locations. Isolates were given isolate codes from each sampling point. Location 1 (98.3621° S, 3.2659° E) obtained 3 different isolates with isolate codes and code of save isolate (1, A132; 6, A156 and 13, A356); location 2 (98.3796° S, 3.2369° E) obtained 3 different isolates with isolate codes and code of save isolate (3, A458; 5, A459 and 8, A425); location 3 (98.3714° S, 3.2497° E) obtained 4 different isolates with the isolate codes and code of save isolate (4, A471; 7, A623; 11, A363; 14, A331); location 4 (98.3700° S, 3.2613° E) obtained 4 different isolates with isolate codes and code of save isolate (2, A468; 11, A241, 16, A652 and 17, A363); location 5 (98.3831° S, 3.2288° E) obtained 3 different isolates with isolate codes and code of save isolate (9, A322; 10, A231 and 12, A321).

Based on the results seen in Table 1, various isolates were obtained as well as different growth of each isolate. Visually, the appearance of Actinomycetes is different and varied hence to distinguish isolates visually can be done by a glance without the aid of a microscope. Colony characterization of several isolates of Actinomycetes isolated can be characterized by their diverse and pleomorphic cell morphology, irregular rod shape, branched filaments which form the mycelium structure, non-motile, gram-positive and facultative anaerobic test that has been done before.
Some of these Actinomycetes will be tested for phosphate solubility activity on pikovskaya media by looking at the phosphate dissolving index with several phosphate sources such as Ca$_3$(PO$_4$)$_2$/FePO$_4$/AlPO$_4$. Some Actinomycetes have the potential to dissolve phosphate with different phosphate sources.

Based on the testing of the phosphate solubilization index on Actinomycetes in solid Pikovskaya media with various sources of P: Ca$_3$(PO$_4$)$_2$, FePO$_4$, AlPO$_4$ for 8 days of incubation can be seen from Table 2 below.

### Table 2. Phosphate Solubilization Index on Actinomycetes in solid Pikovskaya media with various sources of P: Ca$_3$(PO$_4$)$_2$, FePO$_4$, AlPO$_4$

<table>
<thead>
<tr>
<th>Isolate</th>
<th>Sources of Phosphate</th>
<th>Phosphate Solubilization Index / Observation Day</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>1</td>
<td>Ca$_3$(PO$_4$)$_2$</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>AlPO$_4$</td>
<td>1.56</td>
</tr>
<tr>
<td></td>
<td>FePO$_4$</td>
<td>11.33</td>
</tr>
<tr>
<td>2</td>
<td>Ca$_3$(PO$_4$)$_2$</td>
<td>1.87</td>
</tr>
<tr>
<td></td>
<td>AlPO$_4$</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>FePO$_4$</td>
<td>1.56</td>
</tr>
<tr>
<td>3</td>
<td>Ca$_3$(PO$_4$)$_2$</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>AlPO$_4$</td>
<td>2.50</td>
</tr>
<tr>
<td></td>
<td>FePO$_4$</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>Ca$_3$(PO$_4$)$_2$</td>
<td>0</td>
</tr>
<tr>
<td>Isolate</td>
<td>Sources of Phosphate</td>
<td>Phosphate Solubilization Index / Observation Day</td>
</tr>
<tr>
<td>---------</td>
<td>---------------------</td>
<td>----------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>AlPO₄</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FePO₄</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Ca₃(PO₄)₂</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AlPO₄</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FePO₄</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Ca₃(PO₄)₂</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AlPO₄</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FePO₄</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Ca₃(PO₄)₂</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AlPO₄</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FePO₄</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Ca₃(PO₄)₂</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AlPO₄</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Ca₃(PO₄)₂</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AlPO₄</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FePO₄</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Ca₃(PO₄)₂</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AlPO₄</td>
<td></td>
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<tr>
<td></td>
<td>FePO₄</td>
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</tr>
<tr>
<td>11</td>
<td>Ca₃(PO₄)₂</td>
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<tr>
<td></td>
<td>AlPO₄</td>
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</tr>
<tr>
<td></td>
<td>FePO₄</td>
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</tr>
<tr>
<td>12</td>
<td>Ca₃(PO₄)₂</td>
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<tr>
<td></td>
<td>AlPO₄</td>
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<td></td>
<td>FePO₄</td>
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</tr>
<tr>
<td>13</td>
<td>Ca₃(PO₄)₂</td>
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<td></td>
<td>AlPO₄</td>
<td></td>
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<tr>
<td></td>
<td>FePO₄</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Ca₃(PO₄)₂</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AlPO₄</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FePO₄</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Ca₃(PO₄)₂</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AlPO₄</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FePO₄</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Ca₃(PO₄)₂</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AlPO₄</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FePO₄</td>
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</tr>
<tr>
<td>17</td>
<td>Ca₃(PO₄)₂</td>
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</tr>
<tr>
<td></td>
<td>AlPO₄</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FePO₄</td>
<td></td>
</tr>
</tbody>
</table>

Observation was done on solid pikovskaya media of various P sources for 8 days, it was found that the largest efficiency of the phosphate solvent was in isolate 5 with AlPO₄ phosphate.
source of 307% and the smallest efficiency of the phosphate solvent was in isolate 11 with FePO₄ phosphate source of 103%. This showed that isolate 5 application has more potential in releasing P bound to an available form of 307%. The ability of microbial phosphate solvents to grow and dissolve phosphate varies from the area of the clear zone and incubation time.

Actinomycetes that were able to dissolve phosphate with the highest phosphate solubility index was in isolate 7 with a phosphate source of Ca₃(PO₄)₂ of 278% and the lowest phosphate dissolving index was in isolate 2 of 152% and several Actinomycetes isolates were unable to dissolve the Ca phosphate source, namely isolate 1, 3, 4, 5, 6, 8, 9, 11, 12, 13, 14, 15 and 17. Not all Actinomycetes are able to dissolve phosphate, Actinomycetes from Micromonospora sp., Nocardia sp., Actinomadura sp., Rhodococcus sp., Actinoplanes sp., Microbisa sp., and Streptosporangium sp. genus were able to produce the phosphatase enzyme hence it can dissolve phosphorus that is bound in the soil in acidic or basic conditions [10].

The highest phosphate solubility index with AlPO₄ phosphate source was in isolate 5 of 307% and the lowest phosphate solubility index was in isolate 15 of 161% and some Actinomycetes isolates which were unable to dissolve at Al phosphate sources namely isolate 2, 6, 10, 11, 14, 16 and 17.

The ability of Actinomycetes in dissolving phosphate with Fe phosphate sources had the highest phosphate solubility index in isolate 1 of 273% and the lowest phosphate solubility index in isolate 11 by 103% as well as some Actinomycetes isolates which were unable to dissolve in Fe phosphate sources that is isolate 3, 4, 5, 6, 7, 8, 9, 10, 12, 14, 15, 16 and 17.

Several Actinomycetes isolates that cannot dissolve phosphate at the source of phosphate Ca₃(PO₄)₂, FePO₄, AlPO₄ namely isolates 6, 14 and 17. This is because the ability of these isolates to dissolve phosphate is not found, the Actinomycetes cannot remove organic acids or enzymes which functions in dissolving phosphates such as the enzyme phosphatase. An enzyme that can dissolve phosphate can be either a phosphatase enzyme or a phosphomonoesterase enzyme [8].

4 Conclusion

Several Actinomycetes obtained have the ability to dissolve P-not available into P available on solid pykovskaya media with various phosphate sources (Ca₃(PO₄)₂; AlPO₄ and FePO₄) with different abilities.

5 References


Development of Interactive Multimedia–Based Science Teaching Materials

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Abstract. The general objective of this study was to obtain a valid and practical Interactive multimedia-based science teaching materials for Unimed Elementary School Teacher Education students. Development of interactive multimedia-based science teaching materials is carried out using the four D (4-D) model. However, in this study only 3 stages were carried out, defining, designing, and developing. The dissemination phase was not carried out because of limited costs and time. The test subjects in this study were Elementary school teachers student Medan State University. Research variables included material validity, multimedia validity, and student interest. Data analysis techniques that will be performed are data validity analysis, practicality data analysis, effectiveness test data analysis. Values obtained from the validation results of interactive multimedia teaching materials are valid categories. Student interest in participating in learning using interactive multimedia teaching materials The Basic Concepts of Natural Sciences are included in the high category so that these teaching materials are practical for use in learning.

Keywords : interactive multimedia, science teaching materials.

1 Introduction

Nowadays technology is developing so fast. Along with this education is also required to balance the development of Information and Communication Technology (ICT), especially in the teaching and learning process. One of the applications of ICT in the learning process is the use of interactive multimedia teaching materials. ICTs help the learning process to be more effective and more meaningful [1].

Since the enactment of the KKN Framework (Indonesian National Qualification Framework) at Unimed in 2016, Unimed has also increasingly promoted Blended Learning. Where in Mixed Learning allows students to learn (at least in part) through content and instructions delivered online (in a network) with independent control over the time, place, sequence, and speed of learning. To carry out Mixed Learning through this online, it is very much needed multimedia teaching materials that are teaching materials that can be uploaded to e-learning pages (online) so that students can easily learn learning materials through these pages.

Based on the explanation above, it is felt very necessary to develop interactive multimedia teaching materials that can be used in Natural Science Basic Concepts courses as well as to improve mastery of Basic Science concept materials for Unimed Elementary School Teacher Education students.
The importance of the use of interactive multimedia teaching materials in science basic concepts courses is a must given the Mixed Learning system that has been implemented at Unimed, so that in learning it requires teaching materials that must be adapted to learning materials. Interactive multimedia teaching materials in the Science Basic Concepts course are expected to play a role in helping students master the Basic Science Concepts, as well as to make it easier for students to do online learning.

The main focus of this research is to develop interactive multimedia teaching materials in the Natural Science Basic Concepts using Computer Multimedia-based Technology as an alternative problem solving in improving the mastery of Basic Science Concepts materials at Unimed Elementary School Teacher Education students as well as supporting the process of mixed learning (Blended Learning).

The general objective of this research is to create interactive multimedia teaching materials in the Science Basic Concept courses for Unimed Elementary School Teacher Education students.

2 Research Method

This research was conducted at the Faculty of Education Unimed Elementary School Teacher Education students on first semester in 2019/2020. This research begins with the preparation of research, making proposals and designing research, conducting research, processing data, discussing research results and reporting. When the research was carried out for 7 months, starting from June to December 2019.

This study uses 4D models (four-D models). The development of the four-D model consists of 4 main stages, namely: 1) define (determine), 2) design, 3) develop, and 4) disseminate (deployment) [2]. In this study only carried out until the develop stage only, the disseminate stage was not carried out.

The development of science teaching materials based on interactive multimedia is carried out using the four D (4-D) model. However, in this study only 3 stages were carried out, defining, designing, and developing. The dissemination phase was not carried out because of limited costs and time.

The procedure of making these science teaching materials is based on the following:

(1) Defining Phase (define), this stage aims to determine the objectives of the courses in the curriculum. At this stage there are three steps in the activity, namely curriculum analysis, analysis of student analysis concepts.
   a. Curriculum analysis is analyzing learning outcomes based on KKNI.
   b. Concept analysis is conducted to find out the main concepts that must be mastered by students, namely the Basic Concept of Natural Sciences material.
   c. Student analysis is carried out to determine student characteristics including age, motivation, different background knowledge and education, academic abilities, and social skills;

(2) Design Phase (design), this stage aims to design science teaching materials based on Interactive Multimedia. Based on the analysis of the concepts that have been carried out in the Defining Stage and then designed a Teaching Material for Basic Concepts of Science based on Interactive Multimedia. This teaching material is created using the Adobe Flash application. This teaching material
will contain materials for the Basic Concept of Science and pictures or illustrations related to these materials.

(3) Development Phase (develop), this stage aims to produce subjects for science subjects on basic concepts of interactive multimedia-based Science that are valid, practical, and effective. This development phase includes validity, practicality, and effectiveness. Validity means that the teaching materials that are designed will be validated by experts according to their field of expertise. Meanwhile, practicality means that after the validity testing phase is revised, it will then be tested during lectures to find out the practicality. Practicality is the level of practicality of Teaching Materials when used in the learning process, while effectiveness is an assessment of the effectiveness aspects of the Subject Teaching Material Basic Concepts of Interactive Multimedia-Based Science in the form of cognitive evaluation results that are the results of student learning tests and student activities during the learning process.

The research design can be seen in the following fishbone diagram:

![Research Design Diagram](image)

**Fig 1. Research design**

**Data Analysis Techniques**

**Data Validity Analysis**

To analyze the validity of instructional materials used a Likert scale based on the validation sheet with the steps:

a. Score each item with a very good answer (5), good (4), enough (3), less (2), bad (1);

b. Add up the total score for each validator for all indicators;

c. Providing validator values.

For data validity analysis using formulas:

\[
validitas = \frac{\text{skor yang diperoleh}}{\text{skor maximum}} \times 100\%
\]
Table 1. The level of achievement of the validity category of teaching materials

<table>
<thead>
<tr>
<th>No</th>
<th>Degree of achievement (%)</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>90-100</td>
<td>very valid</td>
</tr>
<tr>
<td>2</td>
<td>80-89</td>
<td>valid</td>
</tr>
<tr>
<td>3</td>
<td>65-79</td>
<td>quite valid</td>
</tr>
<tr>
<td>4</td>
<td>55-64</td>
<td>less valid</td>
</tr>
<tr>
<td>5</td>
<td>0-54</td>
<td>very less</td>
</tr>
</tbody>
</table>

Information: Teaching Material is said to be valid if it has reached a validity level above 80%.

A. Practicality data analysis

Practicality data analysis to analyze the practicality of teaching materials is based on a questionnaire given to students. The questionnaire was arranged on a Likert scale with a positive category. By using a formula that was modified from:

\[
\text{output level} = \frac{\sum X}{n x \sum \text{item} x \text{scale max}} \times 100
\]

\[
D\text{output level} = \frac{\sum \text{item}}{\sum \text{score max}} \times 100\% \quad \text{modified}
\]

Table 2 Level of practicality of teaching materials

<table>
<thead>
<tr>
<th>No</th>
<th>Degree of achievement (%)</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>90-100</td>
<td>Very practical</td>
</tr>
<tr>
<td>2</td>
<td>80-89</td>
<td>practical</td>
</tr>
<tr>
<td>3</td>
<td>65-79</td>
<td>quite practical</td>
</tr>
<tr>
<td>4</td>
<td>55-64</td>
<td>less practical</td>
</tr>
<tr>
<td>5</td>
<td>0-54</td>
<td>very impractical</td>
</tr>
</tbody>
</table>

Information: Teaching Material is said to be practical if it has reached a practical level above 80%.

Analysis of effectiveness test data

Effectiveness is observed from the analysis of student learning outcomes, namely cognitive learning outcomes. Determining student completeness can be calculated using the following equation;
Information: \( KB = \frac{T}{T_t} \times 100\% \)

Each student is said to have finished learning if the proportion of correct answers is \( \geq 65\% \) and a class is said to have finished learning if in class there are \( \geq 85\% \) of students completed [3]. Teaching Materials are said to be effective if student learning outcomes have met the data about student activities towards learning activities were analyzed using percentages (%). Standards that if \( \geq 85\% \) of students have been completed.

\[ P = \frac{F}{N} \times 100\% \]

The percentage of student activity data obtained is grouped according to the following criteria: 81% - 100% = very active, 61% - 80% = active, 41% - 60% = moderately active, 21% - 40% = less active, 0% - 20% = very less active. Learning Media is said to be effective if students meet the criteria 41% - 100%.

3 Results and Discussion

In this research, the development of science teaching materials based on interactive multimedia using the Macromedia Flash Player 8 application. This research development uses 4D (four-D models) consisting of 4 main stages, namely: 1) define, 2) design, 3) develop, and 4) disseminate. In this study only carried out until the develop stage only, the disseminate stage was not carried out. The process of making these Science teaching material based on Interactive Multimedia is as follows:

1) Defining Stage.
At this stage an analysis of learning objectives and teaching materials is carried out in the Science Concept Basic course. The analysis was conducted based on the need to master the science concepts at the level of undergraduate students at the PGSD study program. From the results of this analysis 9 (nine) main subjects were obtained in the basic science concept courses with each different learning objective.

2) Design Stage.
At this stage the design of teaching materials for interactive multimedia Science Concepts is based on interactive multimedia. The design of teaching materials is arranged using the Macromedia Flash Player 8 application. These teaching materials are composed of menu buttons with different functions. The menu buttons include learning material, learning objectives, videos, pictures and questions. The following are design drawings from the teaching materials of the Basic Concepts of Science based on interactive multimedia.
3) Development Stage

This development phase includes validity, practicality, and effectiveness. After the initial product development is carried out, the next step is validation, which is an assessment of multimedia teaching materials for the Science Material Teaching. This validation carried out by multimedia design experts and material experts. Validation done by filling out a questionnaire.

In the first stage of multimedia validation, it obtained an average score of 3.81 which was included in both categories. Some of the material and images contained in interactive multimedia Science teaching materials must be reduced and replaced because they are considered less effective and less communicative so that the material is reduced and for images to be replaced into more communicative images. Assessment of the second stage multimedia expert obtained a score of 4.38 in the excellent category.

After the validation of multimedia experts and material experts the next stage was tested on multimedia teaching materials for Basic Concepts of Natural Sciences. The initial field trial was carried out involving 5 Unimed elementary school teacher education students. The first trial results obtained an average score of 4.65 and included in the excellent category. After the
repairs are done, then a second trial is conducted. The second trial was a field trial involving 35 Unimed elementary school teacher education students. The field trial results obtained a score of 4.80 and included in the excellent category.

Based on the main field trials, it was obtained that the student's assessment of interactive multimedia teaching materials on the Basic Concept of Natural Sciences had shown the category of "Very Good". In implementing learning, researchers do not find the problem means it. So that it can be stated in this field trials, multimedia teaching materials The Basic Concept of Science does not require revision and can be used in learning.

4 Conclusion

Development of Science teaching materials interactive multimedia based using Macromedia Flash Player 8 applications. This research development uses 4D (four-D models) consisting of 4 main stages, namely: 1) define (determine the material), 2) design, 3) develop, and 4) disseminate. In this study only carried out until the develop stage only, the disseminate stage was not carried out. This development phase includes validity, practicality, and effectiveness. After the initial product development is carried out, the next step is validation, which is an assessment of Science multimedia teaching materials. This validation carried out by multimedia design experts and material experts. Validation done by filling out a questionnaire. In the first stage of multimedia validation, it obtained an average score of 3.81 that was included in both categories. Assessment of the second stage multimedia expert obtained a score of 4.38 in the excellent category. The first trial results obtained an average score of 4.65 and included in the excellent category. The field trial results obtained a score of 4.80 and included in the excellent category. Based on the main field trials, it was obtained that the student's assessment of interactive multimedia teaching materials on the Basic Concept of Natural Sciences had shown the category of "Very Good". So that it can be stated in field trials this, multimedia teaching materials The Basic Concept of Science does not require revision and can be used in learning.

5 References

Development Of Learning Materials Practicum Accounting Information System Based On Computer Software

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Abstract. The purpose of this study is to produce modules as teaching materials in the Accounting Information Systems Practicum course based on computer software namely MS Visio that meets (1) eligibility standards in terms of content, language and presentation, (2) practical use in learning, and (3) effective used in learning. The development procedure in this study consists of four stages, namely: The needs analysis phase, the product design stage, the validation and evaluation stage, and the final product stage. Research on the development of this teaching material was conducted on accounting students who were in semester 5 who took the Accounting Information Systems and Accounting Information Systems Practicum courses. The validation test is carried out by material experts with a score of 3.6 which means that the material presented in the module is feasible to use. The validation test by the learning design expert for the module was 3.66. This score also shows that the aspects of presentation, language and appearance are appropriate to be used as teaching materials for accounting students. Furthermore, a field test is given to students, the first is an one-on-one test that is given to three students whose score is 3.8. The test results in small groups are 3.76, while the results of tests for large groups are 3.84. These results indicate that learning by using computer software-based modules is appropriately appreciated by students. Furthermore, further research is expected to develop the field of science in the Accounting Information System KDBK. Then the final product of this research is expected to be useful to produce learning innovations that can be utilized in the form of teaching modules for accounting information systems practicum.

Keywords: Accounting Information Systems Practicum, Teaching Materials, Computer Technology.

1 Introduction

The focus of the problem in this research is the need for the development of Accounting Information Systems Practicum teaching materials based on Accounting Software as an alternative learning solution in drawing Flow Chart. In the Higher Education curriculum for the Accounting Study Program, the field of financial information systems is a competency that students must master well. The development of global financial reporting has implications for the need to educate students about global financial reporting. The development of science, technology and globalization flows has brought changes in all aspects of human life. Especially in the field of technology which has rapidly brought changes in the business world of a company.
Learning is a systematic process where each component influences the success of students in the learning process. This means students need to interact with learning resources in achieving learning objectives in order to improve the quality of learning. Efforts that can be made so that learning can take place more effectively, efficiently, have an attraction and are able to motivate students to learn independently one of them by using computer technology which is certainly familiar to students. The attractiveness of learning is usually measured by the tendency of students to continue learning and interest in the subject. Accounting information system courses are very closely related to technological development. This learning will be very interesting if done with appropriate computer technology and software, one of them by using MS Visio. Because the most difficult and tedious work for students is to draw a company's information system flow chart with a manual. Will take a long time and is prone to errors. With the development of technology, this work can be facilitated by the existence of MS Visio Software.

The current problem is that there must be development of material that is in accordance with the material in the classroom with the practice in the laboratory. So, the purpose of this research is to develop practical learning materials in accounting information systems with MS programs. Visio which produced the Accounting Information system practicum module. So far, learning in practicum classes does not use books or modules. Only assignment of tasks to resolve cases related to the material. Then the researchers felt the need to develop teaching materials in the Accounting Information Systems Practicum by making a learning module related to the material given in class. The development of teaching materials is also accompanied by the introduction of the MS Visio prog

MS. Visio is a software developed by Microsoft company with the function as a helper in creating diagram designs, flowcharts, brainstorms and network schemes in the form of vector graphics based on data inputted. This product offers more features and templates in making further diagrams so as to make the work more optimally. In addition, it will make it easier for users to connect diagrams with data sources and information visually in graphical form.

In its implementation, this software is included in the device that is user friendly or easy to use. In it there are many shapes or features that facilitate students in designing a diagram. With the existence of Microsoft Visio it is very helpful for the IT and professional business people in exploring and delivering information visually, easily and precisely. One of the other facilities offered by Microsoft Visio is being able to simplify various complicated data in the database and translate it into the form of Visio Diagrams that are easy to understand.

Advantages of Microsoft Visio
1. As for some of the advantages offered by Microsoft Visio, including the following: Microsoft Visio has been supported by various tools that are very numerous and easily understood, even by a beginner.
2. How to use Microsoft Visio is quite easy and very familiar with Microsoft Word or Excel.
3. Microsoft Visio provides a large selection of attractive images so as to produce dynamic and non-monotonous files.
4. Microsoft Visio has been supported by 3D images that are quite interesting so that the results are more varied.
5. The existence of an Add-ins facility that functions as an additional feature from a third party.
One of the general objectives of the accounting system according to Mulyadi [1], namely: To provide information for managers of new business activities and to improve information generated by the existing system. Understanding of an accounting information system according to Mulyadi [1] which states that the accounting information system is: "The organization, forms, notes and reports are coordinated in such a way as to provide financial information needed by management to facilitate company management."

From this understanding it can be interpreted that the accounting information system is a collection of accounting system parts that work together and are responsible for providing financial information and information obtained from transaction data that aims to produce information and reports to management that can be used in internal control company.

The objective to be achieved from this research activity is the preparation of accounting practicum teaching materials using the MS program. Visio and who are able to improve the quality of learning, namely increasing understanding and professional skills utilizing computer technology for students.

In developing teaching materials, an understanding of the importance of teaching materials is needed in the learning process. In the learning process, teaching materials are located as initial capital that will be used or processed to achieve results. These results are in the form of student understanding and ability. Because of the importance of teaching materials in learning activities, they must always be adjusted to the needs of the work environment. Teaching material is a component that must be present in the learning process.

According to Prastowo [2] teaching materials are all forms of materials used to assist teachers / instructors in carrying out teaching and learning activities. The intended materials can be written or unwritten materials. According to Dick, Carey & Carey in [3] teaching materials are devices that are used for learning consisting of, (1) student guides, (2) teaching materials, (3) learner guides.

According to the Ministry of National Education [4] instructional materials are a set of knowledge, skills and attitudes that students must learn in accordance with basic competencies
in order to achieve predetermined competency standards. Teaching materials are books that contain a description of a particular field of study, arranged in systematic, selected based on objectives, oriented towards learning and adapted to the development of learners [5]. So teaching materials must always be updated in accordance with the objectives and achievements in learning.

2 Research Method

The development phase of Dick & Carey in [3] was adapted into this development research into 4 stages that were adjusted to the module development steps, namely: the needs analysis phase, the product design stage, the validation and evaluation stage and the final product stage. At the validation stage, the material experts, learning design experts, one-on-one trials, small-group trials and large-group trials are conducted with students.

Instrument Analysis Technique The feasibility of learning modules uses a Likert scale with alternative answers: very good, good, sufficient, less and very less. In order to obtain quantitative data, alternative answers are given a score that is very good = 5, good = 4, enough = 3, less = 2, very less = 1.

3 Results and Discussion

3.1 Results of Module Development

Based on the research and development stages of the Accounting Information Systems Practicum module, the development and research design only reaches the Revised Instruction stage to revise the validity, feasibility and effectiveness test stages of a product development from the initial stage. Product trials in the development of teaching materials are conducted to obtain input, responses, and assessments of the product as revised materials to get improvements. In designing teaching materials for the Accounting Information Systems Practicum module, the development phase of Dick & Carey was adapted into this development research into several stages, namely:

Requirement Analysis Phase

This stage aims to review the objectives of the product to be developed. The product to be developed is the Accounting Information Systems Practicum module. So the first step to do is to conduct FGD with KDBK team lecturers to conduct curriculum analysis in determining products that are in accordance with curriculum requirements based on the initial survey conducted on the needs of students in facilitating them in designing and drawing a flow chart of the Accounting System. Conduct a needs analysis by analyzing the curriculum to determine products that are in line with curriculum demands. Curriculum analysis is done by looking at, studying and considering several curriculums at leading universities in Indonesia. After seeing the material from several Syllabus in Accounting Study Program at State Universities, almost all Accounting Information Systems Practicum Courses use MS Visio.

Product Design Stage

The results of the needs analysis will further determine the design of the product to be
developed. This stage is conducted by the FGD with KDBK team lecturers whose activities include determining the components of the Accounting Information Systems Practicum module using MS Visio, the concept of delivering and organizing material, the type of assignments given, evaluation questions, drawings, and module layouts. This stage will produce an initial product design in the form of a module that has previously been carried out preparation of product assessment instruments to be used as guidelines in product design. At this stage the material collection was also carried out by the KDBK doden-lecturer team by collecting material in accordance with the initial design of the Accounting Information Systems Practicum module with MS Visio.

Validation and Evaluation Stage

This stage is the core stage in the form of a series of product development assessments. The next set of validation and evaluation stages is the readability test phase. Products that have been declared feasible by experts are then tested on Accounting 5th semester students as potential users. Then students assess and provide input on the module.

Validation Test by Material Experts and Learning Design

Individual trials, conducted on a material expert who at least has a minimum education qualification of S3 in the field of Accounting Information Systems. Based on the validation test by the material expert on the feasibility of teaching materials or the Accounting Information Systems Practicum module, a score of 3.6 is obtained. Based on the assessment, the development of teaching materials is still in good criteria. According to the material expert's assessment of the Accounting Information Systems Practicum module: "it's good but there still has to be a lot of practice and case questions in it. Material experts consider that the practicum module with MS Visio is very useful to increase student knowledge related to technology that can be used to help the teaching and learning process.

Furthermore, the validation test is conducted by a learning design expert, based on an assessment of the feasibility of the validation value module obtained is 3.66. This result also shows that the module is appropriate to be used as teaching material in the SIA Practicum class. Advice from design experts is that the material presented should be more systematic as well as the tasks presented in the module.

Field Test

The design of trials used in this study are: one-on-one trials or individuals, small group trials, and large group trials. Individual trials were also carried out on three students representing the target population. Small Group Trial, At this stage teaching material needs to be tried out to 10 students who can represent the target population. The sample consisted of students who were less clever, moderate and smart, male and female, with different characteristics. On the basis of feedback small groups of media are refined.

Based on the data table scores above, the value of 3.8 for one-on-one trials and 3.76 for small-group trials is obtained. The results of this trial illustrate that the material presented in the learning material is quite good and in accordance with the learning objectives, although there are some that state the learning material is not in accordance with the learning objectives. Respondents who state learning material are easy to understand as much and the examples presented can clarify the topic.

The terms used in the learning material both the description and the exercises are easy to understand. But some students said they could not be understood. The images used can help
students to understand the MS Visio material. Likewise the language still needs improvement so that it is better understood by students.

4 Conclusion

Based on the results of the validation test by the expert material and the results of one-on-one trials and in small groups and large groups, an illustration is obtained that the material described in the Accounting Information System Paraict module is in accordance with the learning objectives. The suitability includes the following:

1) The material is in accordance with the competencies that must be mastered by students,
2) Assignments given to students in accordance with the competencies that must be mastered by students.
3) Explanatory examples are in accordance with the competencies that must be mastered by students,
4) Exercises and questions in accordance with the competencies that must be mastered by students.

5 References

Response of Growth and Production of Rice (Oryza sativa L) to Paclobutrazol Application with JajarLegowo 4: 1Planting System

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Abstract. This study aims to evaluate the response of growth and production of three varieties of irrigated rice (Oryza sativa L.) to paclobutrazol application with jajarlegowo 4: 1planting system. This research was carried out in the rice field area of Serbajadi 1 Village, Sunggal District, Deli Serdang Regency, Medan. This study uses a separate plot design (RPT) with 2 treatment factors. The first factor is paclobutrazol as the main plot consisting of 4 levels, namely P0 = 0 ppm (without the application of paclobutrazol), P1 = 50 ppm, P2 = 100 ppm, P3 = 150 ppm. The second factor is varieties as subplots consisting of 3 levels, namely, V1 = Inpari 32, V2 = Inpari 4, V3 = Mekongga. The results showed that the best growth and production of rice plants were in the treatment of paclobutrazol concentration of 150 ppm in the Inpari 4 variety, with a plant height of 59.93 cm, number of tillers 33.40 tillers, panicle number of 18.60 panicles, grain weight containing 26.98 g and grain production 1.82 g per plot.

Keywords: Oryza sativa L, varieties, paclobutrazol, jajarlegowo

1 Introduction

Rice is the main food crop in Indonesia because more than half of Indonesia's population makes rice a staple food. The need for rice staples continues to increase, this is not proportional to the rice production produced and consequently, the annual rice needs are not met. The low average rice production per hectare and the transfer of land-use experts are the main causes of low rice production in Indonesia [1].

In Indonesia, rice harvested area in 2015 reached 14,116 million ha, with productivity of 5,341 tons / ha, and a production of 75,397 million tons. In the province of North Sumatra, the rice harvest area in 2015 reached 781,769 ha, with the productivity of 5,174 tons/ha, and a production of 4,044 million tons [2]. In the city of Medan rice production in 2017 with a harvest area of 2,728.4 hectares with a production of 11,994.6 tons [3].

One of the obstacles in rice cultivation is the problem of vulnerability that causes reduced yields, early harvests and decreased grain prices. The cause of the vulnerability is the variety
planted, including varieties that can not stand lodging. To reduce the problem of vulnerability can be done by planting superior varieties, resistant to high productivity and high yields. According to Suhartatik [4], that superior varieties are capable of high yield because plants have morphophysiological characteristics that are appropriate to their environment, that is, both planted in the lowlands and highlands.

Efforts that can be made to reduce plant height and lodging in rice are using paclobutrazol. These growth inhibitors can inhibit stem extension, increase leaf green matter, increase carbohydrate partitioning and indirectly encourage flowering without causing abnormal growth [5]

The treatment of paclobutrazol has a very significant effect on reducing plant height parameters at harvest. The results of the research [6] show that the use of paclobutrazol with a concentration of 100 ppm (P2) tends to produce better production and a concentration of 200 ppm (P3) tends to produce better seed quality in Cihang variety.

Inpari 32, Inpari 4 and Mekongga varieties have a relatively long harvest period of around 116-125 days and plant height ranges from 95-115 cm [7]. In the Inpari 32, Inpari 4 and Mekongga varieties, although the plant height is classified as lower among other lowland rice, the level of lodging is classified as moderate or somewhat resistant compared to other lowland rice plants such as IR64 and other varieties. Therefore the use of paclobutrazol is expected to be able to suppress the vegetative growth of rice plants thereby diverting the use of assimilates from the need for the development of vegetative sinks to the development of reproductive sinks (seeds).

2 Research Method

The materials used in this study were varieties of rice seeds of Inpari 32, Inpari 4 and Mekongga and Paclobutrazol with a concentration of 250 g / l. This research was conducted in the rice field area of Serbajadi 1 Village, Sunggal District, Deli Serdang Regency, Medan. The study was conducted from May to August 2019. This study used a separate plot design (RPT) with 2 treatment factors. The first factor, paclobutrazol consists of 4 levels, namely, P0 = 0 ppm, P1 = 50 ppm, P2 = 100 ppm, P3 = 150 ppm. The second factor, varieties consist of 3 levels namely, V1 = Inpari 32, V2 = Inpari 4, V3 = Mekongga.

Rice seedlings are planted after 12 days after seedling, using 2 rice seedlings per planting hole with a spacing of 25 cm x 25 cm and a depth of 4 cm. Rice is planted using type legowo row 1: 1 planting system with rows perpendicular to the rising sun.

Paclobutrazol was applied in each study plot by the procedure and applied when the rice plants were 30 HST, 38 HST and 46 HST. Application of Paclobutrazol 3 times by spraying all parts of the plant canopy.

Fertilization and maintenance of plants are carried out by recommendations for rice cultivation. The parameters observed were plant height (cm), number of tillers, panicle counts, the weight of filled grain (g) and grain production per plot (kg).
3 Results and Discussion

3.1 Plant Height (cm)

The results of the analysis of variance showed that the treatment of varieties and concentrations of paclobutrazol as well as the interaction of both treatments had a significant effect on the height of rice plants. The average plant height of three varieties of lowland rice due to different concentrations of paclobutrazol can be seen in Table 1.

Table 1. The average plant height of three varieties of lowland rice due to differences in the concentration of paclobutrazol at each observation time

Note: Those numbers followed by the same alphabet on the same application are not different by Duncan test Average Difference α=5%

<table>
<thead>
<tr>
<th>DAP</th>
<th>Concentrations of Paclobutrazol (P)</th>
<th>Varieties (V)</th>
<th></th>
<th></th>
<th></th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>V1 (Inpari 32)</td>
<td>V2 (Inpari 4)</td>
<td>V3 (Mekongga)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>P0 (0 ppm)</td>
<td>61.00 a</td>
<td>56.93bc</td>
<td>61.60 a</td>
<td>59.84 a</td>
<td></td>
</tr>
<tr>
<td></td>
<td>P1 (50 ppm)</td>
<td>61.07 a</td>
<td>55.13 cd</td>
<td>59.13ab</td>
<td>58.44 b</td>
<td></td>
</tr>
<tr>
<td></td>
<td>P2 (100 ppm)</td>
<td>55.80 c</td>
<td>52.60 e</td>
<td>55.47c</td>
<td>54.62 c</td>
<td></td>
</tr>
<tr>
<td></td>
<td>P3 (150 ppm)</td>
<td>52.87 de</td>
<td>52.47 e</td>
<td>52.40 e</td>
<td>52.58 d</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mean</td>
<td>57.68 a</td>
<td>54.28 c</td>
<td>57.15 b</td>
<td></td>
<td></td>
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<tr>
<td>40</td>
<td>P0 (0 ppm)</td>
<td>72.53 a</td>
<td>64.00bc</td>
<td>66.67 b</td>
<td>67.73 a</td>
<td></td>
</tr>
<tr>
<td></td>
<td>P1 (50 ppm)</td>
<td>65.47 b</td>
<td>60.83cde</td>
<td>66.47 b</td>
<td>64.26 b</td>
<td></td>
</tr>
<tr>
<td></td>
<td>P2 (100 ppm)</td>
<td>61.23 cd</td>
<td>56.40 f</td>
<td>60.87cde</td>
<td>59.50 c</td>
<td></td>
</tr>
<tr>
<td></td>
<td>P3 (150 ppm)</td>
<td>56.73ef</td>
<td>56.27 f</td>
<td>57.53def</td>
<td>56.84 c</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mean</td>
<td>63.99 a</td>
<td>59.38 c</td>
<td>62.88 b</td>
<td></td>
<td></td>
</tr>
<tr>
<td>45</td>
<td>P0 (0 ppm)</td>
<td>80.40 a</td>
<td>71.87 c</td>
<td>76.07 b</td>
<td>76.11 a</td>
<td></td>
</tr>
<tr>
<td></td>
<td>P1 (50 ppm)</td>
<td>72.20 c</td>
<td>65.80 de</td>
<td>69.47 cd</td>
<td>69.16 b</td>
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</tr>
<tr>
<td></td>
<td>P2 (100 ppm)</td>
<td>63.53 e</td>
<td>61.73 f</td>
<td>66.47 de</td>
<td>63.91 c</td>
<td></td>
</tr>
<tr>
<td></td>
<td>P3 (150 ppm)</td>
<td>63.47 ef</td>
<td>57.53 g</td>
<td>61.13fg</td>
<td>60.71 d</td>
<td></td>
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<tr>
<td></td>
<td>Mean</td>
<td>69.90 a</td>
<td>64.23 c</td>
<td>68.28 b</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>P0 (0 ppm)</td>
<td>87.73 a</td>
<td>80.80bc</td>
<td>86.00ab</td>
<td>84.84 a</td>
<td></td>
</tr>
<tr>
<td></td>
<td>P1 (50 ppm)</td>
<td>78.07 cd</td>
<td>74.73def</td>
<td>77.47cd</td>
<td>76.76 b</td>
<td></td>
</tr>
<tr>
<td></td>
<td>P2 (100 ppm)</td>
<td>67.40gh</td>
<td>69.87fg</td>
<td>72.07efg</td>
<td>69.78 c</td>
<td></td>
</tr>
<tr>
<td></td>
<td>P3 (150 ppm)</td>
<td>65.53 h</td>
<td>59.93 i</td>
<td>66.73gh</td>
<td>64.07 d</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mean</td>
<td>74.68 b</td>
<td>71.33 c</td>
<td>75.57 a</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Data Table 1 shows that in the treatment of paclobutrazol concentration, the lowest plant height at each observation was found at the concentration of paclobutrazol 150 ppm (P3) which was significantly different from the other treatments. At the age of 50 HST observations, there was an increase in plant height of 20.77 cm (24.56%) at a paclobutrazol concentration of 150 ppm (P3) from plant height in the control treatment (P0).

Rice varieties that produced the lowest plant height were Inpari 4 (V2), 3.35 cm lower than the Inpari 32 (V1) variety and 4.24 cm lower than the Mekongga (V3).

The treatment interaction that produced the lowest plant height was P3V2, which was 59.93 cm that was significantly different from other treatment interactions. Plant height in the P3V2 treatment was 27.80 cm lower than the P0V1 treatment (87.73 cm).

The results showed that plant height of three varieties of lowland rice had decreased with increasing concentrations of paclobutrazol given. Giving paclobutrazol with a concentration of 150 ppm (P3) produced the lowest plant height of 59.93 cm. This is because paclobutrazol is one of the growth regulators that inhibits gibberellin biosynthesis so that vegetative growth of plants is inhibited. The working principle of paclobutrazol is to inhibit the oxidation reaction between kauren and kaurenoic acid in the synthesis of gibberellins, resulting in an emphasis on plant stems[8]. Thus the plants that were given paclobutrazol were thought to have lower endogenous gibberellins compared to treatments without paclobutrazol. Gibberellin in plants, among others, plays a role in cell elongation that will determine plant height.

The variety factor has a significant influence on the height of rice plants, where the Inpari 4 variety shows a lower plant height than the Inpari 32 and Mekongga varieties. This is by the genetic makeup of each variety. Inpari 4 variety has a genetic plant height of 95-105 cm. This is consistent with [9] that the height of the stems of plants is influenced by the traits or characteristics that affect the yield capacity of varieties. In addition to genetic factors, environmental factors and cropping systems also affect plant growth and development. In the legowo row planting system, the plant population is less than the tile system, because the planting method in the legowo row is 4:1, where every four rows are emptied one row of rice plants. Plant height increase in the tile system is higher than jajarlegowo. This is because the plant canopy is getting denser because of the greater plant population and the resulting quality of light received is decreased. The more population planted on land, the higher plant growth will be faster because plants are trying to find each other more sunlight [10].

3.2 Number of Tillers

Results of analysis of variance showed that the treatment of varieties and concentrations of paclobutrazol, as well as the interaction of the two treatments, significantly affected the number of tillers. The average number of tillers of three lowland rice varieties due to differences in paclobutrazol concentration can be seen in Table 2.
Table 2. The average number of tillers of three rice varieties due to differences in paclobutrazol concentration at each observation time

Note: Those numbers followed by the same alphabet on the same application unreal by Duncan test Average Difference α=5%

<table>
<thead>
<tr>
<th>DAP</th>
<th>Concentrations of Paclobutrazol (P)</th>
<th>V1 (Inpari 32)</th>
<th>V2 (Inpari 4)</th>
<th>V3 (Mekongga)</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>35</td>
<td>P0 (0 ppm)</td>
<td>........</td>
<td>22.27 cd</td>
<td>22.20 d</td>
<td>22.67 cd</td>
</tr>
<tr>
<td></td>
<td>P1 (50 ppm)</td>
<td>22.20 d</td>
<td>25.30 a</td>
<td>22.80 cd</td>
<td>24.10 a</td>
</tr>
<tr>
<td></td>
<td>P2 (100 ppm)</td>
<td>24.07abc</td>
<td>25.73 a</td>
<td>23.73 b</td>
<td>26.23</td>
</tr>
<tr>
<td></td>
<td>P3 (150 ppm)</td>
<td>24.07abc</td>
<td>25.73 a</td>
<td>23.73 b</td>
<td>25.63</td>
</tr>
<tr>
<td>Mean</td>
<td></td>
<td>22.80 c</td>
<td>24.52 a</td>
<td>23.88 b</td>
<td>24.73</td>
</tr>
<tr>
<td>40</td>
<td>P0 (0 ppm)</td>
<td>24.20 d</td>
<td>24.87 cd</td>
<td>24.13 d</td>
<td>24.40 c</td>
</tr>
<tr>
<td></td>
<td>P1 (50 ppm)</td>
<td>25.13bcd</td>
<td>25.87abc</td>
<td>26.20abc</td>
<td>25.73 b</td>
</tr>
<tr>
<td></td>
<td>P2 (100 ppm)</td>
<td>23.80 d</td>
<td>26.87 a</td>
<td>26.93 a</td>
<td>26.87</td>
</tr>
<tr>
<td></td>
<td>P3 (150 ppm)</td>
<td>25.80abc</td>
<td>26.53ab</td>
<td>26.67bc</td>
<td>26.33</td>
</tr>
<tr>
<td>Mean</td>
<td></td>
<td>24.73 c</td>
<td>26.03 a</td>
<td>25.98 b</td>
<td>26.75</td>
</tr>
<tr>
<td>45</td>
<td>P0 (0 ppm)</td>
<td>25.47 d</td>
<td>29.00 a</td>
<td>27.00bcd</td>
<td>27.16 c</td>
</tr>
<tr>
<td></td>
<td>P1 (50 ppm)</td>
<td>26.53 cd</td>
<td>27.53abc</td>
<td>27.60abc</td>
<td>27.22 c</td>
</tr>
<tr>
<td></td>
<td>P2 (100 ppm)</td>
<td>26.27cd</td>
<td>28.80 a</td>
<td>28.53ab</td>
<td>27.87 b</td>
</tr>
<tr>
<td></td>
<td>P3 (150 ppm)</td>
<td>28.73 a</td>
<td>28.40ab</td>
<td>28.47ab</td>
<td>28.53</td>
</tr>
<tr>
<td>Mean</td>
<td></td>
<td>26.75 c</td>
<td>28.43 a</td>
<td>27.90 b</td>
<td>28.35</td>
</tr>
<tr>
<td>50</td>
<td>P0 (0 ppm)</td>
<td>28.93 c</td>
<td>30.93 b</td>
<td>29.67bc</td>
<td>29.84 c</td>
</tr>
<tr>
<td></td>
<td>P1 (50 ppm)</td>
<td>30.47bc</td>
<td>30.73bc</td>
<td>29.60bc</td>
<td>30.27 b</td>
</tr>
<tr>
<td></td>
<td>P2 (100 ppm)</td>
<td>30.40bc</td>
<td>30.93 b</td>
<td>30.53bc</td>
<td>30.62 b</td>
</tr>
<tr>
<td></td>
<td>P3 (150 ppm)</td>
<td>30.27bc</td>
<td>33.40 a</td>
<td>32.73 a</td>
<td>32.13 a</td>
</tr>
<tr>
<td>Mean</td>
<td></td>
<td>30.02 c</td>
<td>31.50 a</td>
<td>30.63 b</td>
<td>30.47</td>
</tr>
</tbody>
</table>

Data from Table 2. shows that in the treatment of paclobutrazol concentration, the highest number of tillers in each observation was at the concentration of paclobutrazol 150 ppm (P3) which was significantly different from the other treatments. At the age of 50 HST observations, there was an increase in the number of tillers 2.4 (7.4%) at a paclobutrazol concentration of 150 ppm (P3) from plant height in the control treatment (P0).

Rice varieties that produced the highest number of tillers were Inpari 4 (V2), namely 31.50 tillers that were significantly different from Mekongga (V3), which were 30.63 tillers and Inpari 32 (V1), namely 30.02 tillers.

The treatment interaction that produced the highest number of tillers was P3V2, ie 33.40 tillers that were significantly different from other treatment interactions. The number of tillers in the P3V2 treatment was 4.47 more than the P0V1 treatment (28.93 tillers).

The number of tillers increased with increasing concentrations of paclobutrazol given. Wattimena [5] added that one of the physiological effects of retardant is that it encourages bud formation. Apart from the application of paclobutrazol, the increase in the number of tillers is also influenced by the planting system used. The results of this study are [11] stating the treatment distance of 4:1 legowo row planting has a number of productive tillers (14.43) that is significantly
different from other planting distances namely legowo row 2: 1 and 3: 1 in Inpari 13 variety rice. [12] also states that the legowo 4: 1 table system provides productive tillers per clump higher than the legowo 2: 1 table system, namely 29 each (27-32 tillers), far higher than compared to productive tillers based on varieties 14-17 tillers).

The variety factor shows a significant effect on the number of tillers, where the number of tillers differs in each variety. The highest number of tillers was in Inpari 4 and the lowest was in Inpari 32. This proves that genetics is the main factor influencing the number of tillers produced. According [11] the number of tillers will be maximal if the plant has good genetic traits coupled with favorable environmental conditions or by plant growth and development. In addition to genetic, factor 4: 1 jajarlegowo planting system supports the formation of a total number of tillers. This is due to the lower plant population thereby reducing competition in nutrient absorption and sunlight, this is [11] opinion that the maximum number of tillers is also determined by plant populations because plant populations determine the absorption of solar radiation, mineral nutrients and crop cultivation itself. Plant populations that have less competition for sunlight and nutrients are very few compared to many plant populations.

3.3 Number of panicles

The results of the analysis of variance showed that the treatment of varieties and concentrations of paclobutrazol, as well as the interaction of the two treatments, significantly influenced the number of panicles per rice plant. The average number of panicles per plant of three rice varieties due to differences in the concentration of paclobutrazol can be seen in Table 3.

Table 3. The average number of panicles of three rice varieties due to differences in the concentration of paclobutrazol

<table>
<thead>
<tr>
<th>Concentration of Paclobutrazol (P)</th>
<th>Varieties (V)</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>V1 (Inpari 32)</td>
<td>V2 (Inpari 4)</td>
</tr>
<tr>
<td>P0 (0 ppm)</td>
<td>........</td>
<td>15.47 c</td>
</tr>
<tr>
<td>P1 (50 ppm)</td>
<td>15.87 e</td>
<td>16.73 d</td>
</tr>
<tr>
<td>P2 (100 ppm)</td>
<td>17.60bc</td>
<td>17.93abc</td>
</tr>
<tr>
<td>P3 (150 ppm)</td>
<td>18.20ab</td>
<td>18.60 a</td>
</tr>
<tr>
<td>Mean</td>
<td>16.78 c</td>
<td>17.52 a</td>
</tr>
</tbody>
</table>

Data Table 3 shows that in the treatment of paclobutrazol concentration, the highest number of panicles per plant was found in the concentration of paclobutrazol 150 ppm (P3) which was significantly different from other treatments. The number of panicles per plant experienced an increase of 2.49 panicles (13.51%) at a paclobutrazol concentration of 150 ppm (P3) from the number of panicles per plant in the control treatment (P0).

Rice varieties that produced the highest number of panicles per plant were Inpari 4 (V2), 17.52 panicles, which were significantly different from Mekongga (V3), which were 17.00 panicles and Inpari 32 (V1), 16.78 panicles.
The treatment interactions that produced the highest number of panicles per plant were P3V2, i.e. 18.60 panicles that were significantly different from other treatment interactions. The number of panicles per plant in the P3V2 treatment was 3.13 panicles more than the P0V1 treatment (15.47 panicles).

The results showed that the number of panicle parameters per plant increased with increasing concentrations of paclobutrazol given. This shows that the role of paclobutrazol is very significant in inhibiting growth. According to [13] inhibition of rice is caused by paclobutrazol which can block the synthesis of gibberellins, which are growth-regulating compounds that function in plant cell elongation. Inhibition of the production of gibberellins does not inhibit cell division, but the new cells produced do not grow lengthwise [14].

3.4 Grain Weight Contains (g)

The results of the analysis of variance showed that the treatment of varieties and concentrations of paclobutrazol, as well as the interaction of the two treatments, significantly affected the weight of unhusked rice per clump of rice. The average weight of grains contained per clump of three rice varieties due to differences in concentrations of paclobutrazol can be seen in Table 4.

Table 4. The average grain weight containing three rice varieties due to different concentrations of paclobutrazol

Note: Those numbers followed by the same alphabet on the same application unreally different by Duncan test Average Difference α=5%

<table>
<thead>
<tr>
<th>Concentrations of Paclobutrazol (P)</th>
<th>Varieties (V)</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>V1 (Inpari 32)</td>
<td>V2 (Inpari 4)</td>
</tr>
<tr>
<td>P0 (0 ppm)</td>
<td>24.74abcd</td>
<td>24.26bcd</td>
</tr>
<tr>
<td>P1 (50 ppm)</td>
<td>24.14bcd</td>
<td>26.23ab</td>
</tr>
<tr>
<td>P2 (100 ppm)</td>
<td>23.27 cd</td>
<td>25.51abc</td>
</tr>
<tr>
<td>P3 (150 ppm)</td>
<td>25.88ab</td>
<td>26.98 a</td>
</tr>
<tr>
<td>Mean</td>
<td>24.51 b</td>
<td>25.75 a</td>
</tr>
</tbody>
</table>

Data Table 4 shows that the treatment of paclobutrazol concentration of 150 ppm (P3) resulted in the heaviest weight of grain contained per heaviest clump of 25.93 grams that was significantly different from other treatments. The weight of unhusked rice per clump at the treatment of paclobutrazol concentration is 150 ppm (P3) heavier 1.85 grams than the weight of the filled grain per clump at the control treatment (P0).

Rice varieties that produce grain weight per heaviest clump are Inpari 4 (V2) that is 12.07 grams that is significantly different from Inpari 32 (V1) that is 10.79 grams and Mekongga (V3), which is 11.55 grams.

The treatment interaction that produced the heaviest weight of grains per heaviest clump was P3V2, which was 26.98 grams that were significantly different from other treatment interactions. The weight of filled grain per clump in the P3V2 treatment was 3.76 grams heavier than the P0V3 treatment (23.22 grams).
Paclobutrazol is a retardant that can shorten the stem of the plant, so the plant will become stronger. Besides the ability to shorten plant stems, these growth inhibitors can increase leaf chlorophyll content. Increased chlorophyll content will increase the ability of plant leaves to carry out the process of photosynthesis that produces carbohydrates. This increase in carbohydrate production will increase the grain yield of rice plants [15]. This is consistent with the results of the study that the weight of paddy containing rice was higher with the application of paclobutrazol compared to without the application of paclobutrazol.

The variety factor gives a significantly different effect on the weight of filled grains per clump. This is by the potential yield of each variety. According to Abdullah et al (2008), if the amount of grain per clump is large, the cooking period will be longer, so that the quality of rice will decrease or the level of emptiness is high, due to the inability of the source to fill in the sink.

3.5 Grain production / plot (g)

Results of analysis of variance showed that the treatment of varieties and concentrations of paclobutrazol as well as the interaction of the two treatments had a significant effect on grain production per rice plot. The average grain production per plot of three rice varieties due to differences in paclobutrazol concentration can be seen in Table 5.

Table 5. The average grain production per plot of three rice varieties due to differences in the concentration of paclobutrazol

<table>
<thead>
<tr>
<th>Concentration of Paclobutrazol (P)</th>
<th>Varieties (V)</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>V1 (Inpari 32)</td>
<td>V2 (Inpari 4)</td>
</tr>
<tr>
<td>P0 (0 ppm)</td>
<td>........</td>
<td>...kg...</td>
</tr>
<tr>
<td>P1 (50 ppm)</td>
<td>1.20fg</td>
<td>1.30defg</td>
</tr>
<tr>
<td>P2 (100 ppm)</td>
<td>1.25fg</td>
<td>1.57abcede</td>
</tr>
<tr>
<td>P3 (150 ppm)</td>
<td>1.12g</td>
<td>1.70ab</td>
</tr>
<tr>
<td>Mean</td>
<td>1.30 c</td>
<td>1.60 a</td>
</tr>
</tbody>
</table>

Data Table 5 shows that the treatment of 150 ppm (P3) paclobutrazol concentration resulted in the heaviest grain production per plot which was 1.68 kg which was significantly different from the other treatments. Grain production per plot in the treatment of 150 ppm (P3) paclobutrazol concentration heavier 0.39 kg than grain production per plot in the control treatment (P0).

Rice varieties that produce grain production per heaviest plot are Inpari 4 (V2), which is 1.60 kg, which is significantly different from Inpari 32 (V1), which is 1.30 kg and Mekongga (V3), which is 1.43 kg.

The treatment interaction that produced the heaviest grain production per plot was P3V2, which is 1.82 kg that was significantly different from other treatment interactions. Grain production per plot in the P3V2 treatment was 0.7 kg heavier than the P2V1 treatment (1.12 kg).

The results showed that the variety factor significantly affected the production of rice grain produced, where the Inpari 4 variety had the highest grain yield potential compared to the other
two varieties. This is due to the genetic factors of the plant itself. According to [16] states that the most important factor to obtain the highest grain yield is the number of productive tillers and the number of panicles formed. The more productive saplings that produce panicles, the more grain is produced.

4 Conclusion

The concentration of paclobutrazol that gives the best effect on growth and production is 150 ppm. The rice varieties that have the best growth and production are Inpari 4. The interaction of paclobutrazol treatment and the varieties that produce the best growth and production is the concentration of 150 ppm paclobutrazol in the Inpari 4.

5 References


Design of Nutrition Assessment of Hospitalized Patients Based on Web in Hospital of Universitas Sumatera Utara

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Abstract. Hospital of Universitas Sumatera Utara has some services which are integrated with hospital management information system, but nutrition service has not been included yet. Actually, the nutrition service activities consist of nutrition assessment as well as diet orders of hospitalized patients which been done manually that could cause error. The aim of the study is to make an application of nutrition assessment and diet orders of hospitalized patients based on web, so it can minimize the error. The name of the application is “E-NRD” made with Waterfall method. The study design was research and development and was done for 8 months. The steps of the study were dieticians and nurses interviews, data collection, application establishment, dieticians and nurses workshops of application, and finally the implementation of the application. Hopefully “E-NRD” as a part of hospital management information system could improve the quality of nutrition service in hospital of Universitas Sumatera Utara.

Keywords: nutrition, information system, application

1 Introduction

Hospital management information system is a communication information technology system that processes and integrates the entire flow of hospital services in the form of a network of coordination, reporting and administrative procedures to obtain information precisely and accurately, and is part from the health information system [1]. According to Siregar the hospital is a place to hold health efforts, and one of the efforts in health services in hospitals is hospital nutrition service [2]. At the Hospital of Universitas Sumatera Utara itself has used the hospital management information system for activities every day, but there are still some activities that have not been integrated with the hospital management information system, one of which is nutrition service.

Nutrition service at the Hospital of Universitas Sumatera Utara include the process of nutrition assessment by dieticians and ordering food for inpatients by nurses. Nutrition assessment is a process that begins with screening, assessment, diagnosis, intervention, and monitoring and evaluation of nutrition [3]. The process of nutrition service at the Hospital of Universitas Sumatera Utara is done manually, namely the calculation of nutritional status, recording out nutrition assessment lines to be recorded by nutrition officers on paper. The process runs the risk of causing miscalculation, recording, loss of inpatient dietary records, and miscommunication. In the on paper, and the nurses order inpatient food via telephone...
scope of health, patient safety must be the number one target, for that the quality of service to patients is always the top priority in various health facilities such as hospitals [1].

Based on the above problems, the Hospital of Universitas Sumatera Utara requires an application in nutrition service to improve the quality of services provided. This web-based application called "E-NRD" aims to improve service, speed, accuracy, integration, efficiency, and ease of reporting.

2 Research Method

This research design uses the Research and Development approach. This method is used to produce certain products, and test these products [4]. Testing the resulting product using the Waterfall method. The location of research in the Hospital of Universitas Sumatera Utara from May to September 2019 after obtaining ethical approval from the Research Ethics Committee of the Faculty of Nursing, Universitas Sumatera Utara (letter number 1816/V/SP/2019). The object in this study is information system "E-NRD" which contains a nutrition assessment form and a food order form from the nurses in the inpatient ward. Subjects observed were dieticians, nutrition officers at nutrition installations, and nurses on duty in the inpatient ward.

Data needed to complete this study were the nutrition assessment forms and food ordering forms from patient care who provided information about the presence of inpatients (patients returning, patients returning at their own requests, moving rooms, and dying patients) to the nutrition officers at the nutrition installation of the Hospital of Universitas Sumatera Utara so that the data is well coordinated. The research tools use:

1) One or more communication devices such as computers, laptops, smart phones or tablets to open the browser
2) One router
3) One online hosting
4) Interview with nurses on duty inpatients about matters that become obstacles or problems in ordering food for inpatients to or nutrition officers dieticians at nutrition installations
5) Interview with dieticians about things that cause obstacles or problems in the assessment of patient
6) The research team summarizes the results of the interviews of nurses, dieticians, and nutrition officers
7) The research team made the design of the application which adapted to the needs of nurses, dieticians, and nutrition officers in nutrition installation
8) The research team discussing determining the name used in the application
9) Making the design of nutrition assessment and ordering food application
10) Formation of the "E-NRD" web-based application
11) Holding the "E-NRD" web-based workshop and trial application
12) Application implementation of "E-NRD" web-based in the work accompanied by policies and application guidelines

Identification of this study uses Ishikawa diagram that is to recognize each problem that arises in the use of decomposition and realization of user care diagram further about the components of the system or software, objects, relationships between objects, and so on. So that the activities of the application can be run according to the needs of the existing problems.
3 Results and Discussion

This application has 3 users in the form of admin, dietician, and nurse. Enter the e-nrd.com url in the browser, then the main page and login section will appear to enter your username and password (Figure 1).

Main page of admin and dietician users can access recapitulation of patient nutrition assessment and recapitulation of food ordering from all wards. The initial appearance on the admin and dietician can see the nutrition assessment form and patient data. Nutrition assessment contains anthropometric data, intake analysis data, and list of nutritional problems (Figure 2 and Figure 3).
The nurse users contain patient data and make inpatient food orders such as food forms and diet types to be sent to a nutrition installation (Figure 4 and Figure 5).
Discussion

Currently the hospital is required to always improve the quality of service, improve performance, and competitiveness, but not reduce the social mission it carries. Hospital management information system is a computer system that processes and integrates the entire flow of health services business processes in the form of a network of coordination, reporting, and administrative procedures to obtain information quickly, precisely, and accurately. In addition, the Hospital management information system is a very important supporting facility and must be owned by hospitals to support hospital operational management [5].

Minister of Health Regulation No. 741/Menkes/Per/VIII/2008 concerning minimum service standards for hospitals to determine nutrition service as a medical support service within the organizational structure of the hospital [6]. Nutrition service is service provided and adjusted to the patient's situation based on clinical conditions, nutritional status, and metabolic status of the body. Nutritional conditions are very influential in the process of healing the disease, on the contrary the process of disease can affect the nutritional status. Nutrition therapy is part of the treatment of diseases or clinical conditions that must be considered so that nutrition does not exceed the body's ability to carry out metabolic functions. The patient's nutrition must be evaluated and improved according to the patient's clinical condition and the results of the laboratory examination. Hospital nutrition service activities include outpatient nutrition care, inpatient nutrition care, food service, and research and development [3].

Nutrition service in the Hospital of Universitas Sumatera Utara still done manually and not yet part of the hospital management information system. This can cause service to be slow, data storage and management are not integrated, error in recording, calculation error, loss of diet records for inpatients, and miscommunication [5]. Therefore, nutrition service must be part of the hospital management information system.

The method used to create a web-based "E-NRD" application is the Waterfall method which describes a systematic and sequential approach to software development, starting with the specification of user needs and then through planning, modeling, construction, and deployment, which ends with support for the complete software produced. In its development the Waterfall method has several sequential stages, namely requirements analysis, system design, implementation, integration and testing, and operation and maintenance [7].

The "E-NRD" application has 3 users, namely admin, dietician, and nurse, where admin and dietician has access to nutrition assessment and patient data, while nurses have access to patient data and a list of patient diets. Nutrition assessment contains anthropometric data, intake analysis, list of nutritional problems, and conclusions whether the patient needs to be consulted to the Nutrition Therapy Team. If the nutrition assessment is done manually, it will take a long time and miscalculation. One function is carried out nutrition assessment is to detect patients who are at risk of malnutrition or malnutrition to prevent malnutrition in the hospital. If there is malnutrition in patients, it will increase morbidity, mortality, duration of hospitalization, and hospital costs [8]. For nurse users, access is given in the form of patient data and food ordering, such as food forms and diet types. If done manually such as recording on paper or by telephone to the nutrition installation, there can be a risk of losing the patient's dietary records, error recording, and miscommunication. The accuracy of dieting is one of the quality indicators in the nutrition installation of the Hospital of Universitas Sumatera Utara.

The hospital management information system in the form of an "E-NRD" application can minimize error in nutrition assessment and inpatient food ordering, so as to improve the quality of nutrition service at the Hospital of Universitas Sumatera Utara.
5 Conclusion

The design of a nutritional assessment and food ordering application for inpatients based on the web at the Hospital of Universitas Sumatera Utara and workshops have been completed. This application is expected to prevent error in nutrition assessment by dieticians and inpatient food ordering by nurses.

Acknowledgments

The authors are grateful to the dieticians and nurses in the Hospital of Universitas Sumatera Utara who participated in this study and Talenta of the Universitas Sumatera.

6 References

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Developing a Digital Literacy-Based Teaching Model for Introduction to Educational Management

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Abstract. The rapid development of science and technology requires teachers to develop their competencies continuously. Innovation is the ultimate key in industry 4.0 that requires teachers to form learners to have the twenty-first century skills and competencies, who are able to think critically, creatively, collaboratively, and communicatively. To teach Introduction to Educational Management course in one learning process needs one digital literacy-based teaching model that is taught synergistically and systematically. The main purpose of digital literacy use in teaching and learning is to construct comprehension, writing skills, and communication skills holistically. These three things will result in character and higher order thinking skills developments. The learning content is what is being taught, as for digital literacy, it is how to teach the content itself. This study aimed at developing a teaching model for Introduction to Educational Management that based on digital literacy. This study generated a digital literacy-based teaching model for Introduction to Educational Management course that has good quality by referring to Plomp’s concept of development, which consists of phases such as investigation, design, realization/construction, test and evaluation, and implementation. The result of the study showed that the digital literacy-based teaching model for Introduction to Educational Management had fulfilled the elements of validity, practicality, and effectiveness. The validity score according to three experts was 3.4, which is categorized as valid. The average score of practicality based on students’ and lecturers’ responses was 86, which is categorized as very practical. Meanwhile, the score of effectiveness of the teaching model based on the analysis of pretest and posttest results was 84.5, which is categorized as very effective.

Keywords: Teaching Model, Educational Management, Digital Literacy

1 Introduction

The rapid development of science and technology requires teachers to develop their competence continuously. Innovation is the primary key in the industry 4.0 that demands teachers to form the learners who possess the twenty-first century skills that are able to think critically, creatively, collaboratively, and communicatively. Minister of Education and Culture [1] states that an advanced nation is not only built relying on abundant natural resources and large population. A big nation is characterized with literate society, which has advanced civilization, and actively
Literacy in this context is not only a matter of how a nation is free from illiteracy, but also most importantly of how the citizens possess the life skills in order to compete and be side by side with other nations in creating the world welfare. In other words, a nation with advanced literacy culture shows the ability of that nation in collaborating, thinking critically, creatively, and communicatively in order to prevail the global competition.

In response of the launching of national literacy movement, the State University of Medan (Unimed) as one of the best universities in North Sumatra welcomes the national literacy movement by incorporating its learning process to utilize one of available literacies that is digital literacy. Unimed leaders in various opportunities keep on socializing to the lecturers in all study programs to take advantage of digital literacy in their teaching and learning process.

Introduction to Educational Management course in French Language Study Program is a new course, because this course was firstly given on the fifth semester for students of class of 2016. This course is considered important to be delivered in French Language Study Program due to the problem in education is not only a matter of mastering the French language skills for the students but also a matter of how to manage the educational process, whether in the process of education itself as well as after they become educators later in their lives.

Based on the data in the French Language Study Program, the competence of the students is still not very good. It can be discovered from the number graduates who obtain the certificate of international DELF B2 is only around 10%. This condition should become a serious matter that must be resolved immediately. So does the Introduction to Educational Management course, its result is still not optimal.

To date, the teaching and learning process in French Language Study Program especially for Introduction to Educational Management course has not utilized the advancement of technology and information that is on a rapid rate. By the rapid advancement of science and technology requires lecturers to improve their competences continuously, especially in the teaching and learning process by utilizing digital literacy.

Innovation becomes the primary key in the era of Industry 4.0, demanding lecturers to shape the students to own the twenty-first century skills who are able to think critically, creatively, collaboratively, and communicatively. The competent students are the output of good higher education management system. Lecturers are the main actors who manage the teaching and learning process inside or outside the classroom. Lecturers’ role in enhancing the quality of their students is really significant. In this case, lecturers are required to keep on increasing their self-quality including the management of teaching and learning process through digital literacy. By the increase of digital literacy competence, it is expected that lecturers will be more easily to complete their tasks and conduct the teaching and learning process in the campus by utilizing information and communication technology.

Thus, it is clear that digital literacy as the trigger for lecturers to make changes in the campus, in the forms of the development of teaching and learning process and the increase of education quality standards achievement which based on information and communication technology. Therefore, it is necessary to develop a teaching model that can accommodate and balance the activities on various aspects of teaching and learning. On the other hand, the demands on the mastery of information and communication technology in the era of millennial have to be responded as a part of the teaching and learning itself. In relation to that matter, the development
of digital literacy-based teaching model for Introduction of Educational Management course becomes really prominent to be conducted.

Learning Introduction to Educational Management

The demands of the times and educational challenges nowadays are very complex. Consequently, a breakthrough is needed to fulfill those demands and challenges. One of the ways is by applying digital literacy-based teaching and learning. Digital literacy-based teaching and learning is a teaching and learning that focus on the optimization of all aspects of learning. In digital literacy-based teaching and learning, we focus on the development of the students’ competence, not on the achievement of the competence. So that the educators are more appreciative on the differences of each individual and believe that every individual is born unique, that has lacks and excesses on his or her own. These differences for examples are learning styles, talents, and interests. The appreciation from educators can be in the form of the application of model or media that can support the differences of each student as a whole, not only based on models, techniques, methods or media which are monotonous or unvaried. This monotony can cause some of the learners become unable to develop their potentials. In fact, with the existence of digital literacy-based teaching and learning, it is believed that it can fulfill the educational challenges and demands of the times.

Introduction to Educational Management course is one of subject area courses (MKBS PRC 47028) of the study program that is mandatory to take for all of the students of French Language Study Program. In KKNI curriculum of French Language, the Introduction to Educational Management course is taught in one semester, which is on the fifth semester with the weight of 2 credit hours. This course discusses the definitions, functions and roles of educational management, continued with in-depth study on the management of field of study of educational management, which encompasses learners, educators, curriculum, educational staff, education infrastructure, education funding, education institution management and relationship between education institution and society, as well as educational leadership, education supervision, and entrepreneurship development.

Digital Literacy Learning

The term literacy itself actually often undergoes development and changes from time to time. According to Freire [2], literacy is defined as a social construction and is never neutral. Then literacy is also said as a complex process that involves the construction of prior knowledge, culture, and experience to develop new knowledge and more in-depth understanding. Literacy at the beginning was defined as the ability to literate and further defined as literate or understanding. In the first step, the ability to read and write was emphasized because both of those language abilities are the basis of literacy development on other things. According to Gilster [3], digital literacy is defined as the ability to understand and to use information in any form from any extensive source that can be accessed via computer device. Bawden [4] offers new perspective about digital literacy that is rooted in computer literacy and information literacy. Thus, referring to Bawden’s notion, digital literacy is mostly related to technical skills in accessing, stringing up, understanding and propagating information. Meanwhile, Belshaw [5] in his thesis “What is ‘Digital Literacy’?” says that there are eight essential elements to develop digital literacy, which are: (1) Cultural, the understanding of variety of contexts of digital users, (2) Cognitive, the power
of thought in judging contents, (3) Constructive, the copyrighting of something special and actual, (4) Communicative, the understanding of network performance and communication in digital world, (5) Responsible confidence, (6) Creative, doing new things with new ways, (7) Critical in responding to contents, and (8) socially responsible. The cultural aspect, according to Belshaw, becomes the most important element because understanding the user context will assist the cognitive aspect in judging the contents. From those above opinions, it can be concluded that digital literacy is the knowledge and skill to use digital media, communication devices or networks in finding, evaluating, using, creating information and utilizing it healthily, wisely, intelligently, carefully, correctly and law obediently in order to foster communication and interaction in everyday life.

**Developmental Model of Plomp**

According to Plomp [6], there are five phases in instructional development, which are (1) investigation, (2) design, (3) realization/construction, (4) test, evaluation, and revision, and (5) implementation. In the investigation phase, the activities done are identifying information, analyzing information, making definition on identified information and scope of the problem, and further planning. In the design phase, the design document making is done based on the result of investigation. In the realization/construction phase, the developmental product is produced based on the designated design. In the test, evaluation and revision phase, the quality of developed solution is measured and considered, and continuous decisions are made based on the considerations. It can be said that evaluation phase determine whether the design specification has been fulfilled or not, further it is revised then back to designing activity and so on and so forth. This cycle is the feedback cycle and will stop after the desired solution is obtained. In the implementation phase, the design solution is implemented in possible situations in which the problems could actually happen.

**3 Research Method**

The study was conducted in French Language Study Program of Languages and Arts Faculty of the State University of Medan to fifth semester students on 2019/2020th academic year. The object of the study was the development of digital literacy-based teaching model of Introduction to Educational Management. This study applied the development research approach, based on the developmental model of Plomp, which includes phases of: (1) investigation, (2) design, (3) realization/construction, (4) test, evaluation, and revision, and (5) implementation. The primary data sought in this study was the data of developmental process of digital literacy-based teaching model for Introduction to Educational Management, and the quality of the teaching model was detailed in three sub data, which are validity, practicality, and effectiveness of the teaching model.
3 Results and Conclusion

The result of the study showed that the developmental process of the teaching model was conducted using the procedure of developmental model of Plomp, that were (1) investigation, (2) design, (3) realization/construction, (4) test, evaluation, and revision, and (5) implementation.

The digital literacy-based teaching model has complied the elements of validity, practicality, and effectiveness. The validity score of this teaching model according to 3 (three) experts was 3.4, which categorized as valid. The average practicality score of this model based on students’ and lecturers’ responses was 86, which categorized as very practical. As for the effectiveness score of the teaching model based on the analysis of pretest and posttest results, it was 84.5, which categorized as very effective.

4 References

The Development Of E-Learning Instruments-Based For Bahasa Indonesia’s Subject In Elementary School Education Undergraduate Program Of Universitas Negeri Medan

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Abstract: This research is a research development that aims to produce products, in the form of: the development of E-Learning based learning design in Indonesian language skills courses in the Elementary School Teacher Education Study Program, Universitas Negeri Medan. This development is based on the 4D model (Define, Design, Development, and Disseminate) which emphasizes the needs of users according to the context (lecturers and students). Through theoretical studies and field studies, in the first phase produced a draft of an E-Learning based learning design on Indonesian language skills courses in the Elementary School Teacher Education Study Program covering syllabus, teaching materials, and authentic assessment. In the second stage, the development of products that have been produced is carried out through tests of validity, practicality, and effectiveness. At this stage the developed learning design is reflected and revised according to user needs based on the trials conducted. The results showed that the developed learning design was declared valid, practical, and effective in the use of learning Indonesian language skills in the Elementary School Teacher Education Study Program, Medan State University.

Keywords: e-learning, learning design, Indonesian language skills

1 Introduction

Today's digital age, humans can learn anytime and anywhere. In this case, learning is authentic and based on an individual. Nevertheless, learning strategies that are often used today are traditional learning, namely class-based learning (classical) using the lecture method [1]. In classical learning, student learning processes are bound by the dimensions of space and time, meaning that students must be in the same space and time as their classmates and lecturers to conduct learning activities. Therefore, it is necessary to find alternatives for classical learning that can overcome these problems without eliminating the feeling of social ties between students and classmates as well as between students and lecturers. If the lecture is the only learning method, students' critical thinking skills become less honed because students are not accustomed to thinking outside the context delivered by the lecturer and become passive in choosing additional learning resources outside the learning resources provided by the lecturer. Though lecturers should not be the only source of learning, especially in today's
digital era, where learning resources can be obtained relatively easily through the help of information technology [2,3].

It is undeniable that the digital era has a positive impact on the world of education, for example is the emergence of alternative sources of learning and learning media. Learning that used to only be done in the classroom, has now begun to be replaced by online means. Online Learning is the implementation of teaching and learning which is fully carried out with the help of internet technology and does not require any face to face activities. In this learning, students can learn from anywhere and can be done synchronously (directly) or asynchronously (indirectly) [4,5,6].

Responding to the explanation above, Medan State University has made a policy on strengthening the implementation of the KKNI-based curriculum by using a blended learning model in every learning. This policy requires that learning not only be carried out through face-to-face processes, but can also be done online / online with a minimum of 4 meetings out of 16 planned meetings. In this way it is hoped that students and lecturers will not be separated between space and time so that the learning process can be carried out at any time without having to face-to-face in classical meetings.

In an effort to support the above policy, Medan State University provides direction so that each course in each Study Program develops a learning design that leads to gradual and continuous blended learning. The intended learning design is in the form of Learning Plans, teaching materials, and authentic assessment. Thus, each course provides space for students to study independently without having to face-to-face with the lecturer supporting the course.

However, at present the design of learning especially Indonesian language skills courses in Primary Schools in the Primary School Teacher Education study program has not been designed in the form of blended learning. Learning tools still use the Competency Based Curriculum and are still designed in the form of face-to-face learning. Thus, when referring to the prerequisites of blended learning at Medan State University, Indonesian language skills courses in Elementary Schools still need further development especially in developing learning designs in accordance with the demands of the blended learning model at Medan State University.

Efforts to overcome the above problems can be done by developing an E-Learning based learning design as an effort to strengthen the implementation of the KKNI curriculum oriented towards blended learning at Medan State University. In this way, the learning design developed in the form of syllabus and Learning Plans, teaching materials, and authentic assessment can be accessed independently by students without being limited by time and space.

2 Research Method

This research is a research and development. Development research is research that is designed in a structured and systematic way to develop a product through certain stages and evaluations to test the level of validity and effectiveness in using it. The product produced in development research is different from the development intended simply. Simple development is simply designed without any revision as input from various experts. This has an impact on the level of validity and effectiveness of the resulting product less felt in its use.

Seels and Richey [7] explain that, “Developmental research, as opposed to simple instructional development, has been defined as the systematic study of designing, developing,
and evaluating instructional programs, processes and products that must meet the criteria of internal consistency and effectiveness.” That is, development research as distinguished from simple learning development, is defined as a systematic study to design, develop, and evaluate programs, processes, and learning outcomes that must meet internal consistency and effectiveness criteria. Thus, the development is done by using a development model.

The development model used in this study is a 4-D (four D models) development model. The stages of the 4-D model include: defining, designing, developing, and disseminating [8].

The development procedures carried out in this study can be seen in Figure 1 below.

![Fig 1. Procedures for Developing E-Learning Based Learning Designs](image)

The stages of developing an E-Learning based learning design in Indonesian language skills courses based on Figure 2.1 that have been displayed can be detailed as follows:

1. The definition phase aims to establish and define learning design requirements that are consistent with the research objectives, namely the development of E-Learning-based learning designs in Indonesian language skills courses in Elementary School Teacher Education, Medan State University.

2. The design phase is designing an e-learning based learning design in accordance with the determination and definition in stage 1.
3. The development stage includes testing the validity, practicality, and effectiveness of the E-Learning based learning design that was developed.

4. The deployment phase is the final stage of the 4-D step offered. After being validated and tested for practicality and effectiveness in a particular class, a broader scale of distribution is carried out.

The data analysis technique used to process research data is quantitative and qualitative descriptive data analysis. Expert test and small group test data from the questionnaire were analyzed in percentages and explained qualitatively. Field test/user test data in the form of learning processes in the development environment were analyzed by analyzing qualitative data flow models by applying the principle of multipurpose. In this case what matters is how an analysis technique can be used to support problem solving [9].

Analysis activities, including: data reduction, data presentation, and drawing conclusions or verification. Data reduction activities include classification and coding according to the type of data. Presentation of data in the form of description descriptions, tables, diagrams, pictures or other visual forms. The data that has been presented is verified, interpreted, and concluded. Targets for data analysis include levels of observation, description, and explanation. At the level of observation the data are selected, categorized, and coded. At the level of description the data is presented in units of patterns, units of events, units of inclination, or units of meaning. At the explanatory level the analysis is directed at the effectiveness of the trials.

3 Result and Discussion

a. Results

Validity of Learning Plans and Assessment Guidelines

Data on the results of the validation of the Learning Plan and guidelines for assessment from expert validators are presented in Table 1 below.

<table>
<thead>
<tr>
<th>No</th>
<th>Rated Aspect</th>
<th>Validation Value</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Identity</td>
<td>4.00</td>
<td>Very Valid</td>
</tr>
<tr>
<td>2.</td>
<td>Formulation of Learning Objectives</td>
<td>3.78</td>
<td>Very Valid</td>
</tr>
<tr>
<td>3.</td>
<td>Selection of Learning Materials</td>
<td>3.67</td>
<td>Very Valid</td>
</tr>
<tr>
<td>4.</td>
<td>Methods and Details of Learning Steps</td>
<td>3.47</td>
<td>Valid</td>
</tr>
<tr>
<td>5.</td>
<td>Selection of Learning Resources</td>
<td>3.59</td>
<td>Very Valid</td>
</tr>
<tr>
<td>6.</td>
<td>Assessment</td>
<td>3.59</td>
<td>Very Valid</td>
</tr>
</tbody>
</table>

Average 3.63 Very Valid

The results of the validation of the Learning Plan assessed by experts such as in Table 3.1 described can be seen that the average validation results are 3.63 in the very valid category. Based on the aspects assessed obtained that the inclusion of identity is 4.00, the formulation of learning objectives 3.78, the selection of learning materials 3.67, the methods and details of the learning steps 3.47, the choice of learning resources 3.59, and the assessment of 3.59.

Looking at the assessment above, it was found that the Learning Plan and assessment guidelines were well used as a guide to the implementation of the learning process of
Indonesian language courses in Elementary Schools. The steps compiled can guide the lecturer to facilitate students in conducting various learning activities in accordance with the learning stages of each meeting.

Validity of Teaching Materials
Data on the validation of teaching materials from expert validators is presented in Table 2 below.

<table>
<thead>
<tr>
<th>No</th>
<th>Rated Aspect</th>
<th>Validation Value</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Content Feasibility</td>
<td>3.67</td>
<td>Very Valid</td>
</tr>
<tr>
<td>2.</td>
<td>Linguistic</td>
<td>3.59</td>
<td>Very Valid</td>
</tr>
<tr>
<td>3.</td>
<td>Presentation</td>
<td>3.67</td>
<td>Very Valid</td>
</tr>
<tr>
<td>4.</td>
<td>Grafting</td>
<td>3.42</td>
<td>Valid</td>
</tr>
<tr>
<td></td>
<td><strong>Average</strong></td>
<td><strong>3.60</strong></td>
<td><strong>Very Valid</strong></td>
</tr>
</tbody>
</table>

The results of the validation of teaching materials were assessed by experts in Table 2 above, it was found that the average validation results were 3.60 in the very valid category. Based on the aspects assessed are obtained the following description: the feasibility of the contents of 3.67, the language of 3.59, the presentation of 3.67, and the graphic presentation of 3.42.

Based on the previous assessment, it shows that the developed teaching material is valid. This means that the developed teaching material is good and can be used as a learning resource for students in Indonesian language skills courses in elementary schools. Teaching materials compiled help students understand the concepts and application of Indonesian language skills in elementary schools.

WEB Validity
WEB validation data results from expert validators are presented in Table 3 below.

<table>
<thead>
<tr>
<th>No</th>
<th>Rated Aspect</th>
<th>Validation Value</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>WEB Content Eligibility</td>
<td>3.78</td>
<td>Very Valid</td>
</tr>
<tr>
<td>2.</td>
<td>Linguistic</td>
<td>3.67</td>
<td>Very Valid</td>
</tr>
<tr>
<td>3.</td>
<td>Presentation</td>
<td>3.80</td>
<td>Very Valid</td>
</tr>
<tr>
<td>4.</td>
<td>WEB Display</td>
<td>3.59</td>
<td>Very Valid</td>
</tr>
<tr>
<td></td>
<td><strong>Average</strong></td>
<td><strong>3.72</strong></td>
<td><strong>Very Valid</strong></td>
</tr>
</tbody>
</table>

Based on the data in Table 3 above, a general description of the validator is obtained, namely 3.72 with a very valid category. From every aspect observed, it was found that the feasibility of web content was 3.78, linguistic 3.67, presentation 3.80, and web display 3.59. Based on these data, it can be concluded that the developed WEB was declared valid for use in Indonesian language skills courses in Elementary Schools.

Practicality of Learning Plans and Assessment Guidelines
Test the implementation of the Learning Plan and assessment guidelines known through observation. Observations were made using instruments for observing the implementation of the Learning Plan and Assessment Guidelines.
Based on observations of the implementation of the Learning Plan and Assessment Guidelines, the average scores in the very practical category are obtained. For more details, see Table 4 below.

<table>
<thead>
<tr>
<th>No</th>
<th>Rated Aspect</th>
<th>Observer Judgment</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td>Preliminary</td>
<td>3.42</td>
<td>Practical</td>
</tr>
<tr>
<td>B.</td>
<td>Core Activities</td>
<td>3.50</td>
<td>Very Practical</td>
</tr>
<tr>
<td>C.</td>
<td>Closing</td>
<td>3.60</td>
<td>Very Practical</td>
</tr>
<tr>
<td></td>
<td>Average</td>
<td>3.50</td>
<td>Very Practical</td>
</tr>
</tbody>
</table>

Table 3.4 shows the average ability of lecturers in implementing the Learning Plan and the assessment guidelines used are categorized as very practical as indicated by the evaluation of the implementation of the Learning Plan and the assessment guidelines by two observers as observers.

**Practicality of Teaching Materials**

The result of observation of the intended use of the material is the level of ease of students using the developed teaching material. There are several aspects observed when students use teaching materials, including: (a) students easily understand the various concepts of teaching materials, (b) students easily understand the steps of activities that exist in teaching materials, (c) students are interested and motivated to learn from the design of the teaching material displayed, and (d) active and enthusiastic students working on the assignments that are in the teaching material. For more details, it can be described as follows.

The results of observations on the ease of students understanding various concepts that exist in teaching materials are seen when students observe and read teaching materials. Students do not get significant obstacles in understanding various concepts. The aspect of the ease of students understanding the steps of activities contained in teaching materials is also the same as the ease in understanding the concepts contained in teaching materials. Aspects of student interest and enthusiasm for teaching materials can be observed from the interest of students reading the teaching materials provided. Students look happy to participate in various activities contained in teaching materials. Furthermore, students also look active and enthusiastic about participating in various activities and assignments in the teaching materials provided.

Based on the explanation above, it can be concluded that students find it easy to understand concepts and do various tasks in teaching materials. Thus, students do not have significant obstacles using teaching materials provided in Indonesian language skills courses in Elementary Schools.

**Practicality of WEB**

The practicality of using WEB can be obtained from the results of interviews with lecturers who tested the device that was developed. The implementation of using WEB was carried out with unstructured interviews. This means that the question develops according to the answer of the respondent (lecturer) after being given a question. The results of interviews with students and lecturers show that the WEB used is easy to use in the learning process.

**Attitude Assessment**

Attitude assessment (character) is an assessment of student behavior when the lecture process takes place. Through the lecture process, it is expected that students will be able to
show attitudes that will be assessed, including: ethics of communication, responsibility, and cooperation. Thus, the assessment of the effectiveness of the learning process is not only on aspects of activities and outcomes, but can show a better attitude.

The determination of the completeness of the attitude contained in this study was adopted from the KKN I attitude assessment by Medan State University with a range of grades 1-4. The results of attitude assessment can be seen in the following Table 5.

<table>
<thead>
<tr>
<th>No</th>
<th>Rated Aspect</th>
<th>Value</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Communication Ethics</td>
<td>3.25</td>
<td>Good</td>
</tr>
<tr>
<td>2</td>
<td>Responsible</td>
<td>3.21</td>
<td>Good</td>
</tr>
<tr>
<td>3</td>
<td>Cooperation</td>
<td>3.25</td>
<td>Good</td>
</tr>
<tr>
<td></td>
<td><strong>Average</strong></td>
<td><strong>3.24</strong></td>
<td><strong>Good</strong></td>
</tr>
</tbody>
</table>

Based on Table 5 above, it can be concluded that students are accustomed to showing good attitudes in terms of communication ethics, responsibilities, and cooperation.

**Knowledge Assessment**

Knowledge assessment is an assessment of understanding of lecture material. This assessment can be measured through evaluation questions provided related to the content of lecture material. The evaluation questions provided are an evaluation component of the Learning Plan and developed teaching materials. The questions given were 10 items in the form of multiple choice, 5 items in the form of contents, and 5 questions in the form of essays.

Determination of mastery learning outcomes using learning completeness criteria. The completeness of student learning outcomes individually seen from the formative test results provided and compared with the completeness criteria in each class tested. Detailed learning outcomes can be in Table 6 below.

<table>
<thead>
<tr>
<th>No</th>
<th>Number of Test Participants</th>
<th>Amount of Values</th>
<th>Average</th>
<th>Completeness (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>24</td>
<td>1906.4</td>
<td>79.43</td>
<td>87.5%</td>
</tr>
</tbody>
</table>

Based on Table 3.6, it is obtained that the design of learning can help students understand the lecture material in its entirety. This can be obtained from the acquisition of learning outcomes obtained by an average of 79.43. Meanwhile, completeness is classically obtained 87.5%, meaning that out of 24 students there are 21 people who have completed and 3 people who have not yet completed.

**Skills Assessment**

Skills assessment is an assessment that is observed to see student skills when the learning process of reading is carried out. Students fill out the activity sheets that have been provided. The results of the completed worksheets will be assessed using the reading skills assessment rubric. Then, the results assessment is an assessment of students’ understanding of the reading material provided. Students are given evaluation questions related to reading material then the results are processed using scoring guidelines. Detailed observational data can be seen in Table 7 below.
Table 7 Results of Reading Skills Assessment Process

<table>
<thead>
<tr>
<th>No</th>
<th>Rated Aspect</th>
<th>Value (%)</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Pre Reading</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Predict the content of the reading</td>
<td>95.8</td>
<td>Very High</td>
</tr>
<tr>
<td>2</td>
<td>Fill in the meaning of words that are not yet understanding</td>
<td>86.1</td>
<td>Very High</td>
</tr>
<tr>
<td>3</td>
<td>Test predictions</td>
<td>100</td>
<td>Very High</td>
</tr>
<tr>
<td>4</td>
<td>Respond to information from read text</td>
<td>73.6</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td><strong>Reading</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Summarize the contents of the reading</td>
<td>79.2</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td><strong>Post Reading</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Average</td>
<td>86.93</td>
<td>Very High</td>
</tr>
</tbody>
</table>

Based on Table 3.7 described, it was found that the average value of the process assessment results was 86.93% with a very high category. That is, when the learning process takes place, student activities are very good at understanding and using teaching materials that are developed. There are three main stages that can be observed based on the table above, namely the pre-reading, when reading, and post-reading stages. For more details, it can be described as follows.

At the pre-reading stage, the assessed aspect is the activity of predicting the content of the reading before reading. In the activity of predicting the content of the reading obtained an average value of 95.8% with a very high category. This gives an illustration that most students fill in the prediction sheet for the overall contents of the text. They predict reading through supporting titles and images related to the reading text to be read on teaching material.

At the reading stage, three main aspects are assessed, namely filling in the meaning of words that are not yet understood, testing predictions, and responding to information from the text being read. In the activities of filling in the meaning of words that are not yet understood, an average value of 86.1% is obtained with a very high category. Furthermore, the prediction testing activities obtained an average value of 100% with a very high category, and responding to information based on the text read obtained an average value of 73.6% with a high category. Based on the explanation, it can be concluded that students can follow the reading process activities well in understanding the contents of the reading.

In the post-reading stage, the aspect assessed is the activity of summarizing the contents of the reading. In this activity an average value of 79.2% was obtained with a high category. Students have been able to summarize the contents of the text as a whole nicely coherently. The contents of the summary that has been made can also describe the overall contents of the text. Thus, at the post reading stage, it can follow the activities well.

b. Discussion

Validity of Learning Design

Learning designs that have been developed are said to be valid if they meet certain criteria. The characteristics of the product are said to be valid if they reflect the state of the art of knowledge. This is what is said with content validation. Furthermore, the components of these products must be consistent with each other (construct validity). Therefore, the validation of the learning design in this study emphasizes content validity and construct validity [9].
The validity of the content has been declared valid by the validator because the learning design of the Learning Plan and the assessment guidelines, teaching materials, and WEB developed are in accordance with the actual material and conditions in Indonesian language skills courses in Elementary Schools. The construct validity has also been declared valid by the validator. This is because the learning design construct developed has met the terms and conditions of the preparation of the learning design. Based on the validation assessment data analysis by the validator, the learning design developed is classified as very valid. The following will be explained clearly the description of each learning design that has been developed.

**Learning Plans and Assessment Guidelines**

The results of the analysis of the validation data for the Learning Plan and the assessment guidelines show an average value of 3.63 by the expert validator. Based on the predetermined categories, the Learning Plan and assessment guidelines that have been developed fall into the very valid category. The Learning Plan and assessment guidelines that have been developed illustrate the suitability of all components and activities and the concepts contained therein. This conformity can be seen from the indicators and learning objectives formulated, the material chosen, the description of the strategies used, the steps of learning, the media and learning resources, as well as the assessment conducted. That is, as a whole has been able to describe the components of the Learning Plan in accordance with the development of the KKNI Medan State University.

**Teaching Materials**

Based on the results of the analysis of the validation of teaching materials obtained an average value of 3.60. If seen from the predetermined categories, the teaching materials that have been developed belong to the very valid category. Therefore, it can be concluded that the developed teaching materials are in accordance with the demands of the curriculum. Presentation of material is in accordance with the indicators that are formulated and in accordance with student development.

The contents of teaching materials are also in accordance with Indonesian language lecture materials in Elementary Schools. Various concepts and elaboration of the tasks contained in teaching materials make it easy for students to understand the contents of the reading appropriately. The contents of teaching materials have been able to achieve the selected competencies. In addition, the use of language in teaching materials uses simple and clear sentences so that it is easily understood by every student. Sentence by sentence using the correct spelling. Then, the teaching material developed is designed with attractive colors so that it can motivate students to follow the learning process well. Thus, it can be concluded that the developed teaching material has been declared valid and can be used in the process of lecturing Indonesian language skills in Elementary Schools.

**WEB**

In general, the level of validity of the WEB is based on the evaluation of the validator, which is 3.72 with a very valid category. From every aspect observed, it was found that the feasibility of the WB content was 3.78, the language was 3.67, the presentation was 3.80, and the WEB display was 3.59. Based on these data, it can be concluded that the developed WEB was declared valid for use in Indonesian language skills courses in Elementary Schools.
Practicality of Learning Design
The level of practicality to see the extent to which lecturers and students can use the learning design properly. A learning design is said to be practical if the learning design can be used easily by educators and students in learning [9]. To see whether the learning design that has been developed is practical or not, a trial is conducted on Grade A students in the Elementary School Teacher Education Study Program, Medan State University.

Implementation of Learning Plans and Assessment Guidelines
The results of observations of the implementation of the Learning Plan and assessment guidelines show that learning is carried out in accordance with the plans that have been made. This can be seen from the results of observations of the implementation of the Learning Plan and assessment guidelines which are very good. This data shows that the Learning Plan and assessment guidelines developed are very practical to be used in lectures. During the trial, there were no significant obstacles found by the lecturer in carrying out the learning process although a little lack of time, but can be overcome by more optimal classroom conditioning.

Use of Teaching Materials
The result of observation referred to is the level of ease of students in using teaching material that was developed. Based on observations generally obtained a description of the activities that students find it easy to use teaching materials developed. Students find it easy to understand the various concepts and steps of activities that exist in teaching materials. Then, students seemed to feel interested and enthusiastic and were actively involved in doing various tasks in the teaching material.

Use of WEB
The results of the analysis are based on the results of interviews with lecturers after using WEB in learning to get responses and positive responses. Researchers conduct unstructured interviews meaning questions develop according to the teacher's previous answers. Based on the distribution of lecturer answers from the interview results, it is explained that the WEB developed is easy to use in the learning process. The teacher feels it is easy to give material to students because it provides more detailed and clear stages in helping students understand the contents of WEB-based e-lecture material. Thus, it can be concluded that the WEB that has been developed is practically used in lectures.

Effectiveness of Learning Designs
Product quality or development results can be determined based on the validity, practicality, and effectiveness of the developed learning design. The effectiveness aspect can be done if the product is valid and practical. The effectiveness of the learning program is characterized by the following characteristics: (a) successfully leads students to achieve instructional goals that have been set, (b) provides an attractive learning experience, actively involves students so as to support the achievement of instructional goals, (c) has the means means that support the learning process [10].

The effectiveness of learning design can be seen through the assessment of student activities, attitudes, knowledge, and skills. Learning design is said to be effective if the results obtained by students are as expected. When viewed from the aspect of activities, learning design is said to be effective if it gets a good category. Whereas if seen from the aspect of assessment of students' knowledge and skills it is said to be effective if the mastery of student
learning outcomes obtains classical completeness ≥75%. For more details can be seen in the following explanation.

**Attitude Assessment**

Attitude assessment is an assessment of student behavior when the learning process is carried out. There are three aspects of attitude that are assessed, among others: communication ethics, responsibility, and cooperation. The assessment guidelines adopted were from the KKNI attitude assessment guidelines by Medan State University.

Based on the recapitulation of attitudes, the average value obtained is 3.24 with a good category. That is, if guided by the character education assessment guide, students are accustomed to having a good attitude in the ethics of communication, responsibility, and cooperation.

**Knowledge Assessment**

Knowledge assessment is to see how far students can understand the lecture material in full. Students are directed to answer evaluation questions related to reading texts. From the description of the results obtained, individual and classical completeness is seen. Individual completeness sees the limits of the minimum Minimum Mastery Criteria that are set that is minimal B. While classical completeness, a learning process is said to be effective if it reaches ≥75%.

Based on the acquisition of learning outcomes obtained an average value of 79.43 with the Good category. Then, the complete students are 21 people or if they are presented at 87.5%. While there are not yet completed 3 people or if present is 12.5%. By paying attention to the acquisition of results and the achievement of completeness, the learning process using the developed learning design has been effectively used.

**Skills Assessment**

Skills assessment is done by looking at the overall reading stages, namely the pre-reading, when reading, and post-reading stages. In the pre-reading stage, students are directed to predict the reading content. At the time of reading, there are three aspects to be assessed, namely filling in the meaning of words that are not yet understood, testing predictions, and responding to information from the text being read. Then, in the post reading stage, students are directed to summarize the contents of the reading in a coherent and intact way.

In the pre-reading stage, students can predict the contents of the text in very good categories. That is, students do not have significant obstacles when directed to predict the contents of reading texts. They are able to fill in and answer every question contained in the activity sheet provided, although there are some incorrect answers. However, in general at the pre-reading stage, especially in the activity of predicting the reading content can be done with the maximum and in accordance with the expected results.

At the reading stage, students can fill in the meaning of words that are not well understood, although there are some students who have not been able to fill in completely. To overcome this, students are given the freedom to ask questions related to the meaning of words that are not yet understood. Prediction testing can also work well. Students can prove the prediction that they have done before so they get a true picture of the contents of the text. Furthermore, there was a slight decrease in the activity of responding to information from the text that was read. Students give unclear responses so that the meaning of the responses given is not well understood. Students raise a lot of problems, but they are less able to respond according to the problems raised. However, this aspect can be said to be going well. This is
stated by looking at the results of the observation sheet that activities respond to information from the text that is read into the high category.

In the post-reading stage, students can summarize well. The contents of the summary can be arranged coherently and its contents can provide a complete description of the contents of the text. Nevertheless, there are main things that need to be considered in this activity, namely the use of spelling summaries that have been written still need further guidance. Thus, it is not only the content and the content that is considered, but the spelling accuracy that can support the effectiveness of the summary provided.

Seeing the explanation of the three stages above, it can be concluded that the use of the developed learning design can support maximum learning activities. That is, students can go through stages or process activities in each step well. Thus, in general the process of activities that students go through scores with a very high average.

4 Conclusion

Based on the development and testing of learning designs that have been developed, the following conclusions are obtained.

a. Learning designs have been produced in the form of Learning Plans and assessment guidelines, teaching materials, and WEB with average categories that are very valid. This can be seen based on the results of the learning design validation by expert validators that have been implemented. These results illustrate that the learning design developed is valid and can be used in the lecture process.

b. Practicality of overall learning design in the very practical category. This can be seen from the results of observing the implementation of the Plan and guidelines for evaluating lecturers who teach, lecturer and student responses, observations, and interviews that have been conducted. These results illustrate that the use of instructional design by lecturers is very practical and can help in carrying out the lecture process in Indonesian language skills courses in Elementary Schools.

c. The effectiveness of the use of learning designs can be known through observing student activities, attitude assessment, knowledge assessment, and assessment of student skills. The results of observing activities, evaluating attitudes, evaluating knowledge, and evaluating student skills provide a very good picture of the results, meaning that the use of design in learning has been effectively implemented.

References


The Development of Mathematics Teaching Media
‘Opung Hans’ Based On IAI

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Abstract. The aim of this research is to develop a media for learning mathematics in
"Opung HAN" elementary school based on Interactive Audio Instruction (IAI) for
students majoring in UNIMED elementary school teacher education. The IAI-based
"Opung HAN" fraction media was compiled based on observations during the learning
and analysis conducted on the dictates of high-class mathematics education courses and
interviews conducted with elementary school teacher education students, where teachers
were very difficult to convey material related to fractions. The teacher does not know
what media to use in teaching broken material. On the other hand, in the high school
mathematics education textbook, there is also no media / teaching aids that can be used to
teach fractional material. The specific purpose of this research is: developing IAI-based
"Opung HAN" fraction media which will later be used by students majoring in primary
school teacher education in teaching fraction material when they later become a teacher.
This research uses development research (Developmental Research). The subjects of this
study were students majoring in primary school teacher education at the State University
of Medan. In the initial stage, observations were made during the learning process,
analysis of the dictates of high-level mathematics education courses and continued with
interviews with students. From the results of these observations and interviews, an initial
draft of the IAI-based "Opung HAN" fraction was compiled. Furthermore, the initial
design of the IAI-based "Opung HAN" fraction media was validated by a team that aimed
to assess the quality of these elementary mathematics learning media fractions so that the
fractional media became effective learning media which would later be used by lecturers
and students in the lecture process.

Keywords: IAI, Fraction media, math learning

1 Introduction

UNIMED elementary school teacher education (PGSD) is an institution that aims to
produce teachers at the elementary school level who have good educational qualifications and
insights. Graduates of this elementary school teacher education are expected to become
teachers who have broad insights into education, as well as having various skills in carrying
out the learning process in the classroom. A variety of skills are expected including: skills in
designing learning, implementing learning processes using various approaches and learning
models, skills in designing instructional media and skills in carrying out evaluation of
learning.

"2013 Thematic Learning Curriculum called integrative thematic learning has a
different approach to thematic learning in the previous curriculum. The approach used to
integrate the basic competencies of various subjects is intradisciplinary, interdisciplinary,
multidisciplinary, and transdisciplinary” [1]. According to Sri Muryaningsih [2] that "thematic learning is learning that utilizes themes in the delivery of material. The theme acts as a unifying learning activity that integrates several subjects at the same time by choosing a theme that can unite indicators of several elementary subjects. Elementary school subjects that can be taught using thematic learning are: Religious Education, Civic Education (PKn), Indonesian Language Education (BI), Mathematics, Natural Sciences (IPA), Social Sciences (IPS), Cultural Arts and Crafts (SBDP), and Physical Education Sport and Health (PJOK)”. However, for Mathematics and Physical Education Sports and Health (PJOK) subjects as stand-alone subjects for classes IV, V, and VI.

To realize this expectation, in the lecture process that was carried out at PGSD UNIMED, various activities were designed to improve the competence and skills of PGSD UNIMED students. In addition, the courses given in lectures are courses that are really needed for students if they later become teachers after completing their education in the education department of elementary school teachers. One of the courses given to UNIMED PGSD students is a high-class mathematics education course. In this high-class mathematics course, students are equipped with a variety of material and mathematical concepts related to the material: (a) arithmetic operations and counts, (b) fractions, (c) flat shapes and spaces, (d) roman numbers, (e) comparison and scale, and (f) statistical. which is indeed a matter of mathematics starting from class IV, V and VI at the elementary school level based on the 2013 curriculum that is used today.

"Understanding mathematical concepts and communication is a competency that must be developed in students so that they are ready to face life's problems in the future. In addition, affective competence, such as the spirit of learning, independence and perseverance is also an important capital for students in developing their full potential” [3]. “Mathematics needs to be given to all students from elementary schools to equip students with the ability to think logically, analytically, systematically, critically, and creatively, as well as the ability to work together. These competencies are needed so that students can have the ability to obtain, manage, and use information to survive in ever-changing, uncertain, and competitive circumstances. In mathematics, a student will learn about the concept of arithmetic and is expected to be able to apply it in everyday life” [4]. One of the subject matter of mathematics which is very difficult to be mastered by elementary school level students, especially fourth grade students is fractional material. This can be seen from the results of observations and interviews with a number of students, most students said it was difficult to understand the fraction material. Moreover, when working on the count operations it is addition, subtraction and division of fractions. This is because the mastery of the concept of fraction material itself is not so well mastered by students, other than that how to teach teachers is still very monotonous. In teaching fraction material, the teacher only uses the blackboard to explain how to do fraction counting operations without trying to use media or other supporting aids.

The same thing was felt by researchers as lecturers in the department of elementary school teacher education (PGSD) UNIMED, when conducting interviews and discussions with students, most students also experienced obstacles and did not have ideas and ideas on how to teach these fractional materials to students so students easily understood them. When asked what media / teaching aids can be used to facilitate students' understanding of fractional material, all students do not have ideas or ideas that can overcome these problems. This condition certainly cannot be tolerated and solutions must be sought immediately, so that the learning process, especially in fraction material, can be better and more attractive so as to make it easier for students to understand fraction material.
"That learning media is a tool or object that can be used for intermediaries to channel lesson content or material that is delivered so that students are easy to understand the material delivered by the teacher" [5]. There is also an opinion which says that "Media learning is recognized as one of the factors of learning success. With the media, students can be motivated, actively involved physically and psychologically, maximize all learners' senses in learning, and make learning more meaningful [6]. "In order for mathematics learning to be conveyed well and accepted by students, it requires the latest innovations in learning mathematics, namely by utilizing learning media in order to arouse students' desire to learn mathematics and reduce student anxiety in learning mathematics" [7].

"The reality is in the field, there are still many teachers who do not develop their creativity to plan, arrange, and develop learning media that are innovative and interesting for students. Many educators still use conventional learning media, such as whiteboards and whiteboards, or instant learning media, just buy and use directly such as wall drawings, posters and maps. This has an impact on decreasing teacher creativity and influencing students' interest in learning. It is very possible that the learning media they use are not contextual, less attractive, seem monotonous, and do not fit the needs of students” [8].

Based on the description above, the problem in this study is the absence of media / teaching aids that have been used so far in teaching fractions to elementary school students, so the ability and understanding of students towards fractions is very weak. Fractional media / teaching aids are really needed by students to facilitate their understanding of fraction material. The purpose of this research is the development of elementary mathematics learning media especially for fractional material. Fractional media for elementary school mathematics learning is expected to help provide conceptual understanding of fractions to students in particular and make it easier for students to work on problems related to fraction counting operations. This is because by using this fraction media, students can see firsthand how the fraction counting operation process is found and students can implement it in the process.

2 Research Method

This research was conducted at the Faculty of Education (FIP), Medan State University in the department of elementary school teacher education (PGSD). The use of fractional media for primary school mathematics learning for elementary school teacher education students is to provide provisions and knowledge to students about media / teaching aids that can developed and used in teaching fractions material to elementary school level students. This research uses development research methods, with identified that developmental research is oriented towards product development in which the development process is described as thoroughly as possible and the final product is evaluated.

The researcher uses six elements contained in the Van Den Akker development model, namely: (1) Preliminary analysis, (2) evaluation of experts and teachers, (3) initial fraction media model, (4) fraction media validation, (5) empirical data, (6) reflection and revision. The sequence of development steps for the IAI-based "Opung Han" fraction media based on the Van Den Akker research and development model can be seen from the following figure:
Device Development Stage

Preliminary Analysis
The initial analysis consists of several steps that must be carried out, namely:

Purpose Analysis
The purpose of this analysis is to determine the basic direction needed in the development of elementary mathematics learning media fractions that will be used for PGSD UNIMED students as a provision for them to have completed their education and become a teacher in elementary schools. From this basic direction then compiled alternative media suitable elementary school mathematics learning fractions. In carrying out the analysis of objectives, in terms of aspects of the curriculum used at the present elementary school level.

Analysis of student characteristics
Student analysis is a study of student characteristics which include the level of cognitive development, ability, background knowledge, and socio-cultural background of students. From the results of this analysis will be used as a frame of reference in preparing elementary school mathematics learning fraction media that will be used by teachers and students so that the learning media fraction of mathematics is developed in accordance with the characteristics of elementary school students.

Analysis of Teacher and Student Needs
Analysis of teacher and student needs is a review of the main needs in the development of elementary school mathematics learning fractions. This analysis is based on experience while the teaching and learning process takes place where clearly visible obstacles felt by the teacher in providing an explanation of the concept of fraction material. On the other hand PGIM UNIMED students are also the embryo of teachers who will also teach at the elementary school level, of course, will also experience the same obstacles if they are not equipped with the ability to design and use media in learning, especially learning mathematics in fraction material.
Expert and Teacher Evaluation
Based on preliminary analysis that has been done, the "Opung Han" fraction media was designed which will be used in overcoming the problem of elementary school mathematics learning. Expert and Teacher evaluation was carried out after the "Opung Han" fraction of elementary school mathematics learning was completed designed by researchers. An evaluation will be carried out to see whether the "Opung Han" fraction media designed according to the characteristics of elementary school levels, is harmless and can help teachers and students of PGSD UNIMED make it easier to provide understanding of fraction material, while for students whether the "Opung Han" fraction media can facilitate understanding they are on fractional material, especially in working on fraction counting operations.

Development of Early Models of Fractional Media
The fractional media of elementary school mathematics learning developed was given the name "Opung Han" based on IAI. The name stands for "Interactive Audio Instruction Based Fraction Operations". IAI-based "Opung Han" fraction media are made from simple materials such as: plywood as the main container, while other materials are made of transparent plastic shaded according to the fraction to be studied, while IAI uses audio video which will later be played as a teacher's guide to understand how media use can also be used directly by IAI-based "Opung Han" media users independently. How to use this media is quite easy, students only need to stick transparent plastic in the space provided, and students can see firsthand the concepts of addition, subtraction, multiplication and the division of two fractions.

Fraction Media Validation & Instrument Validation Arrangement
In accordance with the research objective, which is to make elementary mathematics learning media fractions, then in this study a validation instrument will be developed that is validation to measure the quality of the "Opung Han" and IAI fraction developed media. The preparation of a validation instrument to assess the quality of the "Opung Han" fraction media is based on (a) the compatibility of the media with the material used (b) the ease of the media in providing students understanding of the concept of the material being studied (c) the ease of the media to be replicated. While the IAI validation instrument is based on: (a) general aspects of audio video which include: visual quality (appearance), guidance for teachers and students (LKS), audio video content containing the message to be conveyed, audio video content in accordance with the task and learning activities provided, graphics, images or other things have a good color, texture and symbol, and the costs required to produce audio video are worth the benefits. (b) aspects of accessibility of audio video media which include: video components are clarified with audio, audio video components have other alternative forms in the form of print out/printed material, and audio video media is safe to use.

After the validation instrument has been prepared, the next activity is to validate the IAI-based "Opung Han" fraction media using the validation sheet. The validation was carried out by an expert and 3 teachers in the field of mathematics study aimed to see the effectiveness, strengths, weaknesses and other matters of the IAI-based "Opung Han" fraction media that had been developed. The results of the validation will be used as input for improving the IAI-based "Opung Han" fraction media so that the fraction media can be better and more effective when used by teachers and students in the classroom learning process and lectures.
Empirical Data
After the IAI-based "Opung Han" fraction media has been validated by the validator team, the next step is to improve the IAI-based "Opung Han" fraction media in accordance with the input of the validation team. The intended improvement is intended so that all the weaknesses of the media found based on the results of the validation can be corrected so that the IAI-based "Opung Han" fraction media developed can make it easier for PGSD UNIMED students to learn the fraction material and develop it. After the IAI-based "Opung Han" fraction media was repaired, a trial was carried out on the IAI-based "Opung Han" fraction media. The IAI-based "Opung Han" fraction media test was conducted at the faculty of education majoring in elementary school teacher education.

Reflection and Revision
Based on the results of the trials that have been conducted and the results of interviews conducted with students, a reflection and revision of the IAI-based "Opung Han" fraction media was developed. Reflection and revision aims to correct any shortcomings of the IAI-based "Opung Han" media before it is developed more and used in primary schools and becomes material in high-class mathematics education courses in the department of primary school teacher education.

"Opung Han" Fraction Media
The final stage of this research is to develop IAI-based "Opung Han" fraction media after obtaining input through validation activities, and based on the results of reflection when conducted direct trials in the faculty of education majoring in elementary school teacher education at Medan State University. The development of IAI-based "Opung Han" fraction media was carried out and the results were used in lectures at the faculty of education majoring in elementary school teacher at Medan State University.

Research Instruments
The instruments used in this study were grouped into 2 types namely; (1) Instrument of media validation in elementary school mathematics learning fractions, (2) interviews with students after the learning process using IAI-based "Opung Han" fraction media.

3 Result And Discussion
The results of the implementation of research activities in the development of mathematics learning media "OPUNG HANS" on the ability of students can be described as follows:
The pre test was conducted on August 27, 2019 with the results of data obtained from 34 students, 15 students (44%) got good grades, 10 students (29%) in the moderate category, while the remaining 9 students (27%) in the less category. As for the description of the acquisition of student pre test scores can be seen in the following figure:
Implementation of activities with material operations count fractions. In this activity students are invited to design a media guide "Opung Hans". "Opung Hans" media are media that can be used to facilitate understanding of fraction material. Opung Hans media developed in cycle II can be used to facilitate the understanding of concepts in doing fraction computations that are added, subtracted, times and divided (+, -, x and :).

Post test activities carried out aiming to see the usefulness of the media "OPUNG HANS" in helping students understand the fraction material. The results of the post-test activities obtained data from 34 students, 29 students (85%) scored in the good category, and the remaining 5 students (15%) in the sufficient category, from the results of this post-test it was seen that there was an increase in the ability of students of teacher education courses elementary school (PGSD) Medan State University. The description of the acquisition of student post test scores can be seen in the following picture:

Discussion

The development of IAI-based "OPUNG HANS" learning media is proven to be able to improve the ability and understanding of PGSD students at Medan State University. This can be seen from the results of tests conducted before and after this research activity was carried out. Based on the available data, it can be seen that the ability of students to understand various material concepts, especially those related to fractions, is better. Students better understand the process of calculating fraction operations and discover the concept of the arithmetic operations after using the media "Opung Hans".

In addition to developing "Opung Hans" media, the use of Interactive Audio Instruction (IAI) CDs is also felt to be very helpful to students in understanding the material
for calculating fractions. The IAI CD can help deepen students' understanding at home without having to get guidance from lecturers directly. The IAI CD that was developed can make students learn to understand the concept of fraction operations by trying and learning independently.

The use of the media "Opung Hans" and CD Interactive Audio Instruction is very helpful in giving students an understanding of the concept of fractional counting material. This is very useful because students majoring in elementary school teacher education (PGSD) Unimed as prospective education personnel at the elementary school level, are expected to have insight and ability in designing and developing media that can be used in instilling abstract mathematical concepts so they can help students in understanding mathematics material at elementary school level.

4 Conclusion and Suggestions

4.1 Conclusion
• The development of IAI-based "OPUNG HANS" mathematics learning media can increase students' understanding of elementary school teacher education (PGSD) at the State University of Medan's education sciences on fraction material.
• Handbook of using the media "OPUNG HANS" is very helpful for students in understanding how the process and use of the media "OPUNG HANS" in understanding the concept of abstract fraction counting operations.
• The use of interactive Audio Instructional (IAI) CDs, can help users of the "OPUNG HANS" media independently without the need of help from others.

4.2 Suggestions
• The development of mathematics learning media is continued on other materials, so that mathematics learning becomes one of the subjects favored by elementary school students.
• The "OPUNG HANS" media that are developed are given a more attractive color to further foster the enthusiasm of its users.

5 References


Utilization of Oil Palm Empty Fruit Bunch (EFB) as Spodosol Soil Ameliorant for Increasing Oil Palm Root Growth

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Abstract. Spodosol soil is a marginal soil that can be used for the cultivation of oil palm plants which has economic value. Spodosol soil has the physical characteristics of quartz sand and harpand, with both dominance characteristics leads unoptimal oil palm root development. This study was aimed to analyze the effect of oil palm empty fruit bunch, material organic as an ameliorant. Unmanaged EFB will become a breeding site of Oryctes rhinoceros. 3 levels treatments in this study: 30 tons/ha of EFB, 40 tons/ha of EFB and 45 tons/ha were applieded in 2 different placement around the palms weeded circle and oil palm strip. According to root dry weight there is no significant difference for 3 treatment applied. 35 tons/treatment applied in oil palms strip indicate the best result than the other dosages.

Keywords : empty fruit bunch, oil palm, spodosol soil

1 Introduction

Spodosol land is currently an alternative for oil palm cultivation business due to limited fertile land. Spodosol is low fertility soil, properly selection and conservative treat suggested so that it cultivation on spodosols has economic value. Statement of [1] composition of spodosol soil characteristics such as; carbon content (C) which is rather low (0.11-1.31%) and rather high (4.62%) on the spodic horizon, the low to moderately low Nitrogen (N) content (0.10-0.11%), C / N ratio is rather low (0.10-0.11%) in the upper layer and high in the spodic layer (46.2%), the low phosphorus (P) (1-8 ppm) availability in all layers, cation exchange capacity (CEC) classified as low to moderate in the entire horizon (7.64-14.98), the low base saturation (KB) (1-3 %), an acidic soil pH (pH 3.7-4.5) in all layers.

The previous study on spodosol soil on Central Kalimantan[2], states that the soil texture of the whole spodosol soil profiles located at PT. Sawit Graha Manunggal (SGM) East Barito regency, dominated by sand with medium category of Bulk Density (BD) and soil permeability category is moderately rapid permeability to rapid permeability to. Soil chemical parameters include pH, N (%), C (%), C / N, CEC, P-total and P-available and category of base exchange is low to very low.

Palm Oil Mill is not only producing CPO products and kernels, but also organic waste mill such as Empty Fruit Bunch (EFB), Palm Oil Mill Efluent (POME), and Shell. These wastes if if not managed properly, it can be a problem sources around oil palm plantations.
The utility of EFB as an organic amelioration in spodosol soils was aimed to improved soil fertility and prevent EFB from becoming a breeding site or horn beetle pests. If the EFB is stacked an unused, it will become a breeding site of *O.rhinoceros*. this previous study [3], shows that applicating of 200 kg of EFB /tree or 100 kg of EFB compost /tree and combined with the implementation of Best Management Practices provides a trend of increasing crop productivity in spodosol soil.

The roots of the oil palm not only serve as a propoil palmbody but also as an absorber of nutrients and water in the soil for oil palm growth development. Roots are one of the important factors in determining crop productivity [4]. The more extensive a root system, the higher efficiency of plant nutrients and water take.

Previous study [5] describe the size of the roots, oil palm roots are divided into 4 (four) parts, namely 1) primary roots, roots that grow vertically (adventitious roots) and horizontal (adventitious roots), 6-10 mm in diameter; 2) secondary roots are roots that grow from the primary root, the direction of growth horizontally or downward, 2-4 mm in diameter; 3) tertiary roots are roots that grow from secondary roots, the direction of growth is horizontal, its reach 0.7 - 2 mm in length; 4) Quaternary roots are branch roots of tertiary roots, having a diameter of 0.1 - 0.3 mm and average of length 3 cm

2 Research Method

This research was conduct in Sawit Graha Manunggal Estate, Sub District North Barito – Central Kalimantan and it started on 2014 with 10 years old of oil palm. The application of EFB is carried out in two difference places, around the palms weeded circle and oil palm strip. The dosages level of this study are E1: 30 tons/ha as a control (the standard dose for oil palm); E2: 35 tons/ha and 40 tons/hectare and no dose as a comparison. 30 tons / ha as a control because plants. Each treatment was repeated 3 times. EFB application around the oil palms circle path is arranged evenly in one layer with 2 meter radius area, while the application oil palm inter row arranged evenly in a layer between the inter row (plant path).

The root development in FEB layer application and on the soil boundary layer of the EFB in 0-20 cm depth has been observed. Sampling was taken at the EFB application area by making a 1 meter x 1 meter plot, roots taken at the EFB layer area and soil depth 0-20 cm. Then the roots are cleaned from the soil and organic EFB then dried using an oven at temperature of 80 °C.

3. Results and Discussion

3.1 Root dry weight

Data on dry weight of oil palm plant roots in the results of the research sample as shown in Table 1.
Table 1. Number of root dry weight in different dosage level and placement of EFB in oil palm

<table>
<thead>
<tr>
<th>Placing Dosage Level</th>
<th>EFB - 0 (gr)</th>
<th>0 - 20 cm (gr)</th>
<th>Total (gr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil Palm inter row</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E1</td>
<td>245.00</td>
<td>635.00</td>
<td>880.00</td>
</tr>
<tr>
<td>E2</td>
<td>191.67</td>
<td>724.00</td>
<td>915.67</td>
</tr>
<tr>
<td>E3</td>
<td>301.67</td>
<td>373.33</td>
<td>688.33</td>
</tr>
<tr>
<td>Average</td>
<td>246.11</td>
<td>577.44</td>
<td>828.00</td>
</tr>
<tr>
<td>Oil Palm Circle Path</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E1</td>
<td>320.00</td>
<td>402.33</td>
<td>722.33</td>
</tr>
<tr>
<td>E2</td>
<td>278.00</td>
<td>438.33</td>
<td>716.33</td>
</tr>
<tr>
<td>E3</td>
<td>264.67</td>
<td>595.67</td>
<td>860.33</td>
</tr>
<tr>
<td>Average</td>
<td>287.56</td>
<td>478.78</td>
<td>766.33</td>
</tr>
<tr>
<td>Average All</td>
<td>266.83</td>
<td>528.11</td>
<td>797.17</td>
</tr>
</tbody>
</table>

Root distribution is generally greater at 0-20 cm depth than EFB area to the soil surface. According to total dry root weight, it was heavier on oil palm inter row than on palm circle path. Generally the treatment on palm circle path is always cleaner than on oil palm inter row. Palm circle path area is the place where the fruit falls and since it to easier the operational activities of fruit citing, the palm circle path must be clean from organic waste or growing weeds. Otherwise on palm strip is fully of organic matter by the leaves. This study is agree to [6] that most active roots are at a depth of 5 - 30 cm and tertiary roots are at 10 cm from the soil surface where there is a lot of organic matter.

Refers to Table 1, the amount of dry root weight in the EFB application area is smaller compared to the number of roots at a depth of 0-20 cm. Roots in the EFB layer are quarter roots that are smaller than roots at a depth of 0-20 cm, namely secondary and tertiary roots. As a comparison, researchers also took root samples in plants that were not applied to EFB, in Table 2 as follows:

Table 2. Root dry weight in non EFB aplicated

<table>
<thead>
<tr>
<th>Non EFB</th>
<th>EFB 0</th>
<th>0 - 20 cm</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>EFB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EFB</td>
<td>0</td>
<td>529.17</td>
<td>529.17</td>
</tr>
</tbody>
</table>

If we compared the number of total dry root weight on Table 1, and Table 2. It was higher within applied EFB than without EFB application. Low spodosol soil fertility inhibits the growth of oil palm roots. With a high sand texture, spodosol availability of nutrients and ground water is very poor that cause evaporation and soil erosion are easier.

The addition of EFB as an organic amelioration of soil also adds nutrients and maintains moisture in the spodosol soil. In line with the statement [7] that the highest number of roots is under the EFB pile or midrib where the concentration of organic matter from weathering and microorganism activity are high. However, genetic and environmental factors such as temperature, soil moisture and soil softness also affect the length of root path absorption which can affect root development[8]. The movement and distribution of roots in the soil are interconnected with water availability and nutrient availability. The most effective nutrient uptake is carried out by tertiary and quarter roots called feeding roots of approximately 0.2 - 1.2 millimeter in diameter which are generally more abundant in top soil [9].
3.2. Root Dry Weight in the Layer Area of the EFB Application

Data on the results of various observations of dry root weight in the EFB application layer as in Table 3 as follows:

Table 3. Analysis of Variance. Main plot coefficient of variance = 18 %, sub plot coefficient of variance =1,1%  

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>dF</th>
<th>Sum of Square</th>
<th>Mean Square</th>
<th>F Value</th>
<th>F Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.05</td>
</tr>
<tr>
<td>Main plot</td>
<td>5</td>
<td>86275,83</td>
<td>17255,17</td>
<td>0.86</td>
<td>tn</td>
</tr>
<tr>
<td>Replication</td>
<td>2</td>
<td>38574,33</td>
<td>19287,17</td>
<td>0,97</td>
<td>tn</td>
</tr>
<tr>
<td>Application Place (P)</td>
<td>1</td>
<td>7729,39</td>
<td>7729,39</td>
<td>0,39</td>
<td>tn</td>
</tr>
<tr>
<td>Error (a)</td>
<td>2</td>
<td>39972,11</td>
<td>19986,06</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Application Dosage (D)</td>
<td>2</td>
<td>9217,33</td>
<td>4608,67</td>
<td>0,38</td>
<td>tn</td>
</tr>
<tr>
<td>P x D</td>
<td>2</td>
<td>13941,78</td>
<td>6970,89</td>
<td>0,58</td>
<td>tn</td>
</tr>
<tr>
<td>Error (b)</td>
<td>8</td>
<td>96113,56</td>
<td>12014,19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>17</td>
<td>205548,50</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

According to Table 3, there is no significant differences between the level treatment (doses) among E1, E2 and E3 at the alpha value of 5% and 1%. However, the best treatment is in the E1 treatment of the palm circle path area since at the time applying inorganic fertilizer around the palm circle path area there are more nutrients then around in palm inter row. Nutrients given by inorganic fertilizers are earlier dissolved, so that quarter root is the more active to absorb higher nutrients in palm circle path area. The level of E1 (EFB 30 tons/ha) also has no significant effect on the decomposition process and nutrient coverage of organic fertilizer on roots.

3.3. Root Dry Weight in Layer Area 0 - 20 cm

To evaluated this parameters, the sample was taken from EFB layer barrier see Table 4.

Table 4. Analysis of Variance. Main plot coefficient of variance = 19 %, sub plot coefficient of variance =1,8%  

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>dF</th>
<th>Sum of Square</th>
<th>Mean Square</th>
<th>F Value</th>
<th>F Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.05</td>
</tr>
<tr>
<td>Main plot</td>
<td>5</td>
<td>580567,11</td>
<td>116113,42</td>
<td>1,26</td>
<td>tn</td>
</tr>
<tr>
<td>Replication</td>
<td>2</td>
<td>352256,78</td>
<td>176128,39</td>
<td>1,91</td>
<td>tn</td>
</tr>
<tr>
<td>Application Place (P)</td>
<td>1</td>
<td>43808,00</td>
<td>43808,00</td>
<td>0,47</td>
<td>tn</td>
</tr>
<tr>
<td>Error (a)</td>
<td>2</td>
<td>184502,33</td>
<td>92251,17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Application Dosage (D)</td>
<td>2</td>
<td>28836,11</td>
<td>14418,06</td>
<td>0,12</td>
<td>tn</td>
</tr>
<tr>
<td>P x D</td>
<td>2</td>
<td>233949,00</td>
<td>116974,50</td>
<td>0,98</td>
<td>tn</td>
</tr>
<tr>
<td>Error (b)</td>
<td>8</td>
<td>950641,56</td>
<td>118830,19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>17</td>
<td>1793993,78</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
There is no significant effect between the treatment levels of dose E1, E2 and E3 at the alpha level of 5% and 1%. According to Table 1, indicate that the highest weight of root is in the E2 dosage (EFB 35 tons/ha) which is applied on the oil palm inter row. This is due to the fact that there are a lot of organic material decomposes until it reaches 20 cm depths. The dominant root at a depth of 0-20 cm is the tertiary root, [6] which stated that most active roots are at a depth of 5 - 30 cm and tertiary roots are at 10 cm from the soil surface where there is a lot of organic matter. E2 level dose (EFB 35 tons/ha) applied around the oil palm inter row is more optimal for the growth of roots, due to weathering and holding water better, so that decomposed organics are not easily eroded vertically and horizontally.

3.4. Total Dry Root Weight

Furthermore variance data for total root dry weight are listed in Table 5 below as follows

Table 3. Analysis of Variance . Main plot coefficient of variance = 7%, sub plot coefficient of variance = 1,4%

<table>
<thead>
<tr>
<th>Sources of Variance</th>
<th>df</th>
<th>Sum Square</th>
<th>Mean Square</th>
<th>F Value</th>
<th>F Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0,05</td>
</tr>
<tr>
<td>Main plot</td>
<td>5</td>
<td>691525,83</td>
<td>138305,17</td>
<td>5,07</td>
<td>19,30</td>
</tr>
<tr>
<td>Replication</td>
<td>2</td>
<td>619843,00</td>
<td>309921,50</td>
<td>11,36</td>
<td>19,00</td>
</tr>
<tr>
<td>Application Placement (P)</td>
<td>1</td>
<td>17112,50</td>
<td>17112,50</td>
<td>0,63</td>
<td>18,51</td>
</tr>
<tr>
<td>Error (a)</td>
<td>2</td>
<td>54570,33</td>
<td>27285,17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Application Dosage(D)</td>
<td>2</td>
<td>5352,33</td>
<td>2676,17</td>
<td>0,02</td>
<td>4,46</td>
</tr>
<tr>
<td>P x D</td>
<td>2</td>
<td>124152,33</td>
<td>62076,17</td>
<td>0,41</td>
<td>4,46</td>
</tr>
<tr>
<td>Error (b)</td>
<td>8</td>
<td>1212830,00</td>
<td>151603,75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>17</td>
<td>2033860,50</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

According to Table 5. There is no significant differences between the treatment levelsdosages of EFB application. The best treatment is the E2 level dose applied in oil palm inter row this is due to the dry weight of the root inside 0 - 20 cm from the EFB barrier, the E2 application of oil palm inter row has the highest weight. Root weight is dominated in the 0-20 cm depth area from the EFB barrier as compared to the root weight in the EFB. So that even though the dry weight of the EFB layer at E1 treatment is higher and the E2 treatment is the lowest one on oil palm inter row, but E2 treatment on oil palm inter row was the best treatment for the total root dry weight.

4 Conclusion

EFB application gives improvement for oil palm root growth as compared to the development of oil palm plant roots that are not given EFB although it is not significantly different. The E2 dose level treatment which places application around the oil palm inter row is the ideal treatment for root dry weights. As ameliorant of spodosol soil the level of E2 dose (EFB 35 tons/ha) and placement of EFB on the oil palm inter row is able to maintain soil fertility whether physical or chemical soil which visible by total dry weight of roots. However, EFB application can be an alternative way to improve the oil palm root.
5 References


Leading Indicator For Economic Stability Four Emerging Market Countries

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Abstract. The research aims to analyze the contribution of monetary policy to economic stability of emerging market countries, namely China, India, Vietnam, and Indonesia. The special target in this research is to find the leading indicator of effectiveness in controlling economic stability of each of the four emerging market countries. The material used in this study is quantitative material with data panels in 4 civil countries, the data source of the time series secondary is from the first quarter of 2000 until the first quarter of the year 2017. The data analysis model in this research is the ARDL Panel, analysis model. Analysis results of the ARDL Panel model indicate that the leading indicator of state effectiveness in the control of stability of CIVI countries, namely India (interest, exchange rate, amount of money supply, inflation expectations, and GDP) and Vietnam (interest, amount of money supply and GDP). Other countries, such as Indonesia, economic stability control is done by interest and the money supply, whereas China is done through the amount of money supply.

Keywords: interest rates, rates, JUB, inflation expectations, GDP and inflation

1 Introduction

Monetary policy in achieving intermediate and final targets can be predicted in the short and long term. The intermediate target is macroeconomic stability, while the final target is price stability. The monetary transmission has problems with a time lag [1]. The delay effect can occur due to obstacles from other macroeconomic variables [2]. Interest can influence the delay effect [3]. Zega [4] Exchange rates affect the success of the monetary policy. Monetary transmission is significant in maintaining economic stability [5]. Onyeiwu [6] concluded that exports as a variable that can affect the success of the final target.

Alfian [7] states that asset paths affect economic growth and inflation. Natsir in [2] shows that labor and net exports influence economic growth. Hülsewig in [3] Economic stability is affected by consumption, net exports, and investment. Indonesia rose to fifth place because of the increased growth of chemical products, as well as industrial manufacturing and financial services [8]. Vymyatnina [9] inflation targeting is a framework for monetary policy characterized by announcements to the public about the inflation target rate in a period. Given the ability to have a discussion about inflation, it is no wonder that BI has set it as the final goal in implementing its monetary policy.
Fig 1. Inflation developments in the State of CIVI

The chart above shows the trend fluctuations in the inflation state of CIVI during years 2000 S/d 2017. Almost identical movements in the country of Vietnam, Indonesia, and China are a significant increase in inflation in the year 2008. This is due to the impact of international problems, namely rising global food prices. Thus the public will also become more prosperous [10]. Inflation over time is capable of undermining the value of money owed by the public. By increasing the price in the aggregate, it can lower the value of real money in the economy. It is capable of the welfare of the people of the country concerned. Price stability is a barometer of the country's real economic growth. Political rumors are also capable of triggering rising inflation. Not to mention the consumerist pattern of society especially on consumer goods due to the economic openness that makes the growing economic performance of the country undermined its inflation [11].

Fig 2. State GDP Development of CIVI

The chart above shows a tendency to increase GDP in CIVI state from 2000 to 2017. However, Indonesia, Vietnam, and India have seen a slowdown in economic growth, unlike China, which has significant economic growth. According to Trang [2], in an effort to maintain an efficient level of growth necessary, the interference of the Government is to reduce the primary sector and increase the role of non-primary sectors. In other words, constant trend of general price increases or inflation may occur when the increase in the amount of money supply exceeds the actual requirement. If the "amount of money supply
increases, the price of the goods will also rise" [3]. Inflation is also known as a monetary phenomenon; in other words when the amount of money circulating exceeds that of the needs of the community, the public will be more likely to spend its money by increasing consumption of goods and services [4].

In this research, the fiscal policy relations and monetary policy to macroeconomic stability, each of the variables of the fiscal policy and monetary policy is related to the macroeconomic stability variables where each of the fiscal policy variables contributes to variables of macroeconomic stability: inflation and economic growth (GDP). GDP is influenced by the rate of inflation. Inflation is the haunting dilemma of every country's economy. Its development continues to increase to provide barriers to economic growth in a better direction. Inflation tends to happen to emerge economies as Indonesia has an agrarian-patterned economic structure. Domestic failure or shocks will result in fluctuations in domestically listed prices and end with inflation in the economy [10].

Inflation and interest rates; Nwaobi [11] states that there is a link between the interest rate and the rate of inflation that is estimated that interest rates are also influenced by inflation, or in other words the rate of inflation has an influence or effect on the interest rate as a target. Interest rates are likely to increase as inflation is expected to increase as well — inflation and the amount of money supply. The value of money is determined by supply and demand for money. The amount of money supply is determined by the Central Bank, while the amount of money requested (money demand) is determined by several factors, such as the average price level in the economy. The amount of money requested by the community to make a transaction depends on the price level of goods and services in the market. The higher the price level, the greater the amount of money requested. The price increase then pushes the rise in the amount of money demanded by the public.

Based on this theory, the amount of money circulating in an economy determines the value of money, while the growth in the amount of money supply is a major cause of inflation. In general, the money quantity theory illustrates the influence of the amount of money circulating against the economy, attributed to variable price certain output. The relationship between the amount of money supply, output, and price can be written with the mathematical equation as follows: $M \times V = P \times Y$. Where $P$ is the price level (GDP deflator), $Y$ is the number of outputs (real GDP), $M$ is the amount of money supply, $P \times Y$ is nominal GDP, as well as $V$ is the velocity of money (turnover money). This equation is called quantity equation.

Inflation and exchange rates; Changes in the exchange rate need to be examined more thoroughly on how the exchange rate shock affects the economy as well as inflation. This change of exchange rate will certainly implicate the characteristics of the exchange rate fluctuations and their impact on the open economy. The Rupiah gained enormous depreciation pressures beginning with the exchange rate crisis. The rupiah exchange rate simultaneously gets quite heavy pressure due to the large capital outflow due to loss of confidence of foreign investors to the prospects of the Indonesian economy. Pressure on the exchange rate was weighed again by the growing activity so that since the crisis occurred the exchange rate was depreciation to reach 75 percent.
The conceptual framework Panel aims to obtain the estimates of each characteristic separately, providing more informative, more varied data, a more efficient degree of freedom, and avoiding the colonic between Variable. As well as to see the relationship of inflation expectations, the amount of money supply, gross domestic products, exchange rates, and interest rates on inflation in China, India, Vietnam, and Indonesia.

2 Research Method

The study uses data panels using data between time and data between regions. The ARDL regression panel is used to obtain the estimated individual characteristics individually by assuming the presence of co-integration in the long-term lag of each variable. An auto-reactivity Distributed Lag (ARDL) introduced by Rusiadi [5]. This technique examines each variable lag located on I (1) or I (0). Conversely, ARDL regression results are test statistics that can compare with two critical values of asymptotic.

Testing regression Panel with formulas:
\[ \text{INFLASI}_t = \alpha + \beta_1 \text{SB}_t + \beta_2 \text{KURS}_t + \beta_3 \text{JUB}_t + \beta_4 \text{EINF}_t + \beta_5 \text{PDB}_t + \epsilon \]

Here's the regression panel formula by country:
\[ \text{INFLASI}_{\text{CHINA}}_t = \alpha + \beta_1 \text{SB}_t + \beta_2 \text{KURS}_t + \beta_3 \text{JUB}_t + \beta_4 \text{EINF}_t + \beta_5 \text{PDB}_t + \epsilon_1 \]
\[ \text{INFLASI}_{\text{INDIA}}_t = \alpha + \beta_1 \text{SB}_t + \beta_2 \text{KURS}_t + \beta_3 \text{JUB}_t + \beta_4 \text{EINF}_t + \beta_5 \text{PDB}_t + \epsilon_1 \]
\[ \text{INFLASI}_{\text{VIETNAM}}_t = \alpha + \beta_1 \text{SB}_t + \beta_2 \text{KURS}_t + \beta_3 \text{JUB}_t + \beta_4 \text{EINF}_t + \beta_5 \text{PDB}_t + \epsilon_1 \]
\[ \text{INFLASI}_{\text{INDONESIA}}_t = \alpha + \beta_1 \text{SB}_t + \beta_2 \text{KURS}_t + \beta_3 \text{JUB}_t + \beta_4 \text{EINF}_t + \beta_5 \text{PDB}_t + \epsilon_1 \]

3 Results and Discussion

Analysis panel with Auto-Regressive distribution Lag (ARDL) test pooled data that is combined data cross-section (country) with Data time series (yearly), the results of the ARDL panel is good more compared with ordinary panels, because it is capable of long-term integration and has the highest distribution of lag in accordance with the theory, using the Eviews 10 software, obtained the following results.
Table 1. ARDL Panel Output

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Long Run Equation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LNPDB</td>
<td>4.667431</td>
<td>1.526554</td>
<td>3.057495</td>
<td>0.0080</td>
</tr>
<tr>
<td>BUNGA</td>
<td>-1.019133</td>
<td>0.164611</td>
<td>-6.191172</td>
<td>0.0000</td>
</tr>
<tr>
<td>LNKURS</td>
<td>-2.588605</td>
<td>3.271315</td>
<td>-0.791304</td>
<td>0.4411</td>
</tr>
<tr>
<td>JUB</td>
<td>3.921318</td>
<td>0.843635</td>
<td>4.648119</td>
<td>0.0003</td>
</tr>
<tr>
<td>LNEINF</td>
<td>32.13049</td>
<td>8.233768</td>
<td>3.902283</td>
<td>0.0014</td>
</tr>
<tr>
<td><strong>Short Run Equation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COINTEQ01</td>
<td>-0.139881</td>
<td>0.051571</td>
<td>-2.712383</td>
<td>0.0161</td>
</tr>
<tr>
<td>C</td>
<td>-45.19663</td>
<td>16.31298</td>
<td>-2.770593</td>
<td>0.0143</td>
</tr>
</tbody>
</table>

The ARDL Panel model received is a model that has a lag in the integration, where the main assumption is the value of the coefficient has negative slope with a significant rate of 5%. ARDL Panel Model Requirements: The value is negative (-0.13) and is significant (0.01 < 0.05) then the model is accepted. Based on the model acceptance, the data analysis is done by the panel per country.

Table 2. Output Panel ARDL China County

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob. *</th>
</tr>
</thead>
<tbody>
<tr>
<td>COINTEQ01</td>
<td>0.004512</td>
<td>0.000309</td>
<td>14.59018</td>
<td>0.0007</td>
</tr>
<tr>
<td>D(INF(-1))</td>
<td>-0.312752</td>
<td>0.353549</td>
<td>-0.884607</td>
<td>0.4415</td>
</tr>
<tr>
<td>D(LNPDB)</td>
<td>96.53039</td>
<td>105772.9</td>
<td>0.00913</td>
<td>0.9993</td>
</tr>
<tr>
<td>D(LNPDB(-1))</td>
<td>190.9485</td>
<td>71117.10</td>
<td>0.002685</td>
<td>0.9980</td>
</tr>
<tr>
<td>D(BUNGA)</td>
<td>-0.050130</td>
<td>0.121147</td>
<td>-0.413798</td>
<td>0.7068</td>
</tr>
<tr>
<td>D(BUNGA(-1))</td>
<td>-0.028852</td>
<td>0.021444</td>
<td>-1.345458</td>
<td>0.2711</td>
</tr>
<tr>
<td>D(LNKURS)</td>
<td>22.71591</td>
<td>324.7660</td>
<td>0.069945</td>
<td>0.9486</td>
</tr>
<tr>
<td>D(LNKURS(-1))</td>
<td>-7.835592</td>
<td>278.9961</td>
<td>-0.028085</td>
<td>0.9794</td>
</tr>
<tr>
<td>D(JUB)</td>
<td>-0.092870</td>
<td>0.006454</td>
<td>-14.38918</td>
<td>0.0007</td>
</tr>
<tr>
<td>D(JUB(-1))</td>
<td>-0.113662</td>
<td>0.007546</td>
<td>-15.06339</td>
<td>0.0006</td>
</tr>
<tr>
<td>D(LNEINF)</td>
<td>-72.64080</td>
<td>106153.9</td>
<td>-0.000684</td>
<td>0.9995</td>
</tr>
<tr>
<td>D(LNEINF(-1))</td>
<td>-194.7547</td>
<td>77265.34</td>
<td>-0.002521</td>
<td>0.9981</td>
</tr>
<tr>
<td>C</td>
<td>-0.973916</td>
<td>36.83009</td>
<td>-0.026443</td>
<td>0.9806</td>
</tr>
</tbody>
</table>

The ARDL panel test results show that GDP has no significant effect on inflation. Interest rates have no significant effect on inflation. Exchange rates have no significant effect on inflation. JUB has a significant effect on inflation. Inflation expectations have no significant effect on inflation.
### Table 3. ARDL Panel Output Country India

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob. *</th>
</tr>
</thead>
<tbody>
<tr>
<td>COINTEQ01</td>
<td>-0.147311</td>
<td>0.000977</td>
<td>-150.8222</td>
<td>0.0000</td>
</tr>
<tr>
<td>D(INF(-1))</td>
<td>0.241848</td>
<td>0.000591</td>
<td>-408.9720</td>
<td>0.0000</td>
</tr>
<tr>
<td>D(LNPDB)</td>
<td>196.9540</td>
<td>56.92540</td>
<td>3.459862</td>
<td>0.0406</td>
</tr>
<tr>
<td>D(LNPDB(-1))</td>
<td>116.8716</td>
<td>26.35831</td>
<td>-4.43957</td>
<td>0.0213</td>
</tr>
<tr>
<td>D(BUNGA)</td>
<td>-0.422299</td>
<td>0.000582</td>
<td>-726.0580</td>
<td>0.0000</td>
</tr>
<tr>
<td>D(BUNGA(-1))</td>
<td>-0.500857</td>
<td>0.000423</td>
<td>-1184.424</td>
<td>0.0000</td>
</tr>
<tr>
<td>D(LNKURS)</td>
<td>58.10061</td>
<td>4.363703</td>
<td>13.31452</td>
<td>0.0009</td>
</tr>
<tr>
<td>D(LNKURS(-1))</td>
<td>88.06993</td>
<td>6.725875</td>
<td>13.09420</td>
<td>0.0010</td>
</tr>
<tr>
<td>D(JUB)</td>
<td>-0.321468</td>
<td>0.000237</td>
<td>-1355.533</td>
<td>0.0000</td>
</tr>
<tr>
<td>D(JUB(-1))</td>
<td>-0.028718</td>
<td>0.000349</td>
<td>-82.37460</td>
<td>0.0000</td>
</tr>
<tr>
<td>D(LNEINF)</td>
<td>-200.8417</td>
<td>58.52541</td>
<td>-3.431000</td>
<td>0.0415</td>
</tr>
<tr>
<td>D(LNEINF(-1))</td>
<td>-77.76121</td>
<td>17.23195</td>
<td>-4.512619</td>
<td>0.0203</td>
</tr>
<tr>
<td>C</td>
<td>-48.05876</td>
<td>13.24779</td>
<td>-3.627681</td>
<td>0.0361</td>
</tr>
</tbody>
</table>

ARDL panel test results show GDP, a significant effect on inflation. Interest rates have a significant effect on inflation. Exchange rates have no significant effect on inflation. JUB has significant effect on inflation. Inflation expectations have no significant effect on inflation.

### Table 4. State ARDL Panel Output Vietnam

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob. *</th>
</tr>
</thead>
<tbody>
<tr>
<td>COINTEQ01</td>
<td>-0.236921</td>
<td>0.001974</td>
<td>-120.0092</td>
<td>0.0000</td>
</tr>
<tr>
<td>D(INF(-1))</td>
<td>-0.057840</td>
<td>0.000336</td>
<td>-172.2795</td>
<td>0.0000</td>
</tr>
<tr>
<td>D(LNPDB)</td>
<td>-6.807701</td>
<td>10.32094</td>
<td>-0.659601</td>
<td>0.5566</td>
</tr>
<tr>
<td>D(LNPDB(-1))</td>
<td>-147.0746</td>
<td>39.32478</td>
<td>-3.739998</td>
<td>0.0333</td>
</tr>
<tr>
<td>D(BUNGA)</td>
<td>0.091708</td>
<td>0.002563</td>
<td>35.77913</td>
<td>0.0000</td>
</tr>
<tr>
<td>D(BUNGA(-1))</td>
<td>-0.424754</td>
<td>0.003598</td>
<td>-118.0481</td>
<td>0.0000</td>
</tr>
<tr>
<td>D(LNKURS)</td>
<td>-12309.89</td>
<td>77325.83</td>
<td>-0.159195</td>
<td>0.8836</td>
</tr>
<tr>
<td>D(LNKURS(-1))</td>
<td>3040.587</td>
<td>480714.9</td>
<td>0.006325</td>
<td>0.9954</td>
</tr>
<tr>
<td>D(JUB)</td>
<td>-1.469023</td>
<td>0.000964</td>
<td>-1523.567</td>
<td>0.0000</td>
</tr>
<tr>
<td>D(JUB(-1))</td>
<td>0.112932</td>
<td>0.001914</td>
<td>59.00419</td>
<td>0.0000</td>
</tr>
<tr>
<td>D(LNEINF)</td>
<td>12385.69</td>
<td>78632.80</td>
<td>0.157513</td>
<td>0.8848</td>
</tr>
<tr>
<td>D(LNEINF(-1))</td>
<td>-3098.996</td>
<td>489534.6</td>
<td>-0.006330</td>
<td>0.9953</td>
</tr>
<tr>
<td>C</td>
<td>-79.55484</td>
<td>195.4120</td>
<td>-0.407113</td>
<td>0.7112</td>
</tr>
</tbody>
</table>

The ARDL panel test results show GDP, a significant effect on inflation. Interest has a significant influence on inflation. Exchange rates have no significant effect on inflation. JUB has significant effect on inflation. Inflation expectations have no significant effect on inflation.
The ARDL panel test results show that GDP has no significant effect on inflation. Interest rates have a significant effect on inflation. The exchange rate has no significant effect on inflation. JUB has significant effect on inflation. Inflation expectations have no significant effect on inflation.

Based on the overall results, it is known that a significant in the long term affects CIVI state inflation stability, i.e. interest rates, amount of money supply, inflation expectations, and GDP. Then in the short-term interest-only affects the stability of inflation. The leading indicator of the effectiveness of variables in state stability control CIVI, i.e. Flower (India, Vietnam, and Indonesia) judging from the stability of short-run and long-run, where the interest variables in both long and short term significantly control Economic stability. The leading indicator of the country's effectiveness in the control of the stability of CIVI countries is namely India (interest, exchange rate, amount of money supply, inflation expectations and GDP) and Vietnam (interest, amount of money supply and GDP). Other countries, such as Indonesia, economic stability control is done by interest and the money supply, whereas China is done through the amount of money supply. In the panel, the amount of money supply is also able to be a leading indicator for the control of China, India, Vietnam, and Indonesia but its position is unstable in the long run.

Based on the overall results, it is known that the sign in the long term affects the inflation stability of the CIVI state of interest, the amount of money supply, inflation expectations, and GDP. Then in the short term only flowers are affecting the stability of inflation. Here's a summary of ARDL Panel results table:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob. *</th>
</tr>
</thead>
<tbody>
<tr>
<td>D(INF(-1))</td>
<td>-0.331977</td>
<td>0.011964</td>
<td>-27.74717</td>
<td>0.0001</td>
</tr>
<tr>
<td>D(LNPDB)</td>
<td>0.907105</td>
<td>159.3533</td>
<td>0.005692</td>
<td>0.9958</td>
</tr>
<tr>
<td>D(LNPDB(-1))</td>
<td>-98.46323</td>
<td>255.6070</td>
<td>-0.385213</td>
<td>0.7258</td>
</tr>
<tr>
<td>D(BUNGA)</td>
<td>-1.620768</td>
<td>0.229259</td>
<td>-7.069590</td>
<td>0.0001</td>
</tr>
<tr>
<td>D(BUNGA(-1))</td>
<td>-1.406337</td>
<td>0.046725</td>
<td>-30.09791</td>
<td>0.0001</td>
</tr>
<tr>
<td>D(LNKURS)</td>
<td>764.4331</td>
<td>11459.33</td>
<td>0.066708</td>
<td>0.9510</td>
</tr>
<tr>
<td>D(LNKURS(-1))</td>
<td>-1179.064</td>
<td>51110.64</td>
<td>-0.023069</td>
<td>0.9830</td>
</tr>
<tr>
<td>D(JUB)</td>
<td>1.481387</td>
<td>0.110820</td>
<td>13.36747</td>
<td>0.0009</td>
</tr>
<tr>
<td>D(JUB(-1))</td>
<td>0.966816</td>
<td>0.018673</td>
<td>51.77713</td>
<td>0.0000</td>
</tr>
<tr>
<td>D(LNEINF)</td>
<td>-832.4789</td>
<td>14686.59</td>
<td>-0.056683</td>
<td>0.9584</td>
</tr>
<tr>
<td>D(LNEINF(-1))</td>
<td>1240.790</td>
<td>55726.89</td>
<td>0.022266</td>
<td>0.9836</td>
</tr>
<tr>
<td>C</td>
<td>-52.19900</td>
<td>167.3357</td>
<td>-0.311942</td>
<td>0.7755</td>
</tr>
</tbody>
</table>
Table 6. ARDL Panel Summary

<table>
<thead>
<tr>
<th></th>
<th>CHINA</th>
<th>INDIA</th>
<th>VIETNAM</th>
<th>INDONESIA</th>
<th>Short Run</th>
<th>Long Run</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bunga</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Kurs</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>JUB</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Ekspektasi Inflasi</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>PDB</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Source: Data Processed authors, 2019

Leading indicator of the country's effectiveness in the control of stability of CIVI countries, namely India (interest, exchange rate, amount of money supply, inflation expectations and GDP) and Vietnam (interest, amount of money supply and GDP). Indonesia's economic stability control is conducted by (interest rate and amount of money supply), whereas China is through (amount of money supply). India is still strong in controlling price stability through its stability (exchange rate). China's state is still strong in controlling price stability through the preservation of the amount of money supply. Indonesian state is still strong in controlling the price stability through the stability of the amount of money supply [12]. In panel the amount of money supply is also able to be a leading indicator for the control of China, India, Vietnam, and Indonesia but its position is unstable in the long run.

The leading indicator of the effectiveness of variables in the state stability control CIVI, i.e. Flower (India, Vietnam, and Indonesia) seen from the stability of the short-run and long-run, where the interest variables both in the long and short term are significant controlling economic stability. The designation of interest as a leading indicator of CIVI country also supported the opinion of Ashiddiqi [13], stating that the SBI interest rate is real (significant) to economic growth and inflation. The SBI rate is the most dominant variable to influence the variable economic growth rate. The working mechanism changes BI Rate to affect inflation is often referred to as the transmission mechanism of monetary policy. This mechanism illustrates Bank Indonesia's actions through changes in monetary instruments and operational targets affecting various economic and financial variables before ultimately impacting the final goal of inflation. This study uses the interest rate channel, asset prices, and the exchange rate channel [5]. Other studies have nothing in common using these three pathways. For example, those using a single channel such as Alani [1] credit lines, Hussain [4], Soares [14], interest lines and using two channels such as Vymyatina [9] lines of credit and exchange rates [5], Rosoiu [16], Oliner [17], Wollmershäuser [15], interest and credit lines, Rusnák [3],
Vymyatina [9], Shenglin [18], Odo [19], Oliner [17], interest and exchange rates. Using three channels such as Ashiddiiqi [13], interest, credit and exchange rates, Odo [19], interest, credit and asset prices, Forhad [20] credit lines, asset prices and exchange rates [5] and using four channels such as Oguanobi Interest, credit, asset prices, exchange rates and expectations, Trang [2], Nwaobi [11], interest lines, credit, asset prices. Although using the three paths, but not the same path of interest, asset prices and exchange rates, and using the four Paths of Trang [2] and Oliner [17], but only one country.

4 Conclusion

By panel, the amount of money supply leading indicator (China, India, Vietnam, and Indonesia), but its position is unstable in the long run. The leading indicator of the effectiveness of variables in state stability control CIVI, i.e. interest (India, Vietnam, and Indonesia) seen from the stability of short-run and long-run, where the interest variable in both long and short term is significant controlling economic stability. The leading indicator of the country's effectiveness in the control of the stability of CIVI countries is namely India (interest, exchange rate, amount of money supply, inflation expectations and GDP) and Vietnam (interest, amount of money supply and GDP). Other countries, such as Indonesia, economic stability control is done by interest and the money supply, whereas China is done through the amount of money supply. India is still strong in controlling price stability through its exchange rate stability. China's state is still strong in controlling price stability through the preservation of the amount of money supply. The Indonesian state is still strong in controlling price stability through the stability of the amount of money supply.

5 References


The Development of Creative Clinic Model In University: Issues And Implications

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*andrizainal@unimed.ac.id

Abstract - Academics as part of a community of scholars in either higher education institutions or research institutions particularly have a large role in developing the creative economy. The synergy between tertiary institutions and Micro Small Medium Enterprises (MSMEs) through a one to one approach is expected to boost the creative economy sector that has gained significant interest from both business actors and the government due to its enormous economic potential. This qualitative study aims to descriptively analyze the needs of MSMEs in Medan Municipal City toward developing and establishing the creative economy clinical model at LPPM Unimed. The result of the analysis depicts profiles of the business owner, the business profiles and the business performance from MSMEs in Medan. The importance of identifying the needs of MSMEs is based on the theory of Know Yours Customers (KYC) strategies underlining the urgency of MSMEs to provide excellent service for clients by recognizing requirements expected by their service users accurately.

Keywords: Creative Economy, SMEs, Creative Economy Clinic, Quadruple Helix, University

1 Background

The creative industry is one of the industrial fields that has great opportunities to develop rapidly in the industrial revolution 4.0 era. This is due to the incorporation of the recent technology utilized in majority creative industry related-sectors optimizing the creativity and thinking ability of the perpetrators. This opportunity is certainly the right moment for the government, especially Indonesia to strengthen the foundations of the economy, especially by making the creative economy a priority given that the creative economy relies more on creative human resources because human creativity comes from the power of thought which is the basis for creating innovation in face greater competitiveness or market competition in the current eruption era. Furthermore, the concept of a creative economy is getting more attention in many countries because it can make a real contribution to the economy for developing countries to raise, grow and develop with an inclusive and sustainable level of economic growth [1,2,3,4].
The creative economy in Indonesia has given a good contribution to help the national economy. This can be seen from the above figure that shows a positive trend in the development of the Gross Domestic Product (GDP) of the creative economy in Indonesia. The GDP of the creative economy sector from 2010-2018 consistently rose to IDR 1,105 trillion in 2018 which is equivalent to 7.45 percent of the total Indonesian economy. In comparison to other countries, the contribution of Indonesia's creative economy sector to the national GDP is not exactly small. The figure of 7.43 percent in 2017 places the contribution of the creative industry sector in Indonesia above similar performances from other countries such as Canada (4.63 percent), Singapore (5.90 percent), Philippines (5.24 percent) and Russia (6.12 percent).

In 2016 particularly, Indonesia ranked as the third-largest creative economic contribution to the national economy, below the United States (11.12 percent) and South Korea (8.67 percent). The share of Indonesia's creative economy GDP is 7.44 percent greater than Russia, Singapore, the Philippines, and Canada. This figure also indicates the level of the Indonesian economy experiencing rapid development in the scope of the creative economy. One of them is caused by the widely used of information technology that makes opportunities and improvement of the creative economy faster [5,6].

The growing development of digital technology affects the current shift in the structure of the creative economy. The creative economy sector is facilitated by the relationship among the government, intellectuals, entrepreneurs and the community that later called the 'quadruple helix' model. This model has performed as the main actor driving the birth of creativity, ideas, science, and technology that is vital for the growth of the creative economy in Indonesia. A close relationship, mutual support, and symbiosis among the four actors establishing the foundation and pillars of the creative economy model that will last in the long-term period [3].
Apart from the government, academics as part of the community of scholars in higher education institutions and research institutions, have a larger role in developing the creative economy. Academics here (researchers and lecturers) have a role as agents who disseminate and implement science, art, and technology. They are also expected to shape constructive values for the development of the creative economy in society. The majority of researchers believe and state that the university's key role in the creative economy lies in optimizing its ability to transfer the research outcomes to industry, generating new inventions and technology spin-offs in the form of startup companies [3,7].

Accordingly, the role of universities through intellectual transfer will strengthen the formal and informal bases of innovation. In particular, universities can mature innovation concepts and also have the capacity to disseminate information with international networks [3]. In line with this initiative, there has been a movement in the United States and throughout the world to make universities as the ‘engine of innovation’ [9,10,11] that further increase their ability to commercialize their research [7].

In the era of disruption with more complex demands and challenges for creative economy actors - especially for MSME players who have issues in the knowledge of applying technologies - the real contribution of tertiary institutions as strategic facilitators can help stakeholders (MSMEs, governments, and companies) in elevating the performance of the in-country creative economy sector. The number of studies has underlined this phenomenon. Nicholaides [12] analyzes the role of universities in South Africa; Kasim [13] conducted a similar study on how universities in Malaysia have formed an entrepreneurial agenda; Faggian [14] discussed the importance of universities as providers of local MSME research and development; Darwish [15] conducted a study of the role of universities in developing SMEs in Bahrain; Ghina [16] examined the effectiveness of entrepreneurship education in higher education institutions in Indonesia; Comunian [17] conducted a study of the relationship between universities and the creative economy with analysis on creative graduates, knowledge transfer and regional impacts; and Bomani [18] examine the role of higher education institutions in the development of SMEs in Zimbabwe. In general, research findings indicate that tertiary institutions play a very important role in optimizing the performance of SMEs through training, technology transfer, business incubators, research, and research commercialization.

Universitas Negeri Medan (henceforth called as UNIMED) has carried out its role in encouraging the development of MSMEs, especially in the City of Medan. Lecturers as researchers and community service professionals have conducted many research studies and applied the outcomes of studies to the community on a one to one approach, namely through the Community Partnership Program (PKM). The Institute for Research and Community Service at Medan State University (LPPM Unimed) is actively seeking to increase the potential of MSME entrepreneurs who have become partners of LPPM Unimed to become more innovative and independent MSMEs. Even though universities have a very strategic role as stakeholder facilitators in the development of the creative economy, the fact is that in many cases MSMEs still face various obstacles. Head of North Sumatra Province Cooperative and UKM Office, Drs. Amran Utuh, MAP stated several MSME related obstacles: (1) the low quality of HR management of MSMEs; (2) the low growth of MSMEs; (3) lack of MSMEs that have access to capital; (4) low competitiveness of micro and small businesses; and (5) limited product marketing and MSME partnerships. Meanwhile, the Minister of Transportation, Budi Karya Sumadi, revealed that one of the limitations of solving MSME problems was because MSME actors were lagging in the use of technology. SMEs are still not
optimally engaging in digitalization opportunities as shown on the statistic records that until the end of 2018 only 5 percent of MSMEs in Indonesia go digital [19,20].

The role of universities as one of the actors driving the creative economy in a country has not run effectively. The existence of a forum or space for the creative economy on campus is still not optimal in terms of accelerating the development of the creative economy caused by various factors related to the stagnation of the ideal ecosystem. Some evidence to support this statement includes: the lack of ability of lecturers to provide new paradigms related to the importance of entrepreneurship, entrepreneurship partnerships, and tertiary institutions have not operated effectively, lack of collaboration between tertiary institutions and MSMEs, and collaboration with financial and non-financial institutions limited [16].

Based on the phenomena and findings of the research, the quality of university partnerships with MSMEs still needs evaluation to provide the maximum contribution. For this reason, LPPM Unimed continues to make every effort to design a variety of strategic work programs to support the growth and development of MSMEs that are fostered by developing a creative economy clinical model specifically to meet the demands of conditions in the 4.0 industrial revolution era and in welcoming the era of society 5.0.

This descriptive qualitative study analyzes the identification of the needs of MSMEs for the follow-up mapping needed in the development of a creative economy clinical model at LPPM UNIMED with the formulation of the problem:

- Research Problem 1: What are the problems and obstacles faced by MSMEs in Medan in the current conditions?
- Research Problem 2: How can the effectiveness of creative economy clinic services support and encourage the success of MSMEs in Medan?
- Research Problem 3: What are the indicators that explain the needs of MSMEs as the development of a creative economy clinical model?

Thus, the objectives of this study are intended to:
1. To find out the problems and constraints of MSME in Medan.
2. To determine effective factors in encouraging the practice of MSMEs in accordance with their effectiveness criteria.
3. To determine the mapping of indicators identifying the needs of MSMEs in Medan as a preliminary study of the development of a creative economy clinical model.

The Link Amongst University, Creative Economy And Clinical Model

The Relationship Between The University and Creative Economy

Universities have long played an active role in research and technology development, especially in developed countries. In the era of the industrial revolution 4.0, universities are also expected to play a key role in regional development. The role of traditional universities whose main mission is research and teaching has been replaced by entrepreneurial universities that are more actively engaging in income-generating. These entrepreneurial universities are also widely regarded for their competence in increasing economic viability through technology transfer, commercial transfer, innovation, spin-off company generation, and direct involvement in regional development [21].

More specifically, Alexander and Eugeniy [8] state that universities are agents of economic and technological development. Universities offer more than knowledge and service provision hence they should focus on their third role, which includes fostering knowledge that is regionally embedded, co-created, and shared [7]. Plechero [22] and Piterou and Birch [23]
further underline for universities taking more initiatives in building a strong relationship between universities and SMEs through direct and informal contact.

Indonesia's universities have taken in charge of improving the development of the creative economy sector, especially for those contributing to the MSMEs. The respective roles are relevant to the three main universities' roles (called as the Tri Dharma of Higher Education in the local term) set for: (1) encouraging the birth of Indonesia's creative generation with a mindset that supports the growth of initiative and works in the creative economy from a formal education; (2) actualizing high-quality research to provide input on creative economic development policy models and instruments needed, and produce technologies that support the workings and efficient use of resources as well as making a greater national creative economies competitiveness; and (3) establishing more innovative and independent societies that support the growth of the national creative economy through conducting community service engagements [1,24].

![Diagram: The Role of University and Creative Economy]

Source: Comunian dan Gilmore in Florida et al., 2006

Fig 2. A Mechanism of the Relationship between University and Creative Economy

From the above figure, it is known that the interaction between universities and the creative economy fosters creativity, innovation, and technology transfer, which is very important for economic development and national competitiveness [15,25]. Universities have also commercialized research outcomes [8] and can be freely accessed via the Internet [30].
The Creative Economy Clinic In Campus

Creativity is the main capital in facing global challenges. The form of the creative economy always comes up with a unique added value, creates its market, and manages to absorb labor and economic income. To establish a solid creative economy sector, number of high-quality human resources with innovative power and creativity are needed. However, in addition to the need for quality human resources, the development of a creative economy also requires space to explore ideas, work, as well as self-actualization and creative ideas [1].

In developed countries, the formation of creative spaces has led to creative cities supported by an existing conducive atmosphere for the community to foster their creativity. Besides, creative studios are also served as a forum for creative economics that can be formed. The concept of the creative studio is an idea given by University of Selamat Sri academics to provide a forum for business people or communities in developing creative economic activities, managing current potentials, producing goods or services, education, promotion, packaging, and collaborating with various parties [5].

In responding to the situation, LPPM Unimed has also provided space or a place for the development of creative economic ideas through the creative economy clinic that complementing the existing Community Partnership Programs (PKM). Universities and lecturers play a role as facilitators who help stakeholders to enhance the development of the creative economy, especially assistance to MSMEs around the City of Medan. This creative economics clinic is intended to mediate and encourage MSMEs as local partners of LPPM UNIMED. It is also performed as a laboratory for MSME partners’ applying relevant technology in fostering the needs for innovation and digitalization.

Likewise, there has been none of the research conducted in both studying the existence of the creative economy clinic and its influence on accelerating the development of the creative economy for local MSMEs. This is not only caused by various factors related to the stagnation of the ideal ecosystem, to name a few is a weak governance system. Based on the existing limitations, LPPM Unimed conducts a study related to the development of an effective creative economy clinic model toward providing optimal services and assistance for MSMEs.

2 Research Method

This research uses a quantitative descriptive approach started by reviewing theories and empirical studies to obtain a descriptive picture related to the potential of the creative economy sector and the role of tertiary institutions as the mediator for MSMEs. Accordingly, we analyzed relevant problems faced by MSMEs in the era of the industrial revolution 4.0. The output of this step is used to identify the needs of MSMEs towards developing an effective clinical economics clinical model for the development of technology-based MSMEs. The research concludes by developing several conclusions. To clarify the research method, the following figure presents a schematic research design:
3 Results and Discussion

The Conceptual Model

Why is the performance of Indonesia's MSMEs still relatively below their peers in neighboring countries that have relatively the same level of economic development? Based on the analysis of literature, secondary data, and input from several relevant ministries as policy implementers, business associations, the national banking industry, and other private parties, it can be concluded that many factors influence the competitiveness of MSMEs. These factors are divided into internal and external factors. Internal factors include aspects that determine the company's internal competitiveness such as productivity and innovation. Meanwhile, various external factors also influence and support the competitiveness of MSMEs, namely: the ease of doing business in Indonesia, financial and capital access, market access, infrastructure, and general macroeconomic conditions [27].

Internal and external variables relevant to the activities of MSMEs can be used as a basis for determining the criteria for the establishment of an effective creative economy clinic. Firstly, the creative economics clinic must be able to provide innovation development for MSME entrepreneurs. The academia as the initiator of the formation of this clinic must continue to conduct research and development in identifying new things related to innovations. This initiative is pivotal for creative economic actors who have gathered in the...
creative economy clinic [5]. Accordingly, in supporting comprehensive services, the creative economy clinic must be supported by professional and competent consultants in their fields. Lastly, high-quality clinical services require a transparent culture, involvement, and openness between the parties involved.

In the initial stages of developing a creative economy clinical model, a preliminary study of the identification of MSME requirements is needed. The mapping of indicators that are used in identifying the needs of MSMEs in Medan is as follows:

The mapping of the indicators above is based on the theory put forward by Christian Grönroos in formulating the Know Yours Customers (KYC) strategy, which is one of the service strategies used to provide excellent service for service users by recognizing the needs and desires of those service users. The KYC strategy in public services is used to recognize the needs, interests, and aspirations of service users so that service delivery is responsive [28].
Data shows that in 2016 there is no difference in terms of the age of the creative economy workforce with their general counterparts. The participation of young people in this sector is 17.8 percent. On the other hand, the education structure of the creative economy workforce is different from the structure of the workforce in general. This sector still needs additional support from the higher educated generation. In 2016, the creative economy entrepreneurs dominated by women rated by 54.46 percent against men. This data experienced a slight increase from the previous year at 53.68 percent [2]. As indicated by Tambunan [29], the level of education has a positive effect on company growth. SME owners with higher levels of education are proven to have a better understanding of their business, for example, SMEs in the export-oriented rattan equipment sector. Besides, the ability of SME owners to understand the latest market trends is more influential on productivity compared to lack of expertise [27].

The identification of business scale and company age is important because the larger the scale of the business, the greater the opportunity to achieve an expected economic level of production. Thus, the structure of production costs can be reduced. A long-established company shows that the company already has the experience and competitiveness affecting its success in increasing production efficiency over time. Furthermore, labor training and the use of new technologies also play a large role in supporting productivity levels [27]. The phenomenon of the digital economy has been well implemented in the creative economy. The statistics provided by Bekraf and BPS indicate that creative economy entrepreneurs have been familiar with computers at 64.24 percent and use the internet at 68.83 percent.

However, in other regions outside Indonesia, the creative economy actors still have issues in maximizing the use of digital media. The openness that grows in society, especially
in terms of the media, brings a positive impact on the growth of space for expression and creativity. Business location is also important in encouraging the development of the creative economy sector. The opportunity for an MSME to participate in the Global Value Chain (GVC) will be even greater if the business location is close to an industrial estate or port.

In the industrial revolution 4.0 era, the competitiveness of a business actor, especially MSMEs is also determined by the ease of access to business support. This phase is pivotal as additional capital is needed by MSMEs to successfully achieve the level of productivity needed following production demand. Financial institutions are expected to solve the issue in the course of a creative economy as they are the important elements to bridge the financial needs of actors in the creative economy [27]. Based on the results of the identification of MSME performance, especially in terms of MSME needs and the description of business support and business consultations obtained and the mechanism favored by MSME actors will provide a positive picture for LPPM Unimed in developing an effective creative economic clinical model while still paying attention to the concept of competent management, professional community empowerment, good communication and the formation of creative economic potential clusters as Switzerland, Germany, and Italy use cluster development strategies to encourage the MSME sector. The strategy begins with the identification of existing clusters and has the potential to become a strategic industry. This can be seen in the metal and machinery industry sector in Germany and the formation of high-tech industrial clusters (agglomeration) in Silicon Valley, United States [27].

4 Conclusion

The development of the creative economy must be set as an important agenda in building a national economy ecosystem, including in Indonesia. Various collaborative initiatives to improve the performance of the creative sector, especially MSMEs, still need to be done even though Indonesia is relatively late or not optimally utilizing these initiatives. The development of the concept of the creative economy in Indonesia that is currently running is a continuation of the application at the strengthening stage (2008-2014). At this time, the stages of the creative economy are in the direction of acceleration, which is the stage that is deliberately planned by the government so that the creative economy becomes one of the foundations and pillars and economic forces in Indonesia [27].

The role of universities is also important. Lecturers as researchers and community service professionals have conducted many research studies and have applied the results of studies to the community on a one-to-one approach (lecturer approach to MSME as partners). However, the existence of creative economy clinics or other institutions in universities is still not optimal in accelerating the development of the creative economy. This is caused by certain factors such as the resolution of MSME problems that are not holistic and sustainable due to the limitations of the ideal ecosystem and the non-optimal role of managers in carrying out their main tasks and functions as well as weak governance systems.

Based on that, LPPM Unimed developed a model of the creative economy clinic on campus. The analysis of the indicators related to the needs of MSMEs as an initial stage of developing the clinical model consists of the profile of the business owner, business profile, and business performance. The selection of indicators is based on a survey reference conducted on number of SME sector companies in the UK surveying business performance, problem needs and factors that inhibit the growth of SMEs [15].
5 References


Does Parental Financial Communication Affect Emerging Adults’ Financial Behavior?

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Abstract. This study focuses on investigating the relation between parental financial communication and financial behavior in emerging adults, an issue which most studies have less intention in the current literature. Primary data were used with a cohort of university students that taken financial courses in 2019/2020 academics year in State University of Medan with total sample \( n = 241 \) to develop a pathways model of parental financial communication towards emerging adults Financial Behavior. The sample participants ranged from 18 to 25 years old. The finding confirms the existence of parental financial communication relationship towards the development of emerging adults’ financial behavior. More importantly, direct financial communication reveals significant in reflecting parental financial communication as latent variable rather than indirect financial communication. Moreover, direct parental financial communication trigger general management and capital accumulation management as a reflection of the development of emerging adults’ financial behavior as latent variable.

Keywords: Emerging Adults, Parental Financial Communication, Financial Behavior

1 Introduction

A unique transitional stage in development between near total dependence on family adolescence and near total independence is represented by the emerging adult’s population [1] with range of age 18 to 25 years old [2, 3, 4], which financial independence is one key indicator of a successful transition to adulthood [3]. Nevertheless, a significant source of stress for college students is deal in financial strain, that could raise the risks of depression and other mental health problems and lowers the probability of graduating from college if it not manage in proper [5, p. 453]. Moreover, S.L. Worthy, et al. [2] characterized emerging adults as an individual that has less stable: financial situation, interpersonal relationships, living arrangements, cognitive and emotional development, and religious beliefs than adults. Furthermore, studies about emerging adults financial behavior found that lack adequate financial knowledge, poor financial decisions and engage in more risk-taking behaviors are related to most of emerging adults [2,6]. A study that has been done by B. L. Jorgensen, et al [1] in examine the emerging adults financial behavior base
on family financial socialization theory with 321 sample of college students found that financial communication and locus of control mediated the relationship between attachment insecurity and financial behavior. In addition, S. L. Worthy, et al. [2] found that age, gender, public assistance, adults status, sensation seeking, and potential for problem gambling were related to student financial behavior. S. Shim, et al. [3] study revealed that parental socialization has significant role in changing individuals’ financial attitude, financial controllability, and financial efficacy. No study was found in Indonesia emerging adults that focusing relationship between parental financial communication and financial behavior. This study is unique in its exertion to determine how parental financial communication and emerging adults’ financial behavior are reflectively construct in a line of model. Therefore, this study examined relationship between parental financial communication and financial behavior of emerging adults.

Parental financial communication is part of purposive financial socialization [1], which is defined by C. G. Gudmunson and S. M. Danes [7] as efforts of family members in financially socialize each other intentionally. Study that has been done by N. Tang, A. Baker and P. C. Peter [8] showed that parental influence and self-discipline positively correlate with responsible financial behavior. Moreover, a study that has been done by U. Sirsch, M. Zupancˇicˇ et al. [9] with Austrians and Slovens university students as their sample revealed that there is significant links between adopting parental role model and financial behavior control. However, a study showed that parental control in psychologically had a direct effect on emerging adults’ risky behavior, decrease life satisfaction, self-esteem and endorsement [10]. Furthermore, Pinto et al. in C. G. Gudmunson and S. M. Danes [7, p. 650] revealed that college students receive more information about credit from parents than from peers, media or school and that the more information they receive from parent, the lower are their credit card balances. B. L. Jorgensen et al. [1] found that emerging adults’ financial behavior has been affected by parental financial communication, which was assessed through emerging adult perceptions of parental direct (e.g. discussion and teaching) and indirect (e.g. modeling) communication.

C. G. Gudmunson and S. M. Danes [7, p. 650] describe two types of financial behavior. First type is common definition of financial behavior which expresses a frequently pattern of action such as earning, saving, spending, and gifting. The second type relates to financial turning points and decision making. Furthermore, B. L. Jorgensen et al. [1] define financial behavior in the domains of cash management, credit management, capital accumulation, and general management. Moreover, N. Tang and A. Baker [11] revealed of their study on financial knowledge and financial behavior among average household in Europe, the United State, Australia, and other countries that there is significant direct and indirect association between self-esteem and individual financial behavior after have a hold over financial knowledge and other socioeconomic factors.

In light of the pressing nature of this topic, this article makes the following contribution. First, factual definitions of parental financial communication and emerging adults through constructs measurement assessment of its’ confirmatory indicators. Secondly, obtaining the path value between parental financial communication and emerging adults’ financial behavior. Finally, synthesis the result of construct measurement and path measurement. Moreover, the main focus of this study is to examine the financial behavior of emerging adults and their relationship with their parents.
Literature Review

1.1. Parental Financial Communication

As it was mentioned in B. L. Jorgensen et al. [1] that parental financial communication is a segment of purposive financial socialization that is defined by C. G. Gudmunson and S. M. Danes [7, p. 649] as “intentional efforts family members use to financially socialize each other”. Furthermore, B. L. Jorgensen et al. [1] constructs definition that derived from C. G. Gudmunson and S. M. Danes [7, p. 649] and B. L. Jorgensen and J. Savla [6] as emerging adults perceptions of parental direct (e.g., discussion and teaching) and indirect financial communication (e.g., modeling).

1.2. Financial Behavior

Financial behavior examines the decision making of individual, including cognitive and emotional biases, which based on perceptiveness in explaining individual behavior, market inefficiencies, and stocks anomaly [12]. B. L. Jorgensen et al. [1] define financial behavior in the domains of cash management, credit management, capital accumulation, and general management. Furthermore, C. G. Gudmunson and S. M. Danes [7, p. 650] describe two types of financial behavior. First type is common definition of financial behavior which expresses a frequently pattern of action such as earning, saving, spending, and gifting. The second type relates to financial turning points and decision making.

The central focus of the current study was the nature of the relationship between parental financial communication and emerging adults’ financial behavior. Consistent with the model proposed by B. L. Jorgensen [1], this study was hypothesized in three stages. Firstly, parental financial communication as an exogenus and also latent variable was hypothesized with two indicators which is direct parental financial communication and indirect parental financial communication. Secondly, emerging adults’ financial behavior as an endogenus and also latent variables was hypothesized with four indicators which is cash management, credit management, capital accumulation, and general management. Lastly, the path value between parental financial communication and emerging adults’ financial behavior was hypothesized.

In summary, the research hypotheses are:

H1 Parental financial communication could be explained by direct and indirect parental financial communication.

H2 Emerging adults’ financial behavior could be explained by cash management, credit management, capital accumulation, and general management.

H3 Emerging adults’ financial behavior could be affected by parental financial communication.

2 Research Method

This study is explorative study and has been carried out from 1st of August until 16th November 2019. Furthermore, sample were taken from undergraduate students with a total of 241 respondent that were identified as emerging adults with age range from 18 to 25 years old. Purposive sampling technique were used with a criteria of age and must be registered in financial
courses from 1 August 2019 in 2019/2020 academic year at Management Department Program State University of Medan. Nonparametric statistics were used and all data and hypotheses were analyzed through structural equation modeling partial least square with the help of Smart PLS 3.0 application.

Parental financial communication as latent variable was measured through two indicators which is direct and indirect parental financial. In consistent with the model and measurement assessment scale that has been modeled by B. L. Jorgensen [1], each indicator has fifteen items of statement that evaluate budgeting, developing credit rating, and health insurance. The items were four-point Likert-type responses ranging from one to four with one represented by “Never” and four by “Always,” the higher the score represent more frequent parental financial communication.

Emerging adults’ financial behavior construct was measured using four content indicators which is cash management, credit management, capital accumulation, and general management. The four indicators was measured consistent with the model and measurement assessment scale that has been modeled by N. M. Porter [13] and B. L. Jorgensen [1]. The cash management scale contained three items with four-point Likert-type responses examining behavior related to managing one’s cash reserves (e.g., “I used a weekly/monthly budget to track my income and expenses.”). The credit management scale contained a total of four questions, though only two were four-point Likert-type responses. The other two items related to payday loan usage and credit card possession were five and seven-point Likert-type items, respectively. The capital accumulation scale was comprised of two five-point Likert-type items ranging from one to five, with one represented by “Never” and five by “Always.” These items examined saving and investment behavior. Lastly, the general management scale was comprised of three four-point Likert-type questions related to long term planning and continuous assessment of overall financial status. Responses ranged from one to four with one represented as “Never” and four represented as “Always.”

Based on measurement that has been described, the statistical equation for this study are:

1. Parental financial communication construct (Outer Model - $\xi$):
   \[
   x_1 = \lambda_1 \xi \quad \text{Direct}
   \]
   \[
   x_2 = \lambda_2 \xi \quad \text{Indirect}
   \]

2. Emerging adults’ financial behavior construct (Outer Model - $\eta$):
   \[
   y_1 = \lambda_1 \eta \quad \text{General Management}
   \]
   \[
   y_2 = \lambda_2 \eta \quad \text{Cash Management}
   \]
   \[
   y_3 = \lambda_3 \eta \quad \text{Credit Management}
   \]
   \[
   y_4 = \lambda_4 \eta \quad \text{Capital Accumulation}
   \]

3. Path (Inner Model)
   \[
   \eta = \gamma \xi
   \]

95 percent confidence interval was chosen for this study. Therefore, outer model could be justified as reliable if the value of AVE is more than 0.50 and the value of composite reliability and Cronbach alpha is more than 0.70. Furthermore, with significance level of 0.05 the path value or inner model must have T-statistics value more than 1.96.
3 Results and Discussion

Figure 1 showed that direct parental financial communication as reflective indicator has loading factor value 0.957 or more than 0.70. However, indirect parental financial communication has loading factor value only 0.511 or less than 0.70. Therefore, it is revealed that parental financial communication could only be reflected by direct communication rather than indirect communication. Furthermore, emerging adults’ financial behavior is shown that only general management and capital accumulation with loading factor value 0.761 and 0.783 respectively. Consequently, emerging adults’ financial behavior could be explained by general management and capital accumulation.

![Fig 1. Construct Measurement](image1)

After eliminating all the indicators that value below 0.70. The next step was to evaluate the path value and result showed that emerging adults’ financial behavior is affected by parental financial communication with T-Statistics 3.774 or more than 1.96. Therefore, this enlighten the third hypotheses’ which direct parental financial communication could trigger or affects general management and capital accumulation of emerging adults’ financial behavior. In this case, the structural equation could be defined as \( \eta = 3.774\xi \).

![Fig 2. Structural Measurement](image2)

Construct and structural measurement in figure 1 and 2 revealed new perspective on emerging adults. This result is a case picture of emerging adults’ financial behavior in a small cluster of university students in Department of Management Program State University of Medan which direct financial communication would be more prefer for emerging adults rather than indirect communication. This also indicates that general management and cash accumulation of
student in Department Management Program could be triggered by direct parental financial communication. Although, not all indicators are significant, however, this outcome study is linear with the study result of B. L. Jorgensen [1] which direct parental financial communication affects emerging adults financial behavior.

There are limitations that apply to the current study. First, the sample was too small which only apply on one university. Future studies should examine this model with a wider area of sample. Secondly, the use of theories in supporting this study is not in-depth. Finally, the methodology need to be more advanced in coping with different demographic and environment.

4 Conclusion

The study used structural equation modeling partial least square to confirm part of B. L. Jorgensen [1] study in replicating its’ to Department of Management Program State University of Medan. The results showed not all parts that are replicated significantly. Direct financial communication reveals significant in reflecting parental financial communication as latent variable rather than indirect financial communication. Moreover, direct parental financial communication trigger general management and capital accumulation management as a reflection of the development of emerging adults’ financial behavior as latent variable.

5 References


Nias Ethnic Ornaments as an Idea Source for Handmade Batik Creation

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Abstract. The traditional Nias ethnic ornament has a unique and very varied form. It is opened widely to engineer, to develop and to visualize traditional Nias ethnic ornaments into a Batik technique. The artwork products are practical and non-functional artwork. Practical functional artwork is related closely to the needs of everyday human life, while non-functional artwork is only for displaying the values of beauty. The research was conducted by involving the students of Fine Art Department, FBS UNIMED. Research and development method included engineering ideas, exploring forms and developing designs that refer to the Nias ethnic ornaments. Specific method in this study was a research method of work creation by making alternative designs until finished designs. The process of making designs until finishing works referred to the theory of elements and fine art design principles which included composition and harmonization that were well arranged using Batik dye Napthol. From the design to the Batik process, the slanting, coloring, and sagging (removing the wax by boiling the cloth with water glass solution) until becoming a Batik work. The results of the batik process were carried out by designing a pattern to determine the types of practical functional products. The forms of work creation research were a cardigan (auteur), clothes, chair cushions, and long cloth that had non-functional artistic value. The handmade batik work of research result was analyzed in depth by involving experts from fashion and batik design experts. The result of the study was expected to be able to open up new jobs as creative industries. In addition, the creation research result that took ideas from the traditional Nias ethnic ornament could increase toward the repertoire of handmade batik art in Indonesia. The output of this study was scientific article that was sent to reputable journal internationally, while the additional output was Batik Textbook related to Batik Craft course.

Keywords: Creation, developing, ornaments, batik, Nias

1 Introduction

Nias is an archipelago that is integrated of the North Sumatra. Its local cultural resources are very varied. One of the local cultural resources is ornaments, ornaments is a part of the fine arts that can be processed sustainably giving benefits toward the society. It is opened widely to engineer, to develop, and to visualize traditional Nias ethnic ornaments through handmade Batik technique. Theoretically, the society and students obtain the knowledge relating toward the concept, and understanding of art and its scope. Practically, the main key in realizing the idea is expected to continue as a new job for students and the society. It is also related to the Batik Craft and Textile course as well as the Batik Craft Specialization course which is taught
at Fine Art Department, FBS Unimed. The creation result is in the form of artwork to show the beauty aspect. However, functional objects are also created that are closely related to the daily human life needs. The first previous study about Batik research is contained in [1], the study explained that Malaysian traditional ornaments at North Sumatera are very feasible to be applied into the Batik technique.

The research was conducted to develop wings and to engineer or to explore ornaments found in Nias Island that could be implemented into batik technique. Nias Island as part of the North Sumatera, has a local culture resource such as a very diverse ornaments and it is worthy of being used as an idea source in conducting the research by creating and developing traditional Nias ornaments into written batik technique. Hopefully, it could increase creative industries in Nias Island, North Sumatra. However, based on observation, the im of Nias traditional ethnic ornaments as a local culture resource was still limited to certain fields. Not only that, but geographically its existence was also still in the local itself. Based the preliminary data above, the researcher was interested in conducting further research to visualize Nias ornaments on handmade Batik with the following formula. How do you visualize Nias ornaments into handmade Batik technique that was based on Nias ornaments? What creations could be created to visualize the Nias ornaments?

Literature Review

The ability to examine local content that contained a variety of traditional symbols provided an opportunity to build the creation foundation that did not merely change existing ones but also considered local uptake with a global feel. Thus, the findings of creative and innovative forms emerged. In visualizing the innovative forms of creation, creativity has a very important role. Creativity is the ability to produce new and useful work that has never been imagined before, both at the level of individuals and certain groups of people or a combination of abilities, knowledge, and motivation that is adapted to their environment [2].

The research maximized in applying traditional Nias ethnic ornaments into the field of batik art. Craft is a kind of art that produces a variety of quality furniture, decorative items, and elegant items [3]. Therefore, handicraft is a matter of diligent nature related to home industries that produces various types of goods that have artistic value to meet the daily needs of human life. Batik is a fabric stained by a dye technique with a batik wax barrier, with a characteristic pattern of ornaments design [4].

The research was explained that the traditional Batak ethnic ornaments could be identified, classified, and explored according to shape and type. After the three things were conducted, it was applied in making souvenir art that refer to the art tourism which reflected five special features.

From previous study, it was explained that even traditional ornaments could also be processed and developed into Batik technique. The ornaments developed into the batik technique produce Batak Batik motif with a dip bag. The coloring used napthol and salt with the Batak's characteristic colors which are red, black and white. Batak motif and special colors that are specific strength compared toward Batik that has appeared earlier. Thus, it was the reason of researcher to conceive Batak batik motifs.

The previous studies above illustrated the existence of traditional Batak ethnic ornaments strengthened that it could be utilized as an idea source in works of art creation. The artwork creation as souvenirs, in the batik technique that conducted the research, was to implement traditional Nias ethnic ornaments into batik craft work. The creation of batik craft that reflects the characteristic of Nias as a local flagship but it was packaged in such a way that had a global atmosphere and it was also expected to foster innovative creative industries in Nias.
Ornaments

Ornaments is a branch of fine art in which many symbolic values or intentions are found which have something to do with the way of life or philosophy of life of human being or the society creator. In its form, ornaments can be in the form of two-dimensional or three-dimensional in accordance with the style and style of each ethnicity. Each ethnic group in North Sumatra has cultural resources in the form of ornaments which are used as objects to be visualized in batik technique to produce handicraft products that have high economic value. Generally ornaments found in North Sumatra could be seen based on the shape of the picture, which was in the form of human form, animal shape, giant shape, plant form, geometric shape, and natural or cosmic form. The following are various kinds of ornaments possessed by Nias ethnic groups, such as: niohulayo, niotatalakhoi, niogama, niosolafiga, niotalinga woli-woli, niomeme, niobuaya, lasara, nioafi-afi, niobuaya, bawi, I’a, fofo, bae, cia, and gogowaya [5]. Each type of ornaments has a certain symbolic meaning and is still believed by the local community. However, the forms of the ornaments will be used as a basic concept or framework in this study by creating batik craft art forms, so that batik art with a distinctive style and style of Nias as a local identity will be global. Craft is a matter of being diligent, gossip; industry, household handicraft company, non-machined handwork; handmade items. Based on the explanation above, it can be assumed, that handicraft is a matter or diligently related to the home industry that produces various types of furniture items, ornaments that have artistic value. Therefore in this research a creative industry will be created in the field of batik handicraft products with batik art products with Nias style. Ornaments art is a branch of fine art that has taken root in Indonesia as a satisfying sense of beauty and can be developed by adjusting human needs in the present and future [6]. Starting from prehistoric times in Indonesia until today, the existence of ornaments is always needed in everyday human life [7]. Each region also has an ornamental art. The type and style differ from one ethnic to others, one of type and style of ornamental arts that has certain characteristics is the traditional ethnic ornaments art of Nias North Sumatra. The issue of style in ornamentation will also involve the identity problem that is characteristic of the ornaments. A special mark is needed to distinguish one from another by mentioning its special characteristics because each object has certain characteristics. To know the depth of meaning requires sensitivity, foresight, and accuracy. The application of ornaments is also found in various objects, starting from metal objects, wood, leather, children's games and furniture [8].

Nias traditional ethnic ornaments art spread in North Sumatra region as a local cultural resource that is worthy of being used as a reference in the research process in order to create the batik craft industry so that batik art will appear with the ethnic style and style of Nias, North Sumatra. The creation process is by applying elements and principles of fine art design that are proportional between each other [9]. In this way, the continuity of new forms of work will be obtained which refers to the traditional forms of ethnic Nias art works, which further formulation of the model can be applied to the development of handicraft works in a broad way, especially in batik craft originating from ethnic arts. Therefore, it will add toward the repertoire of batik art in Indonesia through a type and style typical of Nias North Sumatra. The application of the Nias ornaments in batik technique is an effort to develop and provide opportunities as well as an alternative to find forms of batik that have certain characteristic [1]. Furthermore, the emergence of creative industries in the field of batik art would open job vacancy opportunities widely. Since, in the process of creating batik art works involving various human resources. Starting from the process of preparing the product, designing the image, to the technical implementation requires skilled and skilled human resources in accordance with their respective competencies.


2 Research Method

The research conducted in two places. The first location was conducted in a craft studio room at Fine Art Gallery FBS Unimed. In the craft studio, students carried out the process of making designs and transferring it into Mori cloth. The second location was conducted at the Pendopo Art Studio. At the Sanggar Seni Pendopo, the students and the research team conducted a coloring process with Napthol and then sags (removes) the wax by boiling it using hot water and water glass. The population of the study was the number of Nias ethnic ornaments in the five regions of North Sumatera. The ornaments were: niohulayo, niotalakhoi, niogama, niosolafiga, niotalinga woli-woli, niomeme, niobuaya, lasara, nioafi-afi, niotozasai, niobutelai, bawi, Fa, jofo, bae, cita, and gogaya. Taking of ornament form was conducted by purposive sampling technique [10]. This selection was made to choose the form of Nias ethnic ornaments which are considered to have certain values and are relatively easy to find in the field and visually appear to be aesthetic values. Data from various types and forms of ornaments were collected through library research. After the data were collected, the next process was to realize the selected data and then to visualize it in the form of batik art works using Mori cloth and the other equipment, such as canting, wax, and Napthol.

The research conducted with the research and development method, which is a method to emphasize product development therefore it can be applied in a broader context. There are some stages in conducting the research, starting from the initial survey, developing the design model, testing the design model, validating and socializing the model. The study was conducted by observing and documenting forms of traditional Nias ethnic ornaments, both in the library and in the research objects, namely in the ethnic Nias of North Sumatra. The ornaments form used as a reference for design and then visualized in the form of batik art. Nowadays, there are many types of batik art with patterns and styles that reflect regionalism, such as Cirebon batik, Pekalongan batik, Lasem batik, Yogyakarta batik, Solo batik, and others. This research will be conducted to create batik art with Nias ethnic type of style by exploring the traditional ornaments of Nias North Sumatra.
3 Results and Discussion

In figure 1, the types of traditional Nias motif of handmade Batik 1 applied were Niogama, Niiozasai, Rumah adat Nias, Ni’ogolilimo, Niobutelai and Nioafi-afi coming from Nias traditional. Motif Niogama, Ni’ogolilimo, Niiozasai dan Nioafi-afi arranged in a longitudinal line on cloth. The form of patterns composition in the application of motifs on batik 1 was the process of repeating the shapes in a horizontal line. Niogama, Niiozasai, Ni’ogolilimo and Nioafi-afi forms were arranged in the same position and the same distance. While the Nias traditional house was only one and it was right above of Niogama, Ni’ogolilimo, Niiozasai dan Nioafi-afi motifs. The technique of making batik with traditional Nias motifs guided the technique of making batik with handmade technique. The colors used were black, red, and white. The white one was used on Nioafi-afi and the white one also was used for contour line on motif Niogama, Ni’ogolilimo, Niiozasai, Nias traditional house, and Nioafi-afi, in inside was put orange colour, while the black one was used as the base colour.

In figure 2, the types of Nias traditional motifs of handmade Batik 2 applied were Niogama, Niiozasai, Nias traditional house, Ni’ogolilimo, Niobutelai, Nioafi-afi, Niotalakhoi (Niotawolo). In the Niobutelai and Niotalakhoi (Niotawolo) motifs were varied. However, they did not change from the original shapes, the traditional motifs are arranged in a long line in the fabric. The shape of the composition pattern in the application of ornaments was the process of repeating the form in a horizontal alignment. The technique of making batik with traditional Nias motifs guided the technique of making batik with handmade technique. The colors used were black, red and white. White one was used for Nioafi-afi motif and it was also used for contour lines in Niogama, Niiozasai, Ni’ogolilimo, Nias traditional houses, and Nioafi-afi motif. Then, red one was used as a motif, and black was used as the base color.
In figure 3, the types of Nias traditional motifs of handmade Batik 3 applied were Niohulayo, Niotalakhoi (Niotawolo), Niotalinga Woli-Woli, Nioiozasai, and Niobutelai motifs in a long array of cloth lined up on the cloth itself. The shape of the composition pattern in the application of motifs is the process of repeating forms in a horizontal parallel. Niohulayo motif, Niotalakhoi (Niotawolo), Niotalinga Woli-Woli, Nioiozasai, and Niobutelai motifs were arranged in the same position and the same distance.

The technique of making batik with traditional Nias motifs guided the technique of making batik using handmade technique. The colors used were black, red and white. The red color was used as the color of the motif, the white color was used as the color of Niohulayo motif and it was used as a contour line on the Niotalakhoi (Niotawolo) motif, Niotalinga Woli-Woli, Nioiozasai, and Niobutelai motif, and black as the base color.

In this 4 handmade batik work, the types of Nias traditional motifs applied were Nioafi-afi, Niosolafiga, Nioiozasai motifs. The Niosolafiga motif was modified. However, it did not reduce the original shape. It was also modified to form a circle, and Niosolafiga motif was modified in terms of leaves and leaves, and Nioiozasai motif was also modified however it did not reduce from the original shape. The motifs that were combined and applied are very varied with compositions that tend to be symmetrical.

The technique of making batik with traditional Nias motif guided the technique of making batik using handmade technique. The colors used were white, red, yellow and black according to the traditional colors of Nias. In the fourth creation, white was used in contrasting motifs, but red was used in the field of Niozasai motifs, the middle circle of Nioafi-afi motif, and red was also used as Niosolafiga color. Yellow was used as the color of the Nioafi-afi motif and in the Niosolafiga motif, and black was used as the base color.
In figure 5, the types of traditional Nias motifs of handmade Batik applied were Nioiasaai, Nioafi-afi, Niosolafiga, Niogama and Niobutelai motifs. Niosolafiga motif was modified in the vine and there were leaves and Nioiasaai motif was modified. Then, Niobutelai motif was also modified but it did not reduce the original shape. In this creation, it was made solid on the cloth.

The technique of making batik using traditional Nias motifs guided the technique of making batik using handmade technique. The colors used were white, red, yellow and black related toward the traditional colors of Nias. The yellow color was used on Nioafi-afi motif and Niogama motif, the red color was used on the Nioiasaai motif, Niosolafiga, and the Niobutelai motif. Furthermore, the white color was used as a contour on the motif, and the black color was used as the base color.

4 Conclusion

The research was conducted in two stages. The first stage is the theoretical delivery to students who took Batik and textile craft subject and craft specialization subject. The theory given concerns the understanding of Batik, tools and materials as well as learning outcomes of batik and textile craft subject and craft specialization. The second stage is the process delivery of creating handmade Batik from the process of making designs to produce handmade batik and the process result in creating handmade batik that explored Nias ornaments. The creation produced in the form of handmade batik which has practical and non-practical functional. Cardigan Batik and T-shirt Batik are handmade, while non-practical functional was handmade work of art in the form of long cloth. The result of this handmade Batik could add to the Batik treasures in Indonesia.

5 References


Development of College Archives Management Book

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Abstract. The amount of unemployment at the university level is due to the low competency which is mastered by graduates. There are no books that can guide students to be able to manage dynamic archives based on the Archive Classification, Archive Retention Schedule. The purpose of this research was carried out to improve the quality of learning through the design of college Archive Management books. Specific Targets in this research resulted: 1) College Archives Management Book, 2) Teaching and Learning Activities Plan based on the Indonesian National Qualification Framework, 3) Archiving learning evaluation instruments, 4) Archiving Learning Media. This research uses a research approach and development (R&D), the method used is descriptive-exploratory method to identify various symptoms and root of the problems that occur in the study of Archive Management and design of the development of College Archives Management Book.

Keyword: Development, Book, Archive

1 Introduction

Every institution, whether it is a government, private or non-governmental organization, owns and produces an archive of each of its organizations. The archive serves as the main tool of organizational memory, evidence, material in the decision making process, barometer of organizational activities, legal evidence and as an administrative product [1]. In addition, the increasing need for information from data that has been created by an institute that forces each institute to manage its archives [2]. Thus the importance of archives in an organization, archives management properly will be used as information in doing the work of the organization.

College as one of the government institutions is also not spared from managing archives. Regulation of the Head of the National Archives of the Republic of Indonesia [3], concerning Guidelines for the Implementation of Archives in College. College in Indonesia as a scientific institution plays a strategic role in building the nation's civilization, because it carries out 3 (three) main functions known as the Tri Dharma of college, namely education, research, and community service. In carrying out this function, universities produce archives as recorded information which is an asset of the college and public asset at once that needs to be managed properly as evidence of accountability of college performance that reflects the achievements of the Tri Dharma of college. Therefore, the archives created by colleges have important benefits in the implementation of community, nation and state life.

Dynamic archive management aims to ensure the availability of archives as a material of performance accountability and as valid evidence in the context of carrying out functions and
tasks [4]. The existence of the archive is not something specifically created, but the archive is created automatically as evidence of the implementation of administrative activities or transactions. The existence of archive reflects a deposition of information on administrative / transaction implementation activities that require archives management to produce information [5].

Furthermore, College Archive Tasks according concerning Archives [6], include: (1) required to carry out static archive management received from work units in college and academic community, (2) managing the academic community's archive in college, (3) managing inactive archives that have a retention of at least 10 years originating from work units and the academic community in college, and (4) archiving guidance in the college concerned.

As part of the national archiving system, colleges organize dynamic and static archiving in their environment. Archives created by universities in any form and style are the nation's collective memory. Dynamic archive management is known as dynamic archive management or records management. There are four archives that must be available and become guidelines for the management of dynamic archives in each institution, both government and private. The four basic instruments for managing archives include: Official Manuscript, Archive Classification, Archive Retention Schedule and Security Archive and Access Archive Classification System. These four basic instruments serve as a factor controlling the practice of each stage in dynamic archive management from the creation, use and maintenance of archives and depreciating of archives [7].

The reality is that currently graduates of Office Administration have not understood and are able to use the four sets of archives above correctly as well as students of Office Administration and Archivists of Medan State University. From the results of the identification of the problems held at the meeting of all Medan state university archivists on January 25, 2019, it was found that all archivists were unable to manage the archives properly. Not understanding and not being able to use four archive devices which must be used in dynamic archive management.

There is no archival book that explains how to manage dynamic archives based on the selected storage system while still referring to TND, KA, JRA and SKKAAD. Meanwhile, the purpose of the preparation of TND, KA, JRA and SKKAAD to ensure the realization of a dynamic archive management system that is integrated from the creation, use, and maintenance to the depreciating of the archive correctly [8].

To improve the mastery of Dynamic Archive Management competencies in students of the Office Study Program and archivists of Medan State University, then it is necessary to design a book on Dynamic Archive Management in college. The innovative thing in the book is to combine the theory and practice of managing dynamic archives by referring to the use of four archive devices (TND, KA, JRA, SKKAAD). Considering there is no Dynamic Archives Management book in College that can help lecturers and students as well as archivists in managing dynamic archives in College.

**Theoretical Framework**

Office Administration Education Study Program is one of the study programs in the Majoring of Economics that prepares students to become prospective teachers in vocational high schools in business management or to become administrative staff in both government and private institute. As a prospective teacher of a vocational high school business must
master a variety of office work which includes managing dynamic archives, as well as when graduates work as administrative staff in government and private institute.

The Office Administration Education Study Program equips students with skills in managing dynamic archives. Dynamic archive management is the process of controlling archives since archives were created, used, maintained and depreciated or destroyed [9]. Each stage in dynamic archive management uses a different mix.

The initial stage of the life process of the archive is the stage of creating the archive, at this stage the archive was created or made, then used as a medium for delivering information as a basis for planning, organizing, taking intelligence, monitoring and so on. Creation of archives properly must follow the Guidelines for Official Manuscript (TND) used in every government and private institute as well as in Medan State University. But in reality students or employees have never known much less let alone use TND in the process of creating an archive. The stage of archive creation is carried out through the categorization, registration, and distribution of archive activities. In connection with the creation of archives, required Official Manuscript in the environment of the creator of the archive [10].

The second stage in dynamic archive management is the use and maintenance of archives. At this stage the archive is categorized as a dynamic archive because it is used directly in organizing daily activities. This stage relates to the activity of recovering archives, easy or difficult to rediscover an archive depending on the storage system used. The better the archive storage system, the easier it will be to find the archive again. This archive storage process requires a list of archival qualifications, which include a list of archival qualifications including substantive and facilitative functions.

Dynamic archive is an archive that is still used for planning, decision making, supervision and other purposes. The use of an archive both by individuals and work units must follow the Security Classification System and Dynamic Archive Access System (SKKAAD). This is to prevent the archive from falling into the hands of undue people or institute. Just like the previous understanding of TND, students of Office Administration and Archivists of Medan State University have not been able to understand and use Archive Classification and SKKAAD correctly. Even though the requirements for storing archives must be able to use an archive classification list.

The last stage is the depreciation of the archive, which is the activity of reducing the archive because the frequency of its use has decreased and has no use value anymore [11]. There are three ways to depreciate the archives, namely: (1) transfer files that have a retention of less than ten years from the processing unit to the archival unit or UPT Archive or record center, (2) destroy archives in accordance with applicable regulations or in accordance with the Archive Retention Schedule (JRA), and (3) submit static archives by the archival unit to the archival institution both at the regional and central levels. In the third stage of dynamic archive management requires guidance on Archive Retention Schedules that are created and used for each institute. Students of Office Administration Education and Archivist in Medan State University have also not been able to determine JRA of an archive correctly.

The Curriculum based on Indonesian National Qualifications (KKNI) is a curriculum compiled based on the framework for qualifying the Indonesian human resources qualification that matches, equalizes and integrates the education sector with the training sector and work experience in a work skills recognition scheme that is adapted to the structure in various work sectors. Curriculum based on KKNI is a study program that requires the education system in College to clarify the profile of its graduates, so that it can be adjusted to suitability in the perspective of analyzing the needs of the community, but graduates of Office Administration Education Study Program are not in accordance with KKNI standards.
The book on Dynamic Archive Management in College is designed according to the needs of practical subjects where the book will include: material covers the basic concepts of Dynamic Archive Management in College and Procedures for storing and recovering documents/files with various filing systems that are designed and still guided by four archive devices, examples of letters and documents that will be stored with various filing systems, examples of the use of TND, KA, JRA, SKKAAD. The practice of saving documents and recovering them with various kinds of filing systems and evaluation instruments, maintaining and destroying files.

2 Research Method

This research uses a research and development approach (R&D), with a combination of qualitative and quantitative research. The method used is descriptive-exportative method to identify various symptoms and root of problems that occur in the study of Dynamic Archive Management and the design of the development of Dynamic Archive Management Book in College.

This research was conducted at the Office Administration Education Study Program, Majoring of Economics, Faculty of Economics Unimed. Willem Iskandar Street Pasar V Medan Estate. The research subjects as a source of quantitative data in this research were lecturers and students who took the Archives Management subject. Lecturers who are the subjects of this research are lecturers who manage the Archives Management subject. While students who are the subjects of this research are students who take the Archives Management subject.

The stages of the research follow the Borg and Gall model [12], R&D research in education includes ten steps, namely: (1) Research and information collection, (2) Planning, (3) Develop Preliminary form of Product, (4) Preliminary Field Testing, (5) Main Product Revision, (6) Main Field Testing, (7) Operational Product Revision, (8) Operational Field Testing, (9) Final Product Revision, and (10) Dissemination and Implementation. The flow chart of the steps is shown in the following figure:

![Fig 1. Borg and Gall R&D Research Steps](image-url)
Analysis of the data used in this research is the analysis of qualitative data and quantitative data. To obtain the expected amount of data, data collection instruments are used including: questionnaire, observation sheet. Data in the form of suggestions and input from experts and students are used to improve textbooks that are being developed.

3 Results and Discussion

The development of the College Archives Management book follows the Borg and Gall R&D Research steps with the following steps:

a. Research and information colletion (research and data collection). This first step includes needs, literature studies, literature review, small scale research and required reporting standards. To conduct a needs analysis there are several criteria related to the urgency of product development and product development itself, as well as the availability of competent human resources and sufficient time to develop. The literature study was conducted for a temporary introduction to the College Archives Management book to be developed and this was done to gather research findings and other information related to the development of the planned College Archives Management book. While small-scale research needs to be done so that researchers know a few things about the College Archives Management book that will be developed.

b. Planning. Prepare a research plan, including the abilities needed in conducting research, the formulation of objectives to be achieved with the design research or research steps the possibility of testing in a limited scope.

c. Develop Preliminary Form of Product. This step includes determining the design of College Archive Management books to be developed (hypothetical design), determining the research facilities and infrastructure needed during the research and development process, determining the stages of carrying out design tests in the field and determining the job description of the parties involved in research. This includes developing learning materials, learning processes and evaluation instruments.

d. Preliminary Field Testing. This step is a limited test of the College Archives Management book, which is conducting an initial field test of product design, which is limited, both the substance of the design and the parties involved. The initial field test was conducted with 10 students in order to obtain a decent design, both substance and methodology. During the trial observations, interviews and distribution of questionnaires were held. Data collection by questionnaire and observation which then analyzed. The results of the Questionnaire Analysis are presented in table 1.

Table 1. Results of initial field trials of Higher Education Archive Management books

<table>
<thead>
<tr>
<th>No</th>
<th>Rated Aspect</th>
<th>Average</th>
<th>Category</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Display of Archive Management book PT</td>
<td>3,5</td>
<td>Very Good</td>
</tr>
<tr>
<td>2</td>
<td>The PT Archives Management book makes learning more enthusiastic</td>
<td>3</td>
<td>Good</td>
</tr>
<tr>
<td>No</td>
<td>Rated Aspect</td>
<td>Average</td>
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</tr>
<tr>
<td>3</td>
<td>PT Archive Management Book makes learning not bored</td>
<td>2.9</td>
<td>Good</td>
</tr>
<tr>
<td>4</td>
<td>The PT Archive Management Book makes it easy to learn about archives</td>
<td>3.3</td>
<td>Good</td>
</tr>
<tr>
<td>5</td>
<td>PT Archive Management Book motivates to study archival material</td>
<td>3.2</td>
<td>Good</td>
</tr>
<tr>
<td>6</td>
<td>The material in the PT Archives Management book deals with the management of daily archives</td>
<td>3.3</td>
<td>Good</td>
</tr>
<tr>
<td>7</td>
<td>The material in the PT Archives Management book is easy to understand</td>
<td>3.0</td>
<td>Good</td>
</tr>
<tr>
<td>8</td>
<td>The examples in the PT Archives Management book are very helpful for understanding archival material</td>
<td>2.6</td>
<td>Good</td>
</tr>
<tr>
<td>9</td>
<td>Shows the order / hierarchy of the text composition (chapters, subchapters, sub-chapters) in stages so that it is easy to understand</td>
<td>2.7</td>
<td>Good</td>
</tr>
<tr>
<td>10</td>
<td>The sentences used follow Indonesian sentence procedures</td>
<td>2.7</td>
<td>Good</td>
</tr>
<tr>
<td>11</td>
<td>The sentences and paragraphs used in the PT Archive Management book are clear and easy to understand</td>
<td>2.7</td>
<td>Good</td>
</tr>
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<td>12</td>
<td>The language used in the PT Archives Management book is simple and easy to understand</td>
<td>2.6</td>
<td>Good</td>
</tr>
<tr>
<td>13</td>
<td>The typeface used is simple and easy to read</td>
<td>2.6</td>
<td>Good</td>
</tr>
</tbody>
</table>

a. Main Product Revision. This step is an improvement of the model or design based on limited field testing. Improvement of the initial product will be carried out after a limited field trial. At the stage of perfecting the College Archive Management book, the results of this initial field trial, were carried out more by a qualitative approach. Improvements made include: clarifying the steps in managing archives, adding examples of managing archives, adding images of materials and equipment used in managing archives, choosing fonts that are easier to read.

b. Main Field Testing. The revised College Archive management book is then used in the main product field test involving 20 students. This step is a further Archive Management book test, including testing the effectiveness of product design, testing the effectiveness of the design. The results of this test are effective design in terms of substance and methodology. Data collection by questionnaire and observation which then analyzed. The results of the Questionnaire Analysis are presented in table 2.

Table 2. Results of field trials of main products

<table>
<thead>
<tr>
<th>No</th>
<th>Rated Aspect</th>
<th>Average</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Display of Archive Management book PT</td>
<td>3.5</td>
<td>Very Good</td>
</tr>
<tr>
<td>2</td>
<td>The PT Archives Management book makes learning more enthusiastic</td>
<td>3.35</td>
<td>Good</td>
</tr>
<tr>
<td>3</td>
<td>PT Archive Management Book makes learning not bored</td>
<td>3.15</td>
<td>Good</td>
</tr>
<tr>
<td>4</td>
<td>The PT Archive Management Book makes it easy</td>
<td>3.55</td>
<td>Very Good</td>
</tr>
<tr>
<td>No.</td>
<td>Rated Aspect</td>
<td>Average</td>
<td>Category</td>
</tr>
<tr>
<td>-----</td>
<td>-----------------------------------------------------------------------------</td>
<td>---------</td>
<td>-----------</td>
</tr>
<tr>
<td>5</td>
<td>PT Archive Management Book motivates to study archival material</td>
<td>3.6</td>
<td>Very Good</td>
</tr>
<tr>
<td>6</td>
<td>The material in the PT Archives Management book deals with the management of daily archives</td>
<td>3.6</td>
<td>Very Good</td>
</tr>
<tr>
<td>7</td>
<td>The material in the PT Archives Management book is easy to understand</td>
<td>3.5</td>
<td>Very Good</td>
</tr>
<tr>
<td>8</td>
<td>The examples in the PT Archives Management book are very helpful for understanding archival material</td>
<td>3</td>
<td>Good</td>
</tr>
<tr>
<td>9</td>
<td>Shows the order / hierarchy of the text composition (chapters, subchapters, sub-chapters) in stages so that it is easy to understand</td>
<td>3</td>
<td>Good</td>
</tr>
<tr>
<td>10</td>
<td>The sentences used follow Indonesian sentence procedures</td>
<td>3.05</td>
<td>Good</td>
</tr>
<tr>
<td>11</td>
<td>The sentences and paragraphs used in the PT Archive Management book are clear and easy to understand</td>
<td>3.1</td>
<td>Good</td>
</tr>
<tr>
<td>12</td>
<td>The language used in the PT Archives Management book is simple and easy to understand</td>
<td>3</td>
<td>Good</td>
</tr>
<tr>
<td>13</td>
<td>The typeface used is simple and easy to read</td>
<td>3.5</td>
<td>Very Good</td>
</tr>
</tbody>
</table>

a. Operational Product Revision. This step is the product improvement of the field test results based on the input and main field test results. So this improvement is the second improvement after a wider field test than the first field test. In accordance with the respondents' input to make it easier to determine Archive Classification and determine Archive Retention Schedules, an attachment to Archive Classification and Archive Retention Schedule was added to the draft book.

b. Operational Field Test (Large scale field trial / due diligence). This step was taken to involve 30 third semester students taken in the Dynamic Archives Management subject. Large-scale field trials are conducted to test the compatibility and adaptability of product designs, and the compatibility and adaptability trials of designs support potential product users. Field test results consist of models that have been applied, both in terms of substance and applied.

c. Final Product Revision. This step is a improvement of the product being developed. Improvement of the final product is deemed necessary for more accurate products being developed. At this stage a product whose level of effectiveness can be accounted for has been obtained. The final product improvement has a reliable "generalization" value. Improvement is based on input or the results of the feasibility test in a wide scale.

The results of research on the development of College Archive Management books are books that will be used for archival learning and college archive management. The College Archives Management book presents material: 1) Understanding the basic concepts of College Archives Management, 2) Using the Official Script Management, 3) Using Archive Classification, 4) Using the Archive Retention Schedule, 5) Conducting Active Archive Management, 6) Conducting Archive Management Inactive, 7) Conduct Static Archive Management, 8) Conduct Vital Archive Management, 9) Conduct Archival Depreciation.
The Learning Media that was designed was the Archive Management video in the Archive Technical Services Unit of Medan State University. Learning media that are designed to describe the steps in managing college archives at Medan State University. The learning tools designed include Semester Learning Plans, Evaluation Instruments including questions and assessment rubrics based on the Indonesian National Qualification Framework.

4 Conclusions

This College Archives Management book is interesting and needs to be developed so that it can be used in archival learning and archive management in University. Based on the results of large-scale field trials involving 30 students, it is known that learning by using the College Archive Management book designed can improve student learning outcomes. This College Archives Management book can be used as a learning resource for students in studying Archive Management, it can also be used by archivists and archival managers in managing state and private university archives. The design of teaching and learning activities and learning media that are designed can be used to facilitate understanding of college archive management materials.

5 References

Reconfirming the 21st Century Teaching Skills Using Integration of Pedagogy and ICT

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Abstract. This article aims to reconfirm the construct in 21st-century teaching skills, through integrating pedagogy with ICT. Data were collected in 2019 with a total sample of 128 people divided into students, teachers, and lecturers spread across seven provinces in Indonesia. The methodology in this research is exploratory factor analysis with oblique rotation (varimax) method. Of the 38 variables analyzed, six factors were formed that represented integration between pedagogy and technology. However, further discussion is needed by future researchers regarding naming these six factors.

Keywords: teaching & learning, 4.0, education.

1 Introduction

Over the past decades, the question of how the ideal characteristics of the ideal teacher have been widely discussed by many researchers, the concept of an ideal teacher from three categories, namely professional competence, relationships with students, and personal attributes [1]. The concept of an ideal teacher is in terms of teaching quality, professional quality, and personal quality [2]. Teacher’s effectiveness divided into four dimensions, namely the delivery of instructions, assessment of students, learning atmosphere, and personal qualities [3]. Meanwhile, the effectiveness of teacher’s consists of five main dimensions, namely: social skills, fair assessment, knowledge related to subjects, facilitators of students' intellectual development, and respect for students [4]. Indonesia itself, through Law Number 14 of 2005 concerning Teachers and Lecturers in Article 10 paragraph (1) states that teacher competencies include pedagogical competencies, personality competencies, social competencies, and professional competencies.

This study seeks to renew the conception of teacher competence in Indonesia, which is stated in Law Number 14 of 2005 concerning Teachers and Lecturers in Article 10 paragraph (1) that the teacher competencies referred to in article 8 include pedagogical competencies, personality competencies, social competencies, and professional competence. Even though nowadays, with the rapid development of technology, those four things are not enough. There needs to be technology integration in classroom teaching. This is because students today who are already very familiar with technology, no longer rely solely on the teacher in the classroom. The teacher must be able to develop competence in the use of technology in order to further enrich the abilities of students.
2 Research Method

The population samples in this study are teachers, students, and lecturers in Indonesia. This study uses convenience sampling in the population. Data analysis will use Exploratory Factor Analysis, or commonly referred to as factor analysis only. Factor analysis is an interdependence technique where the main objective is to find the structure behind the variables being analyzed [5]. After loading the factors of each variable is known, then to facilitate the determination of components/factors that form, the loading of these factors must be rotated. There are two ways of doing rotation, namely orthogonal rotation and oblique rotation. In this study, the rotation technique chosen was orthogonal rotation with the Varimax method.

3 Results and Discussion

After rotating the data, 6 factors were created, the details of which can be seen in Table 1.

### Table 1. Rotated Component Matrix

<table>
<thead>
<tr>
<th>The teacher is able to present learning materials that are in accordance with the goals / indicators that have been set</th>
<th>0.765</th>
</tr>
</thead>
<tbody>
<tr>
<td>The teacher is able to use methods that are appropriate to the learning material delivered in the learning process</td>
<td>0.679</td>
</tr>
<tr>
<td>The teacher is able to use media that is suitable with the material presented in the learning</td>
<td>0.631</td>
</tr>
<tr>
<td>The teacher gives a reference of learning material that will be given</td>
<td>0.6</td>
</tr>
<tr>
<td>The teacher is able to allocate the time that is provided appropriately</td>
<td>0.581</td>
</tr>
<tr>
<td>The teacher is able to use learning media skillfully</td>
<td>0.58</td>
</tr>
<tr>
<td>The teacher is able to give a review of the material that has been given when closing the learning</td>
<td>0.572</td>
</tr>
<tr>
<td>The teacher is able to carry out assessments that are relevant to the goals set</td>
<td>0.558</td>
</tr>
<tr>
<td>Component</td>
<td>1</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------</td>
<td>-------</td>
</tr>
<tr>
<td>The teacher is able to carry out learning in accordance with the steps</td>
<td>0.552</td>
</tr>
<tr>
<td>planned in the lesson plan</td>
<td></td>
</tr>
<tr>
<td>The teacher must pay attention to the principles of using media in</td>
<td>0.528</td>
</tr>
<tr>
<td>carrying out learning</td>
<td></td>
</tr>
<tr>
<td>The teacher can provide an assessment in accordance with the lesson plan</td>
<td>0.514</td>
</tr>
<tr>
<td>The teacher is able to increase student attention in learning activities</td>
<td></td>
</tr>
<tr>
<td>The teacher is able to prepare learning that is able to direct students</td>
<td></td>
</tr>
<tr>
<td>to use IT for learning needs</td>
<td></td>
</tr>
<tr>
<td>The teacher is able to carry out the learning process with clear voice</td>
<td>0.815</td>
</tr>
<tr>
<td>articulation</td>
<td></td>
</tr>
<tr>
<td>The teacher shows enthusiasm in displaying learning</td>
<td>0.664</td>
</tr>
<tr>
<td>The teacher is able to provide clear examples in the delivery of subject</td>
<td>0.644</td>
</tr>
<tr>
<td>matter</td>
<td></td>
</tr>
<tr>
<td>The teacher is able to provide variations of body movements that do not</td>
<td>0.639</td>
</tr>
<tr>
<td>interfere with students’ attention</td>
<td></td>
</tr>
<tr>
<td>The teacher is able to teach with mobility in class positions well</td>
<td>0.608</td>
</tr>
<tr>
<td>The teacher is able to explain learning material (material) clearly</td>
<td>0.592</td>
</tr>
<tr>
<td>The teacher has broad insights in conveying learning material</td>
<td>0.539</td>
</tr>
<tr>
<td>The teacher is able to provide motivation to students to continue</td>
<td></td>
</tr>
<tr>
<td>learning</td>
<td></td>
</tr>
<tr>
<td>The teacher has skills in responding and responding to student questions</td>
<td></td>
</tr>
<tr>
<td>The teacher is able to utilize the use of IT to provide effective</td>
<td>0.766</td>
</tr>
<tr>
<td>learning</td>
<td></td>
</tr>
<tr>
<td>The teacher is able to use IT to monitor progress and evaluate student</td>
<td>0.726</td>
</tr>
<tr>
<td>learning</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Component</td>
</tr>
<tr>
<td>------------------------------------------------------------------</td>
<td>-----------</td>
</tr>
<tr>
<td>The teacher is able to use IT to collaborate with others related</td>
<td>0.713</td>
</tr>
<tr>
<td>with learning and research activities</td>
<td></td>
</tr>
<tr>
<td>The teacher is able to install software related to education</td>
<td>0.707</td>
</tr>
<tr>
<td>and teaching on his computer</td>
<td></td>
</tr>
<tr>
<td>The teacher is able to use the Internet (e.g., choosing an</td>
<td>0.678</td>
</tr>
<tr>
<td>appropriate website, WA group / discussion forum, Google</td>
<td></td>
</tr>
<tr>
<td>Classroom / Edmodo) to support student learning</td>
<td></td>
</tr>
<tr>
<td>The teacher is able to find useful material / teaching materials</td>
<td>0.556</td>
</tr>
<tr>
<td>on the Internet</td>
<td></td>
</tr>
<tr>
<td>The teacher understands the learning situation or teaching</td>
<td>0.517</td>
</tr>
<tr>
<td>material as to what is suitable for IT use</td>
<td>0.53</td>
</tr>
<tr>
<td>The teacher can give apperception (the relation of the</td>
<td>0.796</td>
</tr>
<tr>
<td>previous material to the material to be delivered)</td>
<td></td>
</tr>
<tr>
<td>The teacher is able to provide motivation at the beginning of</td>
<td>0.773</td>
</tr>
<tr>
<td>learning</td>
<td></td>
</tr>
<tr>
<td>The teacher conveys the learning objectives that will be given</td>
<td>0.691</td>
</tr>
<tr>
<td>before the learning takes place</td>
<td></td>
</tr>
<tr>
<td>The teacher is able to attract the attention of students to</td>
<td>0.657</td>
</tr>
<tr>
<td>start learning</td>
<td></td>
</tr>
<tr>
<td>The teacher gives assignments to students both individually and</td>
<td>0.782</td>
</tr>
<tr>
<td>in groups</td>
<td></td>
</tr>
<tr>
<td>The teacher has given the opportunity to ask questions and</td>
<td>0.649</td>
</tr>
<tr>
<td>answer questions when closing learning</td>
<td></td>
</tr>
<tr>
<td>The teacher is able to provide a conclusion of learning</td>
<td>0.602</td>
</tr>
<tr>
<td>activities when closing learning</td>
<td></td>
</tr>
<tr>
<td>The teacher is able to inform the material / learning material</td>
<td>0.627</td>
</tr>
<tr>
<td>that will be studied next</td>
<td></td>
</tr>
<tr>
<td>The teacher is able to use a variety of forms and types of</td>
<td></td>
</tr>
<tr>
<td>assessment</td>
<td></td>
</tr>
</tbody>
</table>

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 11 iterations.
Conclusion

Times continue to change, as well as patterns of teaching in the classroom must also continue to keep abreast of the times. From this study, it is known that six factors are formed on the integration of technology with ICT. However, the names of these factors have not been recognized. For this reason, further discussion is needed from the researchers to agree on the naming of these formed factors.

5 References

Attitude Appraisal System in Introduction Text at French Language Thesis in Universitas Negeri Medan

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Abstract. This study examines the appraisal system in the text introduction to the French thesis at UNIMED by applying the Systemic Functional Linguistics theory. This study aims to describe the attitude appraisal system contained in the text introduction to the French thesis at UNIMED. The method used in this research descriptive qualitative method. The research sample was the introduction text of a French thesis at UNIMED on behalf of Ayokta Ghea M. Panjaitan, where the type of thesis is linguistics with the title analysis of the lexical meaning of eye activity in French totaling 58 pages with the highest GPA of 3.85 which has been validated native speakers named Marine Petite. Data were analyzed using the Simple Concordance Program (SCP) concordance software program using the appraisal system, namely: attitude appraisal. The results showed that the appraisal system in the French thesis introduction text at UNIMED was a paradigmatic system because the appraisal system in the French thesis text consisted of (a) Gender which consists of masculine and feminine (b) Number which consists of singular and plural.

Keywords: appraisal system, text introduction French thesis

1 Introduction

This research was conducted to determine the Paradigmatic System in French thesis text consisting of (a) Gender, masculine and feminine, (b) Number, which consist of: singular and plural. La langue possède un rôle important dans la vie humaine. (Language plays an important role in human life)

Fig 1. Language in human life
The attitude appraisal system of the above sentence has a masculine gender and a number single. This research studies on attitude appraisal system in the text Introduction to French thesis at UNIMED. The researcher chose the research location at UNIMED because UNIMED has a French Language Study Program, a French thesis, native speaker and language laboratory facilities.

Formulation of the problem is: what attitude appraisal system is contained in the Introduction text to the French thesis at UNIMED? Research Purposes Describe the attitude appraisal system contained in the Introduction text to the French thesis at UNIMED.

Appraisal System
The theoretical basis used in this study is the Appraisal theory, which is the development of Linguistic Functional Systemic Theory in Systemic Functional Linguistics from the realm of interpersonal meaning [1,2]. This appraisal theory is an analytical tool within the scope of discourse analysis that emphasizes the positioning of readers of a text with three main domains, namely (1) attitude (2) positioning and (3) graduation, each of which becomes a single unit to analyze interpersonal meaning where in one there must be a negotiation of meaning between the writer and the reader. Paradigmatic relationships are traditionally displayed in a paradigm that describes one dimension to another [3]. The designed image referred to as (system network), a network of systems for displaying paradigmatic relationships. The names of rows and columns in the paradigm are treated as features in the system of choice, and any feature can be an input condition to other systems.

Text
Text is a functional language that is a language that performs certain tasks in a particular context, and as a unit of language users [4]. As a functional language unit in context, text is the use of language produced by people to convey the purpose of a meaningful message [5]. Text is basically a unit of meaning. Text must be viewed from two angles simultaneously, namely as a product and as a process because of its nature as a unit of meaning. As a product, text is an outcome, something that can be recorded and studied because it has a certain arrangement of texts and can be described in systematic terms. Text is also a process in the sense that text is formed through the process of choosing meaning continuously.

French Grammar
Les lettres ou les syllabes dont la désinence se compose d’indiquer selon les cas le genre, le nombre, la personne des mots et dans le verbe, le groupe, le temps et le mode [6]. Letters or syllables that have a suffix have problems with gender, number, type of words, and in verbs, groups, times, and modes.

Gender
Par genre d’un mot, on entend un caractère distinctif de ce mot, provenant de ce qu’il désigne un être mâle ou un être femelle. Il y a deux genres principaux : Le masculin, commun à tous les mots désignant des êtres mâles : homme, chat ; Le féminin, commun à tous les mots désignant des êtres femelles : femme, chatte. Des raisons d’analogie, d’étymologie, d’homophonie, etc. On fait ranger dans l’un ou l’autre groupe les noms d’êtres inanimés : char, charrette. Le latin avait un troisième genre, le neutre. Il n’en est resté en français que des traces dans les adjectifs et surtout dans les pronoms : l’utile, l’agréable, cela, quoi, etc. Le neutre français se confond pour la forme et la construction avec le masculin [6]. Based on the sex of the word, we see the characteristics of a word, based on the sex, masculine or feminine. There
are two main sexes of nouns: masculine, generally all masculin nouns are: homme, chat, feminine, generally all feminine nouns: femme, chatte.

2 Research Method

Descriptive method has properties and characteristics that are considered very suitable to be used for this study. Description of grammatical and semantic categories of language evaluation is done through testing the form, meaning and relationship with the elements of the text or discourse obtained specifically from the corpus of language use in French thesis text at UNIMED. Through this method with the help of concordance software programs, research data can be captured that can be used to solve research problems and achieve predetermined research goals.

This study uses a corpus as a source of research data in the form of 2 French thesis texts at UNIMED on behalf of Ayokta Ghea M. Panjaitan, with the highest GPA of 3.85 with the thesis title Analyse De Champ Lexical Des Activités Des Yeux En Français, of which 58 pages have been validated by native speakers who taught at the French Language Education Study Program at UNIMED in 2015 and also taught at the Alliance Française (AF) called Marine Petite.

Some of the reasons used as the basis for selecting the Introduction to the French thesis text above as a data source for this study are:

a. Easy access to data sources
b. Each data source can theoretically present the genre of language use in written text in the form of a different French thesis text.
c. The written text in the form of French thesis text realizes interpersonal semantic resources in a different way from the oral text.
d. Each type of text in the data source above is assumed to utilize interpersonal semantic resources differently because the two French thesis texts above are assumed to realize different contextual situations in the use of their language.
e. These two different French thesis texts have never been examined together in terms of evaluative language.

Data collection techniques carried out by collecting 2 French thesis texts at UNIMED. Then the Appraisal framework is used to find attitudes, positioning, and graduations that show the characteristics of Appraisal in the French thesis text at UNIMED. Data collection uses data search techniques by collecting French thesis text data at UNIMED. Additionally web concordance tools provided by Webcorp on the internet are used to facilitate language analysis. After the data source for each group of text is obtained and recorded in a computer. This study uses the Simple Concordance Program (SCP) concordance software program to capture, classify each lexeme of French thesis text based on Appraisal theory, namely the Attitudes, Positioning and Graduation realms, gathering and then analyzing the data. Some data collection steps are carried out as follows [7]:

1) The format of all text (html and MS Word doc) used as data sources is converted into text files (txt) format so that it can be read by SCP.
2) Each script is then scanned to collect word list data and word statistical data in the manuscript.
3) To collect lexical word data, a Stop List archive is created.
4) Stop List is made from this word list data manually set aside words that are not included in the word with a lexical meaning, for example task words, abbreviations, names of people, and so on.

5) In the List of lexical words then observed manually to capture and collect data of words that are included in the appraisal Lexicon.

6) The appraisal lexicon is composed of examples of appraisal words that exist in each model plus a few words obtained from several text texts used as data sources in this study.

7) The appraisal Lexicon is then made a Keyword or Key Words.

8) Keywords are used in SCP to calculate and analyze the language lexicon of evaluation in each text.

The collection and processing of data ultimately results in Keywords Appraisal. This keyword is part of the data analysis tool that has been collected through the above stages.

**Data Analysis Technique**

The analytical method used in this research is the concordance and distribution method using the Simple Concordance Program (SCP) concordance software. Furthermore, using the Appraisal theory analysis tool there are three main domains, namely (1) the realm of attitude, (2) positioning and (3) graduation. The data analyzed is the Introduction text of the French thesis at UNIMED. Text Introduction to the French thesis at UNIMED which is used as data is distributed and interpreted to see the status and types of semantic and grammatical categories that appear in discourse texts based on Appraisal tools.

A statistical analysis is performed to see the characteristics of each text. This analysis includes analysis of lexical variations, lexical visibility, and Yule's K (text characteristics based on statistical formula to calculate the level of difficulty and repetition of words in the text) [8].

- Lexical Variation (VL) = \( \frac{\text{token type ratio}}{100} \)
- Lexical flash (KL) = \( \frac{\text{ratio of lexical token type}}{100} \)
- Yule's K = statistical formula in the SCP program

**3 Results and Discussion**

Research data on the analysis of the Appraisal system in the text Introduction to the French thesis at Universitas Negeri Medan in this study were analyzed in a descriptive qualitative manner. Descriptive qualitative analysis is based on the concordance software system of the Simple Concordance Program (SCP) on the French thesis text. Through a concordance program, each word is examined in terms of form, collocation and concordance in each distribution of phrases and clauses.

By using analysis tools Appraisal theory, there are three main areas, namely (1) Attitude, (2) Positioning and (3) Graduation. The data analyzed were 2 French thesis texts at UNIMED.

**a. Important**

**Text 1**

In text 1, important lexis appears in 7th lexis. Important lexis include Attitude: Appreciation: significance: positive.

*La langue possède un rôle important dans la vie humaine.*
b. Bien
Lexis *bien* appears in 10 Lexis, includes attitude, appreciation, valuation, social valuation.
*Elle est importante de limiter le problème de cette recherche pour qu’elle soit claire et bien organisée.*

4 Conclusion


In this study conclusions can be drawn as follows: The attitude appraisal system in the text Introduction French Thesis at UNIMED is a Paradigmatic System because the attitude
appraisal system in French thesis text consists of (a). Gender, which consists of: masculine and feminine and (b). Number, which consists of: singular and plural.

5 References

Effectiveness of Computer Assisted Tests Based on Macromedia Flash on Understanding Concept Ability in PGSD Students of Santo Thomas Catholic University Medan

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Abstract. The problem in this study is the lack of use of media in learning, the ability to understand concepts in learning is less effective, the lack of understanding in developing learning media. This study aims to determine the effectiveness of computer assisted tests based macromedia flash on the ability to understand concepts in PGSD students of Santo Thomas Catholic University. This research is using experimental research methods with quantitative approach. In field trials the average pretest score is 67.03 while the average posttest score is 90.14 with an average increase of 23.11. The minimum gain value is 0.70 with a high category while the maximum gain value is 1.00. The results of data processing showed that the effectiveness of computer assisted tests on Macromedia Flash was 95.00. It can be interpreted that the variable computer assisted test based on macromedia flash has a very positive effectiveness with a contribution of 95.00 with very good criteria for the ability to understand the concept of students and 5.00 others are influenced by other factors beyond the variable computer assisted test based macromedia flash. Thus it can be stated that using computer assisted test based macromedia flash in learning has a very positive effectiveness on the ability of understanding students' concepts.

Keywords: CAT, Macromedia, Understanding Ability.

1 Introduction

Learning is the process of interaction between the recipient of the message with the source of information and learning resources in the learning environment that exchanges information related to the topic presented. The process will result in the acquisition of knowledge and knowledge, mastery of skills and character, as well as the formation of attitudes and beliefs. In the context of education, the lecturer teaches that students can learn and master the content of the lesson to achieve something determined objectives that include cognitive aspects, attitudes (affective aspects), and skills (psychomotor aspects), but this teaching process gives the impression only as the work of one party, that is, teacher work, while learning implies the interaction between instructors and students.

In reality on the ground the learning process carried out at this time did not meet the expectations of the lecturers as the development of learning strategies in class. Students have difficulty in learning, especially in mastering learning topics with the ability to understand concepts. Thus, the ability to understand concepts is a very important factor for the cognitive
development of students. This can be seen in measuring the ability to understand the concepts of students as follows: draw a house plan with a length of 20 m and a width of 10 m on the size of the land, this students do not understand the steps of problem solving because students do not have the ability to understand concepts, which should be from the planning stage students solve by modeling first into the form of mathematics in accordance with the problem, then solve it by determining the length of each building to be built. Understanding is interpreted from the word understanding. The degree of understanding is determined by the level of interconnectedness of an idea, procedure or mathematical fact understood comprehensively if these things form a network with a high connection. And the concept is interpreted as an abstract idea that can be used to classify a group of objects [1]. School mathematics, hereinafter referred to as mathematics, as follows: Mathematics as an activity to trace patterns and relationships, Mathematics as creativity that requires imagination, intuition and discovery, Mathematics as a problem solving activity, Mathematics as communication tool [2].

The indicators of understanding concepts according to the 2006 curriculum, namely: restating a concept, classifying objects according to certain properties (according to the concept), giving examples and non-examples of concepts, presenting concepts in various forms of mathematical representation, developing necessary conditions or a sufficient condition of a concept, using, utilizing, and choosing a particular procedure or operation, applying the concept or problem solving algorithm.

To address the problems that arise in the process of learning mathematics, learning approach solutions that can accommodate Computer Assisted Test are defined as a test method using computer aids that are used to obtain minimum standards of basic competency and staff competency standards. As for the stages the process of designing a CAT system begins with research and data collection, then planning, prototyping, testing, and improvement and development. The CAT system prototype has the following characteristics: (1) The application uses a windows platform or an open source website-based; (2) There is a narrative that contains instructions that are presented on a computer monitor screen; (3) The application is accompanied by a mouse movement video to facilitate its use in operating it, and (4) Equipped with tutorials and text containing instructions on a computer monitor screen so that all test takers can easily operate it [3]. CAT as one of the methods used in conducting tests has the following basic principles; (1) The CAT system is designed as easily as possible, so that test takers can operate it; (2) How to operate it is very easy, even for beginners because only by using the mouse to work on test questions and choose answers. The committee is required to provide guidance and display video instructions on how to operate the CAT system to provide instructions on using the CAT system; (3) the questions in the CAT application vary but with an equal difficulty level. Participants get different questions, and questions are randomized automatically and then distributed to each participant's computer; and (4) Automatic checking of test results is carried out by the application [4,5]. The score of the participant can be monitored simultaneously through the monitoring room outside the place of the test implementation. While the test participant can find out the value obtained shortly after completing the test through the monitor screen of each computer.

This Computer Assisted Test is designed using flash media macros. Macromedia Flash 8 is a software version of Macromedia.inc in the form of graphics and animation programs whose existence is intended for lovers of design and animation to be creative in creating interactive web animation, cartoon animated films, making company profile business presentations or interesting activities and flash games [6,7]. Based on the background above, the problems identified in this study are:
a. The lack of use of media in learning.
b. Lack of student skills with media development.
c. The ability to understand the concept is less than the maximum.

As for the limitation of the problem in this study are: effectiveness of computer assisted test based on macromedia flash against the ability to understand the concept of scale and comparison of higher class mathematics education subjects in PGSD semester III students in the University Catholic Santo Thomas Medan.

As for the formulation of the problem in this study are: how is the effectiveness of computer assisted test based on macromedia flash against the ability to understand the concept of scale and comparison of high class mathematics education subjects in PGSD III semester students in the University Catholic Santo Thomas Medan?

The objectives of this research are: to find out the effectiveness of computer assisted test based on macromedia flash on the ability to understand the concept of scale and comparison of higher class mathematics education subjects in PGSD semester III students in the University Catholic Santo Thomas Medan.

2 Research Method

In research, each researcher should first determine the method / type of research to be used. The research method used in this study is a quantitative method of experimental type. Place of Research This research was carried out in PGSD FKIP of University Catholic Santo Thomas Medan 2019/2020 academic year. The time of this research is estimated to take place in the odd semester of the 2019/2020 school year which is adjusted to the lecture schedule.

The research design used is the true experimental design method. One form of true experimental design method is pretest-posttest control group design. Pretest-posttest control group design is a design consisting of two groups chosen randomly, then given a pretest to find out the initial state is there a difference between the experimental group and the control group [2].

<table>
<thead>
<tr>
<th>Group</th>
<th>Pretest</th>
<th>Treatment</th>
<th>Posttest</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1</td>
<td>O1</td>
<td>X1</td>
<td>O2</td>
</tr>
<tr>
<td>E2</td>
<td>O3</td>
<td>X2</td>
<td>O4</td>
</tr>
</tbody>
</table>

Information

E1 = Group 1 (experimental class 1)
E2 = Group 2 (experimental class 2)
O1 = Experimental group pretest 1
O2 = Posttest of experimental group 1
X1 = Application of Computer Assisted Test
X2 = Ordinary Learning
O3 = Pretest the experimental group 2
O4 = Posttest of the experimental group 2

Populations are the whole subject of research. If someone wants to examine all the elements that exist in the research area, then the research is population research, the study or
research is also called population study or case study. Population is the area of generalization consisting of: objects / subjects that have certain quantities and characteristics set by researchers to be studied and then drawn conclusions [2]. This means that the population is not only to humans, but also objects or other objects that have the same nature / character.

The sample is a portion of the amount owned by the population with the same characteristics. Sample is part of the number and characteristics possessed by the population. If the population is large, and researchers may not study everything in the population, for example due to limited funds, manpower, and time, then researchers can use samples drawn from that population [2]. This means that a portion or amount that represents the population that is used as the object of research.

Data is the result of recording research, both in the form of facts and figures. Data collection can use primary sources and secondary sources [2]. Primary sources are data sources that directly provide data to data collectors, and secondary sources are sources that do not directly provide data to data collectors ". Then the researcher will use a data source that is primary data obtained directly from the research subject.

The source of research data is the subject from which data can be obtained". So in this study, the data source used was 60 fifth grade students from 117 populations. Observations as an assessment tool is widely used to measure the behavior of individuals or the process of the occurrence of an observed activity, both in actual situations and in artificial situations". In this study, researchers conducted direct observations of teaching and learning activities undertaken by teachers in the classroom while teaching. This observation is useful to find out the conditions of learning in the classroom conducted by lecturers during learning activities.

Researchers also use the test as a data collection tool. Test is a number of statements that must be responded with the aim of measuring a person's ability level or reveals certain aspects of the person subjected to the test". In this study, researchers will use multiple choice tests [2]. Multiple choice tests consist of a statement or notification about an incomplete understanding. And to complete it must choose one of several possible answers that have been provided ". The preparation of this instrument refers to the revised Bloom domain of cognitive taxonomy, starting from C1 - C4. C1 is the cognitive domain of remembering, C2 understanding, C3 applying, and C4 is analyzing.

Before the test is given to the sample, the test is tested first. This test was tested on other students who were judged to have the same abilities as the students to be studied. The items that have been tested will be tried out to school. To see the characteristics of the test, the validity and reliability tests were performed and the application of IBM SPSS Statistics 22 was used.

Validity is a measure that shows the levels of validity or validity of an instrument. A valid or valid instrument has high validity ".

\[
 r_{xy} = \frac{N \Sigma xy - (\Sigma x)(\Sigma y)}{\sqrt{(N \Sigma x^2 - (\Sigma x^2))(N \Sigma y^2 - (\Sigma y)^2)}}
\]

Information:

\( r_{xy} \) = Correlation coefficient x and y
\( N \) = Number of respondents / many students taking the test
\( X \) = Number of scores obtained by students for each item items
\( Y \) = Correct total score

From the results of the calculation of the validity of the test instruments using the IBM SPSS Statistics 22 program according to the calculation results obtained rcount > rtable with a significance level of 5%. Reliability refers to an understanding that an instrument can be
trusted enough to be used as a tool to collect data because the instrument is already good. To test the reliability of the tests in the study the following KR-20 formula[2] is used:

\[
\rho_{rr} = \left( \frac{n}{n-1} \right) \left( \frac{\sum p q}{\sum (p-q)^2} \right)
\]

Information:
- \( R_{rr} \) = Test reliability
- \( p \) = proportion of subjects who answered the item correctly
- \( q \) = The proportion of subjects who answered the item incorrectly
- \( \Sigma pq \) = Number of multiplication results between \( p \) and \( q \)
- \( n \) = The number of items
- \( S \) = standard deviation

The formula for finding the standard deviation is as follows:

\[
SD = \sqrt{\frac{\Sigma f x^2}{N}}
\]

Information:
- \( SD \) = Standard Deviation
- \( \Sigma f x^2 \) = Number of multiplications between the frequencies of each interval with frequency squared
- \( N \) = Number of samples

The interpretation of the value of \( \rho_{rr} \) presented in the following table [8]:

<table>
<thead>
<tr>
<th>No</th>
<th>Qualification Correlation Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0,80 &lt; ( r_{xy} ) ≤ 1,00</td>
</tr>
<tr>
<td>2</td>
<td>0,60 &lt; ( r_{xy} ) ≤ 0,80</td>
</tr>
<tr>
<td>3</td>
<td>0,40 &lt; ( r_{xy} ) ≤ 0,60</td>
</tr>
<tr>
<td>4</td>
<td>0,20 &lt; ( r_{xy} ) ≤ 0,40</td>
</tr>
<tr>
<td>5</td>
<td>( r_{xy} ) ≤ 0,40</td>
</tr>
</tbody>
</table>

This research was carried out with the help of SPSS program ver.21.0 and Ms. Excel 2007. The steps in the analysis prerequisite test and data analysis are as follows. Data normality test is intended to ensure that the sample data comes from populations that are normally distributed[9]. To find out whether the data is normally distributed or not, the researchers used the Kolmogrov-Smirnov analysis with the help of the SPSS program ver.21.0. The normal criteria are met if the test results are not significant for a certain level of significance (\( \alpha = 0,05 \)). If significance obtained is >\( \alpha \), then samples from populations that are normally distributed. \( \alpha \) H0 is rejected, that means the data is normally distributed.

If the significance obtained <\( \alpha \), then it does not come from a population that is normally distributed. \( \alpha \) H0 received. That means the data is not normally distributed.

Homogeneity test is intended to show that groups or more sample data come from populations that have the same variance[9]. In this study, the homogeneity test was performed on a difference test that would use the help of the SPSS program ver.21.0. The interpretation is done based on the determination of the significance level (\( \alpha = 0,05 \)). If the significance obtained >\( \alpha \), then the variance of each sample is homogeneous. If the significance obtained <\( \alpha \) then the variance of each sample is not homogeneous.

Hypothesis testing is done by t-test analysis. T-test is used to determine whether the two means differ significantly or not at the chosen probability level. The calculation is done with
the help of the SPSS program ver. 21.0. The result is that if the price of t-count is equal to or
greater than the price of t-table, the means are significantly different at the selected height.
Increased concept understanding ability to find out the improvement of students’ mathematical
understanding ability, they do a pre-test and post-test. The results of both tests are calculated
with N-gain;
\[
(g) = \frac{(gain)}{(gain)_{Max}} = \frac{(postest)−(pretest)}{100−(pretest)}
\]

Table 3. The upgrade criteria are determined as follows:

<table>
<thead>
<tr>
<th>g</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>g &lt; 0.3</td>
<td>Low Category</td>
</tr>
<tr>
<td>0.3 ≤ g ≤ 0.7</td>
<td>Medium Category</td>
</tr>
<tr>
<td>g ≥ 0.7</td>
<td>Category Height</td>
</tr>
</tbody>
</table>

Student learning activities are observed during the course of action. Observational data
obtained were analyzed by determining the percentage of the average score of student activity,
and then the success criteria were determined.
Student learning activity scores are calculated using the formula:
Percentage of average score (PA)= \frac{\text{total score}}{\text{maximum score}} \times 100\%

Interpretation of average scores as follows:

- 90% ≤ SR ≤ 100%: Very good
- 80% ≤ SR <90%: Good
- 70% ≤ SR <80%: Enough
- 60% ≤ SR <70%: Poor
- 00% ≤ SR <60%: Very Poor

Success criteria for action for aspects of student activities are achieved when SR ≥ 80% and
Criteria for completeness learning are classically achieved when P ≥ 85%.

The research procedure is the stages of activities that will be carried out by preparing
learning material and collecting data. Done with the steps as follows:

1) Preliminary Research
2) Planning Phase
3) Research Implementation Stage
4) The final stage

3 Results and Discussion

This research focuses on the following questions: The Effectiveness of computer assisted
tests based macromedia flash on the Ability to Understand the Concept of Scale and
Comparison of Higher Class Mathematics Education Subjects in PGSD Semester III Students
in the of University Catholic Santo Thomas Medan.

The following will be explained one by one the research questions based on the results of
research data analysis: Ability to Understand Scale Concepts and Comparison of High Class
Mathematics Education Subjects in PGSD Semester III Students of University Catholic Santo
Thomas Medan with computer assisted tests based macromedia flash. Learning outcomes are
the results of student evaluations in the form of values concerning knowledge (cognitive)
obtained from the learning process. There are two types of learning outcomes in this study, namely the pre-test and post-test scores. The pre-test score is the value of learning outcomes before being given treatment with the application of computer assisted tests based macromedia flash. Posttest value is the value of learning outcomes after treatment, namely the application of computer assisted tests based macromedia flash.

Based on the results of the study obtained a pre-test minimum value of 45 and a maximum value of 80. The results of the calculation of student learning outcomes obtained an average value (mean) of pre-test of 67.03. While the minimum posttest score is 80 and the maximum value is 98. The results of calculations from student learning outcomes obtained an average value (mean) posttest of 90.14. Based on the acquisition of the average value of pre-test and post-test, it can be said that the value of learning outcomes by applying computer assisted tests based macromedia flash in semester III students is very good because it is above the indicator criteria determined by the researcher. Learning activities before and after treatment with the application of computer assisted tests based macromedia flash is effective on the ability of students to understand concepts. This is evident from the increase in the average value, increase in the average value of 23.11. The gain value is 0.70 with a high category while the maximum gain value is 1.00. The results of data processing showed that the effectiveness of computer assisted tests based macromedia flash was 95.00. It can be interpreted that the computer assisted test variable based on macro flash media has a very positive effectiveness with a contribution of 95.00 with excellent criteria for the ability to understand student concepts and 5.00 others are influenced by other factors beyond the variable computer assisted tests based macromedia flash. This improvement shows that the application of computer assisted tests based macromedia flash makes students better mastered the concepts in the learning process in high-class mathematics education subjects on scale and comparison topics. This is because the computer assisted tests based macromedia flash emphasizes concept understanding.

4 Conclusions

Based on the results and discussion of research on The Effectiveness of Macro Media-Based Flash Computer Assisted Tests on the Ability to Understand the Concept of Scale and Comparison of Higher Class Mathematics Education Subjects in PGSD Semester III Students in the University Catholic Santo Thomas Medan, it can be concluded that the ability to understand the concept of scale and comparison of high-class mathematics education courses in the third semester students of the PGSD University Catholic Santo Thomas Medan with the computer assisted tests based macromedia flash with an average score of 67.03 pretest and posttest 90.14. The gain value is 0.70 with a high category while the maximum gain value is 1.00. The results of data processing showed that the effectiveness of a computer assisted test based on macro flash media was 95.00. With an increase of 23.11 so that it can be said that with computer assisted tests based macromedia flash is effectively applied in improving the Concept Understanding Ability.

Based on the conclusions, implications, and limitations of the research that has been submitted, the following suggestions can be given:

1) For students, they should be more creative in improving their ability to understand concepts, in developing media as future teacher candidates.
2) For lecturers, especially lecturers supporting subjects, so that they can be creative in improving their students' understanding ability. Because these students are a mirror of ourselves as future teacher candidates.

3) For further researchers to be able to apply more effective learning in further research in order to improve students' understanding of concept skills and to increase students' knowledge in the application of learning.

5 References


Tax Compliance of Village-Owned Enterprises Based on Government Regulation (PP) No 23 Year of 2018

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Abstract. Taxes are source of income for a country to finance its activities in providing facilities and infrastructure as well as services to the community, while one of the largest sources of tax revenue comes from Micro, Small and Medium Enterprises, which in this study focus on Village-Owned Enterprises (BumDes) Focus This research is with the implementation of Government Regulation No. 23 of 2018 which is an improvement from Government Regulation No. 46 of 2016 concerning tax rates for SMEs which were previously at 1% to 0.5%. The purpose of this study is to provide fundamental knowledge about the factors that influence an SME to comply with paying taxes. Operationally, this research has the following objectives: (a) explore factors that influence MSMEs to comply with paying taxes, (b) test tax planning practices for MSMEs, (c) understandings for the government to find out what factors influence MSMEs to comply with paying taxes, (d) knowing the dominant factor for MSMEs as a driver of tax compliance. The results of this study indicate that only understanding, awareness, and sales variables affects the tax compliance, while socialization and trust have insignificant effect.

Keywords: Tax Compliance, Understanding of Tax, Awareness, Sales, Public Trust.

1 Introduction

Economic growth and business competition between countries is very fast and tight now that requires the government to find ways to be able to compete. One of them is through the provision of facilities and infrastructure to support the development and equitable distribution of welfare and the provision of services to the wider community. Development is not only done in urban areas but also in rural areas. The goal is that rural communities can benefit from the development. In achieving this increase in economic growth, the government provides stimulation to the community to be more independent and not rely on limited employment. One of the stimuli carried out by the government is through the independence of the community by creating micro, small and medium enterprises (MSMEs). In some countries, especially developing countries, MSMEs play an important role in development, especially in making a large contribution to the country's GDP [1,2,3]. Besides that, in creating a large and successful company begins with a small company so that it is expected that with the development of micro, small, and medium-sized companies in the future can increase the number of large companies [4]. The government aims to increase MSME growth because it has an important role in reducing poverty, unemployment, a large contribution to a country's GDP through tax payments, investment mobilization, and the use of raw materials in a region
It is expected that with the increase in the number of MSMEs the community will be more independent, which in turn will contribute greatly to state revenues.

Besides that, in developing an area or country, adequate and sustainable funding is needed. One significant source of funding in development is through taxes collected from the community [6,7]. Tax is very important in the development of a country especially developing countries whose purpose is to finance state activities and reduce state dependence on assistance from international and state financial institutions [4,8,9]. This tax is obtained from the activities of both small companies such as MSMEs and large companies. The tax collected does not only come from the central government but also from the village, district, and provincial levels, which will later be returned to the regions for the purpose of welfare and community development. The main focus of the current government is to collect taxes from MSMEs. This number of MSMEs has increased every year so that it is projected that the amount of tax received will also increase [10]. Therefore, it is necessary to have a special policy for taxation of MSMEs so that businesses can help develop a country's awareness of paying taxes.

The number of MSMEs has increased every year. According to data from the Ministry of Cooperatives and MSMEs the number of MSMEs in 2016 was 61 million and increased to 63 million in 2017 or an increase of 2.06% while large businesses 1.67% so it can be seen that the largest increase in MSMEs [11]. In addition, the contribution to GDP received from 2016 to 2017 increased by 9.92% so that MSMEs played an important role as a source of funding for a country. However, the increase in the number of MSMEs currently available is not proportional to the increase in the amount of GDP received by the government. Previously, the government issued Government Regulation No. 46 of 2016 which imposed a 1% tax on MSMEs with a turnover of up to 4.8 billion rupiahs / year. The government objectives are increasing revenue from the MSME sector and also stimulating MSMEs to be able to arrange their books to be more orderly through providing transaction evidence [7]. Through the implementation of PP No. 46, the government obtained a tax of 57.48% so that the potential is greater compared to other sources of income. But in 2017, revenue from MSMEs decreased and did not reach the target set. According to tax data, it shows that in 2017 only reached the target of 60% of the target set ie only received 3-4 trillion. This is a concern for the government with regard to reducing the amount of revenue coming from MSMEs while the amount is increasing every year.

Several studies have shown that there is a reluctance of MSMEs in developing countries to pay taxes [4,5,12,13]. This is due to many factors such as lack of accountability and transparency in the use of taxes for the development of the country so that there is a lot of corruption, large tax costs, the complexity of the tax system adopted in an state, double taxation granted, large tax rates, lack of knowledge of tax laws, amount of revenue obtained, justice, motivation, audit levels, law enforcement, lack of accounting knowledge, and other factors [1,6,7,14,15,16]. The impact of the lack of compliance of business practitioners in making taxes is that many MSMEs report a small portion of their taxable income so that the amount of tax received is small. Awareness of business people in paying taxes related to compliance paying taxes, as well as the separation of the amount of revenue obtained [18]. The need of tax policy is to make taxpayers to voluntarily and consciously pay taxes for economic growth and resource use.

A factor that often arises in tax compliance is the cost of tax compliance. Tax compliance costs are the overall costs incurred by taxpayers and third parties in the process of ensuring that they meet the provisions of the tax law to tax authorities [1]. With the existence of these compliance costs it becomes a burden for MSMEs to pay more tax amounts beyond the
obligations that must be paid. In addition, the negative impact of compliance costs is the slow growth of MSMEs because they must focus on how MSMEs can meet tax payments in accordance with applicable laws and regulations. In addition, most of the SMEs have insufficient knowledge related to tax regulations, thereby increasing the costs of compliance with MSMEs. Therefore, important attention needs to be paid to the government to increase the amount of revenue that comes from MSME taxes through growing awareness of businesses in paying taxes.

The problem of this research focuses on finding the problems faced by research subjects in growing awareness of paying taxes. Besides that, this research is related to the development of teaching materials and empirical evidence of tax planning and financial reporting materials in introductory accounting courses. This research is a continuation of previous research relating to tax avoidance conducted by companies with research subjects listed in the stock market in several countries such as Indonesia, Malaysia, and Singapore. The results of the study show that in each country the practice of tax avoidance is different by looking at the opportunities of the tax regulations that apply to a country. The companies are large companies which have a large turnover as well. But this research was conducted on small companies because it has a large contribution to the country's GDP compared to large companies. The purpose of this study is to find empirical evidence of tax planning practices by the public through tax compliance. In addition, this research also deals with how business people prepare their financial statements and financial planning in reporting their taxable income to the government. The results of this study can contribute both to researchers, the community, and the government related to tax payment compliance by the community, especially MSMEs. The results of this study also provide empirical evidence to students to see the practice of taxation in the community so that students know the practice of taxation in the community.

One area that has a large number of MSMEs comes from the countryside. If observed, many rural communities use their local wealth to create businesses to improve their welfare. But in building a micro, small, and medium-sized business requires substantial funding. Law No. 6 of 2014 relating to villages, a Village-Owned Business Entity (BumDes) was formed, the purpose of which was to provide a forum for village communities to utilize the resources of their villages through a family spirit and mutual cooperation. As for the results of this BumDes used for business development and village development, BumDes is part of the business of MSMEs so that its existence helps in improving the welfare of the community. Through this BumDes, it is hoped that the income that the village receives will also help contribute to taxes for the country. Reflections on UMKM tax revenue in 2017 which experienced a decline and only reached the target of 60%, which is 3.4 trillion, it is necessary to look at the determinants of the level of tax compliance from village-owned enterprises that are part of MSMEs through PP No. 23 of 2018 whose rates are experiencing the previous decrease was 1% to 0.5% with the company's turnover reaching 4.8M / year.

Tax is a source of income for a country, especially developing countries. This tax will be used to finance a country's activities. Indonesia is one of the countries that give special attention to the acquisition of taxes used to finance the activities of the country. Therefore, it is important in preparing regulations in determining the appropriate tax rates so that the tax received can be maximally.

Tax payments are relating to compliance and awareness of taxpayers to pay taxes. Tax according to the KUP Law No. 28/2007 was a levy imposed by the government on the community in order to realize the shared ideals of community prosperity. So the purpose of collecting taxes is to provide facilities and infrastructure as well as services to the community.
where the benefits are not directly obtained [19]. The tax function is divided into 2 y regular end functions, budget functions. Where the regular end function as a regulator to achieve goals in the field of financial finances based on the function of the budget where the tax serves as financing development and spending for the welfare of the people.

In relation to taxpayers, awareness and motivation are needed. Awareness and motivation to pay taxes related to one theory, namely the theory of planned behavior or also called the theory of reasoned action [20]. This theory explains about how human behavior based on will with consideration to do or not do a behavior. This is based on the view of a person of what is seen so decides to act. In this case the awareness of taxpayers in paying taxes is based on the views of taxpayers on the benefits obtained so that they can assess what behavior must be done to carry out their tax obligations. Other theories related to tax awareness are fiscal and social psychology models. This theory explains the belief in a person to respond to social norms related to compliance with paying taxes to understand and predict human behavior. Based on the theory underlying tax compliance can be clearer that compliance in paying taxes is related to the awareness of a person to comply with applicable regulations in the community. In the awareness of paying taxes, one of the factors that reduce this awareness is the cost of compliance. Tax compliance costs are related to all costs incurred by companies outside of the tax obligations paid to ensure that the company is in accordance with applicable regulations [1]. Tax compliance is related to the awareness of taxpayers to pay and comply with applicable tax regulations [21]. Tax compliance is also related to ignorance in situations where taxpayers will reduce the amount of tax paid through income that is not reported in the short term [18]. From the individual side, the cost of tax compliance includes how someone to obtain enough knowledge to meet the legal requirements compile evidence in making tax calculations, tax returns, and other costs related to tax compliance. In relation to tax compliance, the type of tax paid is income tax, that is, the tax treatment that is imposed on taxpayers of all income received in a country within 1 tax period [19].

The object of this research is micro, small and medium enterprises which include Village-Owned Enterprises that are developed by villages in utilizing the resources owned by the village both natural and human. Micro, Small, and Medium Enterprises according to RI Law No. 20 of 2018 is divided into three namely:

1) Micro business is productive business owned by individuals and / or individual business entities.

2) Small Business is a productive economic business that stands alone, which is carried out by individuals or business entities that are not subsidiaries or non-branch companies that are owned, controlled, or become a part either directly or indirectly from Medium Enterprises or Large Enterprises.

3) Medium Business is a productive economic business that stands alone, which is carried out by individuals or business entities that are not subsidiaries or branch companies that are owned, controlled, become a part either directly or indirectly with a Small Business or Large Business with a net worth or annual sales results.

From the three definitions above, it shows that MSME is a productive economic enterprise that is established by both individuals and groups. One of the government development programs of UMKM in the countryside is a Village-Owned Enterprise (BumDes). This business entity was established based on RI Law No. 6 of 2014 concerning Villages. Previously, the village was a legal community unit that had the authority to regulate and manage government affairs, the interests of the local community based on community initiatives, original rights, and / or traditional rights recognized and respected in the government system of the Unitary State of the Republic of Indonesia [22]. Since 2014, each
village has been given village funds aimed at managing the village to become more independent. One of the large fund allocations is the establishment of Village-Owned Enterprises whose purpose is to build rural communities through the establishment of business entities managed by village communities through a family spirit and mutual cooperation. This BumDes is engaged in economy and / or public services where the results are used for business development and village development. Because this business entity is engaged in the economic sector, the income obtained by this institution must be deposited to the state in the form of tax. It also aims to assist the country in obtaining income in developing and improving the economy. Based on the results of the study showed that MSMEs have low tax payment compliance [1,4,5,6]. Therefore, it is necessary to know the factors that influence MSMEs in having compliance in paying their taxes to the government. The factors in this study are the understanding of taxpayers against the applicable tax regulations, taxpayer awareness, the number of sales obtained, and public trust.

The first factor is an understanding of tax regulations. The understanding of taxation is a condition where taxpayers fulfill all tax obligations and carry out their tax rights [23]. This understanding shows that taxpayers know all the rules relating to taxes paid based on the provisions of tax legislation. The more understanding of taxpayers related to tax regulations, the more obedient to pay taxes. The second factor affecting tax compliance is the awareness of paying taxes. This awareness includes how taxpayers know and understand the amount of tax to be paid in accordance with applicable tax regulations. The more aware of the importance of food taxes the more obedient taxpayers to pay the amount of tax obligations. The third factor is the number of sales obtained. The basis for tax is the amount of sales obtained. From this amount the tax paid is calculated. Therefore, it is important to deliver actual sales information relating to tax compliance paid. The fourth factor affecting tax compliance is public confidence in the use of taxes. If the public sees fraud and improper use, it will cause public distrust of the use of taxes, which in turn will affect the public's reluctance to pay some of the taxes paid.

2 Research Method

This research is a quantitative study in which research uses data derived from answers to questionnaires given to respondents in the form of primary data. The questions given in the form of closed and open questions so that there is an opportunity to obtain information more related to compliance in paying taxes.

The location of this research is villages that have Village Owned Enterprises in Deli Serdang Regency, Langkat Regency, and Serdang Bedagai Regency. The results of this study are a reference to the deepening of learning planning material at the Faculty of Economics, State University of Medan.

The population of this research is Village-Owned Enterprises in Deli Serdang Regency, Langkat Regency, and Serdang Bedagai Regency. Sampling uses a random sampling method, especially a business entity that has been established for at least 1 year so that the amount of sales obtained for 1 year and the amount of tax paid.

The analysis technique used in interpreting and analyzing data uses multiple linear regression models to find out the factors that influence the compliance of MSME taxpayers in paying the amount of tax to the state. Before testing the model, classical assumptions are tested first.
3 Results and Discussion

This research is a causal field research in which the aim is as an empirical proof related to tax planning and tax payment compliance by SMEs, especially BumDes. The results of this study become empirical learning material on taxation subjects relating to income tax paid by BumDes to the government. The research was conducted at Micro and Small Medium Enterprises including Village Owned Enterprises (BumDes) in Deli Serdang Regency. The number of BumDes is 88 units, including services, trade and manufacturing businesses.

Hypothesis testing

Hypothesis testing uses linear regression to see the effect of understanding taxation, socialization, awareness, sales, and trust towards MSME compliance, especially BumDes in paying taxes. The results of hypothesis testing can be seen in the table below:

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
<td>.984</td>
<td>3.672</td>
<td>.268</td>
<td>.789</td>
</tr>
<tr>
<td>Understanding of Taxation</td>
<td>.591</td>
<td>.159</td>
<td>.445</td>
<td>3.714</td>
</tr>
<tr>
<td>Socialization</td>
<td>.111</td>
<td>.116</td>
<td>.075</td>
<td>.958</td>
</tr>
<tr>
<td>Awareness</td>
<td>.321</td>
<td>.140</td>
<td>.209</td>
<td>2.296</td>
</tr>
<tr>
<td>Sales</td>
<td>1.123</td>
<td>.212</td>
<td>.395</td>
<td>5.291</td>
</tr>
<tr>
<td>Trust</td>
<td>-.334</td>
<td>.253</td>
<td>-.135</td>
<td>-1.320</td>
</tr>
</tbody>
</table>

a. Dependent Variable: tax compliance

\[ Y = 0.984 + 0.591 + 0.111 + 0.321 + 1.123 - 0.334 \]

Based on the table above it can be explained that:

a) Based on table 1 above shows that the variable understanding of taxation has a significant level of 0.000 so that it shows a significant effect on tax compliance.

b) The second variable, namely socialization, shows a significant level of 0.341, thus indicating that socialization has no significant effect on tax compliance.

c) The third variable, namely awareness of paying taxes, shows a significant level of 0.024, indicating a significant effect on tax compliance.

d) The fourth variable is sales, which shows a significant level of 0.000 so that it is concluded that there is a significant effect on tax compliance.

e) The fifth variable is trust which shows a significant level of 0.190 which shows no significant effect on tax compliance

Discussion

Understanding of Taxation

Understanding taxation is related to the knowledge of taxpayers, namely the executor of a Village-Owned Enterprise who understands the related amount of tax paid for activities from BumDes. This shows that the understanding of the importance of taxes and the tax calculation process makes BumDes obedient to pay taxes from their activities. The results of this study are in line with research conducted before which shows that knowledge has a positive effect
on taxpayers’ compliance with paying taxes [24,25,26]. The results of this study also indicate the importance of knowledge owned by BumDes in planning tax payments so that in the end by understanding the taxes to be paid, it is expected that there is ongoing compliance in paying taxes.

**Socialization**

Socialization does not significantly influence tax compliance. Socialization in this case is the participation of the government in submitting tax regulations to BumDes so that there is taxpayer compliance in paying a number of taxes from the proceeds obtained. Hypothesis testing results show that the significant value obtained is 0.341 so it can be concluded that there is no significant effect of socialization on tax compliance. The importance of the socialization of taxpayers is the government's effort in making people aware, especially entrepreneurs, in paying taxes. But this research shows no effect. No socialization has shown that whether or not socialization does not affect BumDes in raising awareness of paying taxes. Besides that, the government still lacks of socialization conducted so that the lack of compliance in paying taxes, but the results of this study contradict which shows that the importance of socialization of regulations related to taxation so that taxpayers comply with paying taxes [19].

**Tax Pay Awareness**

Awareness of paying taxes significantly affects tax compliance. Awareness of paying taxes is an attitude that arises from within the taxpayer, especially the owner of BumDes, to pay a number of taxes on the business income he gets to help development. Hypothesis testing results show that the awareness of paying tax has a significant effect on the compliance of taxpayers paying a number of taxes based on PP No. 23 of 2018. This attitude arises because of the awareness of the importance of taxes paid as well as the obligations of taxpayers to the state so that they obediently pay taxes according to regulations applicable. The results of this study are in line with research conducted before which shows that awareness in paying taxes has a significant effect on tax compliance [26,27].

**Sales**

Sales have a significant effect on tax compliance. It shows that the gross income obtained by the taxpayer for the business carried out. These results indicate that taxpayers have an awareness that the income obtained must be deposited to the country whose purpose is to assist development. The results of this study are in line with research conducted before which shows that sales have a significant effect on tax compliance [28,29,30]. The greater the income earned shows the greater compliance in paying taxes so the importance of increasing company sales in showing compliance paying taxes.

**Taxpayer Trust**

Trust shows a person's belief in something that benefits him. The taxpayer's trust here is the belief that the taxpayer has for the tax benefits paid so that if the benefits obtained are higher than it shows more obedience in paying taxes. Hypothesis testing shows that trust does not have a significant effect on taxpayer compliance, especially BumDes in paying taxes. The results of this study contradict the research conducted before which shows that there is a significant effect of trust on tax compliance [31]. These results indicate the benefits received by the public so that taxpayers trust and obey in paying taxes.
4 Conclusions

Based on the results of research that has been done, it can be concluded that understanding, awareness, and sales have an effect on tax compliance while the socialization and trust variables have no significant effect. The importance of government supervision in showing increased compliance in paying taxes from BumDes entrepreneurs. Besides that, socialization and benefits received are also important in increasing compliance in paying taxes so that it becomes an important concern for the government to improve taxpayer compliance, especially BumDes in paying taxes.

5 References


Physiological Tests on Soybean Mutant Lines against Stem Rot Disease Athelia Rolfsii Curzi

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Abstract. Soybean plants are often attacked by soil fungi that cause the plants to become wilted and generally caused by Athelia rolfsii Curzi. The research aims to test the physiology of soybean mutant lines against the stem rot disease of Athelia rolfsii Curzi. The results of data analysis showed that the inoculation of fungi to soybean mutant lines increases the content of the enzyme SOD and POD’s in each soybean genotypes. There are lines selected with the character resistant to stem rot A. rolfsii Curzi namely M100 A17 (18/5), M100 A25 (3/7), M200 A17 (18/5) and M200 A12 (6/5).

Keywords: soybean, mutant lines, Athelia rolfsii Curzi, SOD, POD

1 Introduction

The efforts that can be done in increasing genetic diversity and the improvement of varieties to obtain superior varieties can be made through the induction of genetic mutations. One way that can be done with physical mutagen. The physical mutagen is as ionizing radiation, one of them is gamma ray [1].

One of the technological innovations that can improve soybean productivity is the use of superior varieties. In the period from 1918 to 2015 there are 83 varieties of soybeans that have been removed and sought to be distributed to farmers. These superior varieties have a variety of potential character outcomes, harvest age, seed size, seed skin color, resistance to biotic/abiotic stress, and adaptation areas [2].

One of the common fungi is A. rolfsii Curzi often attack soy, green beans, and peanuts in the gardens scope of the crops research of legumes and tuber-Umbrian (Iletri). The results of identification of diseases of the plants that are attacked wilt generally show the disease caused by A. rolfsii Curzi. A rolfsii Curzi fungus survives in the soil or remnants of plants in the form of Hyfa or Sclerotia as microorganisms that are of facultative parasites. A rolfsii Curzi is the cause of the stem rot at the soybean crop. The fungus will live as saprophytes when the host plant is not found. In humid conditions, this fungus is also infected with soybean branches and leaves that are near the ground. Such microorganisms have the ability of low saprophyte competition activity [3].

The damage can caused by A. rolfsii Curzi can trigger changes to physiological, such as membrane disorders, nutrient imbalance, impairs the ability to detoxify reactive oxygen species (ROS). The concentration of ROS formed for the value of the highest SOD activity shows the plant to recovery itself to overcome the hick against the stem rot disease. The high
antioxidant enzyme activity shows the plant balancing the content of the ROS increased sharply. The increase in SOD becomes one of the plants to cope with the effects of the trigger. The high value of SOD signifies that the inexperienced plant has undergone a change in metabolic activity in the plant cells where photochemical reactions have been obstructions [4].

In previous research the character of high production and tolerant of stem rot. The results of the study showed that the strains planted there were the selected strains with high production characters and the stem rot resistant to the base of *A.rolfsii* Curzi on the soybean generation of soy plant M200A17 (13/6), M200A17 (18/5) and M300A6 (33/8) [5].

Based on the results of previous research authors interested in continuing research on the observation of the incidence of diseases as well as analysis of the enzyme superoxide Dismuatisi (SOD) and peroxide dismutation (POD).

## 2 Research Method

This research was conducted in October 2019 until December 2019 in the Pasar 1 Setia Budi Medan. The material used in this study is 9 lines of putative mutants, Anjasmoro varieties as the parent of lines mutant. Fertilizer used is Urea, SP-36 and KCl as the basic fertilization, top soil as a medium to grow, polybag size 40 x 50 cm as a place of planting media, insecticide-active material Profenofos to control pests, compost, bamboo, water, labels, trichodermabiopesticide, pure Culture *A.rolfsii* Curzi, Media of Potato Dextrose (PDA), coarse corn milled, cotton, HD/PP plastics, alcohol 96%, Aquades, spritus, Aluminium foil, Cling Wrap, gloves, masks, PVP (Polyvinyl pyrrolidone), EDTA (acid Ethenadiminetetraacetate), methionine, NBT (Nitro Blue Tetrazolium), Riboflavin, calcium chloride (CaCl2), phenol, 4-Dimethylaminoantipyrine, MES (M-2-(N-Morpholin) ethanesulfonic Acid), HEPES (M N-(2-and) ethanol 95%, phosphoric acid, hydrochloric acid (HCl), acetone 80%, filter paper, liquid nitrogen and other supporting substances in this study.

The tools used in this research are tape measure, bamboo marker, polybag size 10 Kg, watering can, camera, and stationery, graduated cylinder, petri dish, Bunsen burner, matches, Scalpel, Inoculating loop, Laminar Air Flow (LAF), biochemical microscope, analytical scales, mortar and pestle, centrifuges, reaction tubes, micropipette, spectrophotometer UV/VIS, pH meter, oven, centrifuge Thermoscientific (Sorval Legend Micro 17R), vortex Thermolyne (speed control type 37600 mixer) and other tools that support in this research.

Land preparation, measuring 9 m x 10 m, filling polybag, thinning, fertilizing and pest control, on 7 days after planting (HST) is done by leaving a plant. Plants are preserved, treated and fertilized. Fertilizer administered a week after planting. Pest control of plants using insecticide-activated Profenofos (2g/Liter of water) is given from the age of 2 weeks. Pathogenic inoculation of *A.rolfsii* Curzi into soybean plants is done by sowing 15 g of *A.rolfsii* inoculants / plants around the base of soybean plants that have been aged for 2 weeks. Analysis of the superoxide enzyme dismutase (SOD) and peroxide dismutase (POD) conducted in the Tissue Culture Laboratory of the Faculty of Agriculture Universitas Sumatera Utara. The leaf samples used are healthy leaves in the infected plant *A.rolfsii* Curzi performed on 3 weeks after inoculation of pathogens.

This research design used Factorial Randomized Block Design with one factor. The planted soybean seed is the seeds obtained from the previous generation. There are 9 genotypes and 1 varieties of soy. The comparative plant is a varieties of Anjasmoro as a source of elders in general there are 9 groups of genotypes used in land i.e. M (100)-A-25
3 Results and Discussion

The research data was collected for two months at the research location, namely in Pasar 1 Setia Budi, Medan Indonesia. The data collected is needed to be analyzed in this study. The results of the collection and analysis of research data are described as follows.

Table 1. Occurrence of the disease at the observation interval I-VIII days after inoculation

<table>
<thead>
<tr>
<th>Genotypes</th>
<th>INTERVAL I</th>
<th>INTERVAL II</th>
<th>INTERVAL III</th>
<th>INTERVAL IV</th>
<th>INTERVAL V</th>
<th>INTERVAL VI</th>
<th>INTERVAL VII</th>
<th>INTERVAL VIII</th>
</tr>
</thead>
<tbody>
<tr>
<td>M100A25(3/7)</td>
<td>33,33%</td>
<td>33,33%</td>
<td>33,33%</td>
<td>33,33%</td>
<td>33,33%</td>
<td>66,66%</td>
<td>66,66%</td>
<td></td>
</tr>
<tr>
<td>M100A25(2/7)</td>
<td>0%</td>
<td>33,33%</td>
<td>33,33%</td>
<td>33,33%</td>
<td>33,33%</td>
<td>100%</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>M100A25(3/4)</td>
<td>0%</td>
<td>0%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>M200A17(18/5)</td>
<td>33,33%</td>
<td>33,33%</td>
<td>33,33%</td>
<td>33,33%</td>
<td>33,33%</td>
<td>33,33%</td>
<td>33,33%</td>
<td>33,33%</td>
</tr>
<tr>
<td>M200A12(6/5)</td>
<td>33,33%</td>
<td>33,33%</td>
<td>33,33%</td>
<td>33,33%</td>
<td>33,33%</td>
<td>33,33%</td>
<td>33,33%</td>
<td>33,33%</td>
</tr>
<tr>
<td>M200A11(32/3)</td>
<td>66,66%</td>
<td>66,66%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>M100A17(18/5)</td>
<td>33,33%</td>
<td>33,33%</td>
<td>33,33%</td>
<td>33,33%</td>
<td>33,33%</td>
<td>33,33%</td>
<td>33,33%</td>
<td>33,33%</td>
</tr>
<tr>
<td>M200A17(13/7)</td>
<td>33,33%</td>
<td>66,66%</td>
<td>66,66%</td>
<td>66,66%</td>
<td>66,66%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>M100A17(30/2)</td>
<td>0%</td>
<td>33,33%</td>
<td>33,33%</td>
<td>33,33%</td>
<td>33,33%</td>
<td>33,33%</td>
<td>33,33%</td>
<td>33,33%</td>
</tr>
<tr>
<td>ANJASMORO</td>
<td>33,33%</td>
<td>33,33%</td>
<td>33,33%</td>
<td>66,66%</td>
<td>66,66%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Fig 1. Results of analysis of the enzyme Peroxide Dismutase (POD) on some genotypes
Discussion

Results showed that disease infections in plants had occurred from the incidence of disease interval I (7 days after inoculation) to Interval VIII (28 days after inoculation). Based on visual observations made, the most disease attacks on genotypes M100A25 (3/7), M100A25 (3/4), M200A11 (32/3), M100A6 (30/2), and Anjasmo by 100%. The lowest disease attack was found in genotypes M200A17 (18/5), M200A12 (6/5), and M100A17 (18/5), respectively, 33.33%. The intensity of the stem rotten disease is attacking plants depending on genotypes and varieties of plants that are able to survive is that has a character resistant to the stem rotten disease. Starting from small to entering the generative phase which states that stem rot diseases attack since the vegetative phase and evolved to the generative phase so as to lower production. Infection of the disease shows the severity depending on varieties or genotypes [5].

Based on the analysis of parameters observed superoxide enzyme dismutation, the condition of the plant in a state of stress fungus SOD highest value is present in the Anjasmo (5.164 units/mg protein) and the lowest is at the lowest in Optimum condition M100A6 (30/2) (0.098 units/mg protein). The higher the value of SOD, it will hold the crop to a shallow. This is due to the enzyme SOD is an important component in the handling of Reactive oxygen Species (ROS) is done in chloroplasts and mitochondria. The value of the highest SOD activity indicates the plant to recovery itself to overcome the disaster that occurs in plants. The high antioxidant enzyme activity shows the plant balancing the content of the ROS increased sharply [4].

The results showed that some strains that had a higher pod content in the pathogenic condition were the administration of the stem rot rotten fungus compared to its control plant in
genotypes M100A25 (3/7), M200A12 (6/5), M200A17 (18/5), M200A11 (32/3), M100A17 (18/5), and M200A17 (13/7). This genotyping has a resistance to the stem rotten pathogenic disease. Peroxidase activity plays an important role in plant cell wall strengthening mechanisms (lignification) and the production of phenolic compounds. Reinforcement of cell wall plants can inhibit the initial infection process of pathogens because pathogens require nutrients from within the plant cells. In addition, the plant cell serves as the venue for mechanisms governing the activity of crop defense response to pathogenic attacks [6].

Interaction between SOD enzyme and POD relationship that is SOD is the first defense system in tackling the damage caused by ROS by catalyzed the O₂ into hydrogen peroxide (H₂O₂). Peroxide is an enzyme that plays a role in crop resistance to pathogenic attacks such as stem rot mold. The content levels of SOD and PODS affect crop defense against the stem of rotten fungus disease based on research in the find that genotypes that have resistance to stem rot are M200A17 (18/5), M200A17 (13/7), M200A11 (32/3), M200A12 (6/5) and M100A25 (3/7) states that Superoxide produced on the membrane surface thus can be trapped and converted immediately into H₂O₂. Peroxidase solves H₂O₂ into water when oxidizing a number of substrates. Thus peroxidase is an enzyme of oxidoreductase group which uses H₂O₂as an electron acceptor to be catalyzed the various oxidative reactions occurring within the plant [7].

Based on the results of the incidence of disease obtained that there is genotyping the percentage of attacks on the base rotten disease and has a high content of SOD enzyme and enzyme POD so that the plant is more resistant to A.rolfsii Curzi at M200A17 (18/5) which percentage of the incidence of disease is 33.33% and SOD content is 4931.40 units/mg, POD 0.12 units/mg, M6200A11 (6/5) percentage of the incidence of diseases ranging from 33.33% and SOD content is 1740.65 units/mg, POD of 0.17 units/mg. There are several genotypes that have a high content of SOD enzymes and POD enzymes but have a high incidence of disease also in genotypes M100A17 (18/5) percentage of disease incidence is 33.33% and SOD content is 422 units/mg, POD of 0.02 units/mg and M100A25 (3/7) percentage of the incidence of its disease, ranging from 66.66% and SOD content of 4066.57 units/mg than POD content of 0.17 units/mg of research results showed agronomy character appearance on a medium inoculated fungus A.rolfsii Curzi lower than treatment without inoculation of A.rolfsii Curzi on population. Selections performed on the population of mutant lines produce selected individuals with a tolerance of stem-rotten disease ranging from 100Gy and the population of 200 Gy [8].

4 Conclusions and suggestions

There are lines selected with the character resistant to stem rot A. rolfsii Curzi namely M100 A17 (18/5), M100 A25 (3/7), M200 A17 (18/5) and M200 A12 (6/5). It is advisable to do planting soybean in field of production center in North Sumatera.
5 Acknowledgements

The author wishes to thank Rector of the Universitas Sumatera Utara and the Ministry of Research, Technology and Higher Education, Republic of Indonesia who has supported and funded this research.

6 References

Media Development Based Learning of E-Learning Course in Entrepreneurship Education Study Program at Business Education of Economics Faculty Universitas Negeri Medan

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Abstract. Education is seen as one of the aspects that have an important role in shaping the future generation. Various countries in the world take part in improving the quality of human resources through education. In the normal teaching and learning process in entrepreneurship course in Business Education courses it is mandatory to use e-learning based learning media. But in reality e-learning based learning has not been clearly seen to be done and focused in accordance with specified operational standards. It is important to develop a media-based e-learning in entrepreneurship courses at business education courses Faculty of Economics Universitas Negeri Medan. This study is a research and development type, which aims to produce or develop a product. The location of this research is done in the Faculty of Economics, Business Education Program State University of Medan. This study uses a model of ADDIE (Analysis, Design, Development, Implementation, and Evaluation). As of the indicators in this study was learning module with e-learning based in entrepreneurship courses and international scientific journals indexed publications.

Keywords: Entrepreneurship, Media Learning, E-Learning, ADDIE

1 Introduction

Education is seen as one of the aspects that have an important role in shaping the future generation. Various countries in the world took part in improving the quality of human resources through education. This research is expected to produce quality human resource, responsible and able to meet the future advancement.

Today, universities are required to produce graduates who have the skills to compete in the world of work. In order to compete later in the work then the college should prepare students to educate and provide training to students learning by using various media. Along with the development of Information Technology (IT) is rapidly increasing, the need for a concept and IT-based teaching and learning mechanism becomes inevitable. The increasing development of technology has a large impact on many sectors in the education sector, no exception. The use of Information and Communication Technology in education has given birth to an electronic learning model, known as e-learning.

E-learning based learning should really be something that needs to be considered and
applied to campus. Online learning (e-learning) has three functions, namely, supplements (enhancer), complement and substitution (replacement) of learning in the classroom [1]. Implementation in Indonesia, including Universitas Negeri Medan, particularly in the Business Education courses of Economics Faculty, according to the author is still limited to supplement and complement in learning process.

This study aims to assist the development of instructional media based e-learning in entrepreneurship courses in Business Education study program at the Faculty of Economics Universitas Negeri Medan planned and scalable system so that students and faculty can apply effective and efficient learning.

The overall objective of the above related to the research umbrella established by Universitas Negeri Medan Research Institute in 2015-2020 in the research process and learning outcomes, namely the development of e-learning in entrepreneurship courses in Business Education courses Faculty of Economics Universitas Negeri Medan.

E-Learning is a convergence or integration of computer technology, Internet network, with aspects of communication and educational materials in supporting the creation of internet-based teaching systems. The term e-Learning is more precisely intended as an effort to make a transformation of teaching and learning process in the schools into a digital form that is bridged by information technology (internet).

This research is the development of previous research regarding the development from demonstration-based multimedia learning modules in business administration education courses at the Faculty of Economics Universitas Negeri Medan. The results of the study show that demonstration-based learning method produces a valid learning multimedia modules, effective, and practical learning.

Based on preliminary studies that have been done the research roadmap can be seen as follows:

![Roadmap](image)

**Fig 1. Roadmap**

2 **Research Method**

This study is a research and development (R&D) method, which aims to produce or develop a product. Research is the development of research methods used to produce a certain set and test the effectiveness of the product. In this study, the authors use development model ADDIE (Analysis, Design, Development, Implementation, and Evaluation).

This study uses ADDIE (Analysis, Design, Development, Implementation, and Evaluation) model, ADDIE model image following the implementation of the development of teaching materials.
The indicators of achievement can be seen in the following table:

<table>
<thead>
<tr>
<th>Year</th>
<th>Achievements</th>
<th>Final</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019</td>
<td>1. The learning module based on e-learning in entrepreneurship courses.</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>2. Publication of the international scientific journal indexed.</td>
<td>100%</td>
</tr>
</tbody>
</table>

Based on the research development model of this research plan, it can be seen in the following study flow chart. Regarding the development of a demonstration-based learning multimedia modules on business administration education courses in the Faculty of Economics Universitas Negeri Medan.
3 Results and Discussion

a. Analysis Phase

At the stage of the analysis performed to determine the existing problems in the learning of subjects including analyzing curriculum, students, and concepts. In accordance with the educational development resulting Presidential Decree 8 of 2012 on the Indonesian National Qualifications Framework which contains about levels, equalization, and application qualification of human resources. In this KKNI reflect learning outcomes (learning outcomes) through education, training, work experience, and independent learning. The analysis is done by analyzing curriculum SK and KD on entrepreneurship courses. The results of the analysis is requires students to understand and able to use e-learning account of Universitas Negeri Medan in which built using a CMS e-Learning named SIPDA.

This Analysis of students is to find out students’ characteristics which determine how the module should be made so that it can easily be understood. The student characteristics include age, motivation, background, science and knowledge, academic and social abilities. It is important to understand the characteristics of students as a capital in the analysis of students to develop learning modules.

b. Design Phase

At the design stage to explain the views of the cover, the formulation of learning objectives, and describing the content of the module. Cover is designed so that students are more interested in the learning process. The cover used in this module can be seen as in the picture below.

Fig 4. Cover module-based learning e-learning
Formulation of interest is based on the target accuracy of the curriculum in entrepreneurship courses. The draft formulation of learning objectives can be seen in the following figure.

![Fig 5. The design of the learning objectives](image)

Materials module refers to the Indonesian National Qualifications Framework (KKNI) which refers to the learning outcomes (learning outcomes). The following description of the learning modules based on e-learning in entrepreneurship courses.

![Fig 6. Introduction to E-learning](image)
c. Development Phase

The development stage is the process of realizing the blueprint into reality. After the first step, the next step is to carry out validation of media products developed to expert language support and expert (lecturer). Validation is done by two experts to examine the draft modules and provide an assessment of the questionnaire that was given, from the results of the assessment will be obtained validity of the draft modules.

d. Implementation Phase

Based learning module implementation of e-learning SIPDA by how educators provide examples first, followed by all students. Students are asked to demonstrate what a module that is unknown whether they understand the stage or not.

e. Evaluation Phase

The evaluation phase is done by observing activities student activities in the learning process. Observation activities carried out four times. Students’ activities categorized by observers, among others: read the modules and practice in accordance with the directives, the students ask questions that are poorly understood, students solve problems, and to modify the outside of the module.

4 Conclusion

Based on the results and discussion it can be concluded that this research-based learning module generates a valid e-learning, effective, and practical learning. Usage-based learning method SIPDA e-learning is very effective in improving student’s learning, achievement and creativity. Not only that, the use of teaching methods based on e-learning SIPDA should be use for materials that require practice in the learning process.

5 Acknowledgments

On this occasion, with all humility authors thank the author of endless family pray and give encouragement and affection invaluable in any form. The author would like to thank the existing academic environment in particular Faculty of Economics Universitas Negeri Medan who have supported and provide guidance and motivation to the author so as to complete the learning modules based e-learning as well as possible. Thanks to LPPM Universitas Negeri Medan that provide support for this research.

6 References


Logging waste of Eukaliptus ind 61 clone in industrial plantation forest, North Sumatra, Indonesia

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Abstract. The purpose of this study was to obtain the influence of height and diameter at breast height on the volume of logging waste of Eukaliptus clone ind 61. This research was carried out at industrial forests areas of PT. Toba Pulp Lestari, North Sumatra, Indonesia. Data collection consists of primary data and secondary data. Data analysis is to know the relationship of height and diameter at breast height on the volume of logging waste. The factor seen can be analyzed using multiple linear regression analysis, to determine the relationship of variables to the volume of logging waste. This research resulted that the percentage of stump waste and stem waste were 15.38% and 84.62%, respectively. The results showed that regression model was \( \hat{Y} = 0.002X_1 + 0.0049X_2 - 0.01 \). The increasing in height and diameter at breast height that occurs in each tree is directly proportional to the addition of logging waste volume.

Keywords: logging waste, industrial forest, diameter at breast height.

1 Introduction

Lack of raw materials underlies given permission to manage forests sustainably, one of which is the industrial plantation forest. Wood production from industrial plantation forest is targeted to reach 360 million m³ per year in the next 10 years, to support the forest industry. One of the activities observed in this study was timber harvesting. Timber harvesting is an effort to move log to a collection or management of wood that can increase the economic value of the wood. Forest harvesting usually produce waste, the waste can be in the form of leaves, bark, and tree branches [1,2]. This waste can be managed into added value, and can be resold. Eucalyptus hybrid Ind 61 clone is considered to growth well in PT. Toba Pulp Lestari areas.

According to [3], the volume of wood used tends to be smaller than the volume of wood that is felled, so there is residual wood that is not transported in logging plots or in wood collection sites. This situation is quite alarming, because on the one hand the needs wood will continue to increase and on the other hand there is a significant waste of wood.

Different criteria in defining and classifying wood harvesting waste with different conditions of the research location will produce different volumes of logging waste. For this reason, research on the identification and potential of logging waste is very much needed in
order to extent to the prospects for the utilization of logging waste. The objective this study was to obtain the influence of height and diameter at breast height on the volume of logging waste of eukaliptus ind 61 clone.

2 Research Method

This research was carried out at PT. Toba Pulp Lestari, North Sumatra. Object of this research is the forest stand after the harvesting activities. Secondary data in the form of data obtained from companies that support the results of research. This secondary data is in the form of field conditions and maps of the location of cutting plots. Primary data is the main data obtained by direct observation in the field. Analysis of the relationship of some factors that influence the volume of logging waste. The factor seen is the influence of tree diameter and height on the volume of waste can be analyzed using Multiple Linear Regression Analysis, to determine the relationship of these variables to the volume of waste carried out and t test. Data analysis was performed using SPSS (Statistical Product and Service Solution) version 16.

3 Results and Discussion

3.1 Volume and percentage of wood waste

Wood waste was measured and found the volume of wood that could be used approximately, the volume of wood produced and the volume of wood parts that could not be utilized or counted as wood waste. This data is obtained by direct measurement of the diameter of the wood, both the diameter of the tip and diameter of the base. The volume of production wood is obtained from the calculation of the volume of wood that has been cleaned from the skin, stems, twigs, and ready to be sent to the factory. In order to find out the wood that has not been cleaned the numbering is carried out on the wooden waste using paint. The results of the volume of wood can be estimated, the volume of wood production and waste can be seen in Figure 1.

![Figure 1](image)

Fig. 1. Estimated wood that can be utilized, wood production and wood waste
**Figure 1** showed that the estimated volume of wood that can be utilized was 5.95 m³ and wood production was 4.79 m³, respectively. It was resulting that logging waste was 0.44 m³. The wood harvesting waste is caused by the field condition which has a moderate to steep slope, so that the chainsaw and helper operators have difficulty in cutting down. So that some tree stumps have uneven surfaces. With the condition of such areas, it is difficult for workers to determine the direction of felling notches and notches so that there are some broken woods at the top of the first branch [4,5].

The upper trunk waste comes from the first branch waste up to the tree canopy. The stump waste is the waste which is under the back notch and fall notch. For delinquent logging waste is left behind so that the soil structure in the area does not change and prevents landslides. In addition, the wood will be transported more if it is in a round shape and the compilation into trucks will be easier. To see the comparison of the volume of stem waste and the stump waste can be seen in **Figure 2**.

Based on investigated in the field, this waste occurs due to inefficient harvesting activities carried out or referred to as technical factors. Lack of seriousness in cutting is one of the factors that cause the arrears to be taken too long. In addition, the harvesting waste can also occur due to the determination of the wrong felling direction, thus causing the wood to break during logging. In addition, in forest harvesting activities, problems often occur because the equipment used stop working due to lack of maintenance of the forest harvesting tools [6]. According to the research by [7] and [8] resulted that the occurrence of a large amount of logging waste and residual stand damage caused by technique of felling and determining the direction of felling.

![Graph showing percentage of stump and stem waste](image)

**Fig. 2.** The percentage of stump waste and stem waste volume.

### 3.2 Interaction of plant height and diameter at breast height to waste volume

Analysis of the data in this study was used to see the relationship between diameter at breast height and height of trees and tree volume. This data analysis was performed using statistical product service solution (SPSS) software. All data obtained are included in SPSS with the independent variable being the height and diameter of the tree while the dependent variable is the volume of waste. This data analysis was performed with a 95% confidence interval. Significance value is below 0.05 means that the independent variables significantly influence the dependent variable. To see the correlation model in each replication plot can be seen in **Table 1**.
Based on the regression model $\hat{Y} = 0.002X_1 + 0.0049X_2 - 0.01$, it can estimated that the plant height and diameter at breast height of the tree has a positive effect on the increase in the volume of logging waste, meaning that each increase in height and diameter at breast height of the tree will increase the volume of logging waste. In other words, the increase in height and diameter at breast height that occurs in each tree is directly proportional to the addition of logging waste volume in the cutting plot. This was also stated by [4] in general logging waste was caused by two factors, namely natural factors and technical factors. In this study, natural factors that influence the amount of logging waste are topography, stand density, wood dimensions, wood species, soil conditions and weather conditions. For this reason, special attention needs to be paid to waste utilization, where there are many types of wood processing such as particle boards, fiber boards or other types of boards using the raw material for harvesting waste itself. It has been proven by [9], where logging waste of *Acacia mangium* can be used as a non-structural particle board such as furniture.

4 Conclusion

The plant height and diameter at breast height of the tree has a positive effect on the increase in the volume of logging waste, meaning that each increase in height and diameter at breast height of the tree will increase the volume of logging waste. In other words, the increase in height and diameter at breast height that occurs in each tree is directly proportional to the addition of logging waste volume in the cutting plot.

5 Acknowledgment

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6 References


Batakinese Dalihan Na Tolu Culture System as a Learning Model of French Production Orale Skill

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Abstract. This study aims to produce a learning model of Production Orale (Speaking Skills) of French level B1 based on the local Batak culture of the Dalihan Na Tolu system with the theme Exprimer des opinions (giving opinions). This research and development with Plomp development model through four phases. The research subjects were 20 of 5th semester students of FBS Unimed French education study programs. Research and development results are obtained through material expert validation, media validation and language validation. The practicality of the learning model is obtained from the assessment of validators and questionnaires to students and the effectiveness of the learning model is obtained from the results of student learning after applying the French speaking learning model based on Dalihan Na Tolu. The results from the responses of students in the category of very practical with an average score of 89.5%, the pre-test and post-test when learning with the blended learning model based on local culture of students before and after using the learning model local Batak culture based on the Dalihan na tolu systems is effective with an average student final grade of 80 in the good category.

Keywords: model, speaking, French, local culture, dalihan na tolu

1 Introduction

French is a foreign language taught in educational institutions in Indonesia. French learning emphasizes four language skills, namely listening, speaking, reading and writing skills. Speaking skills or Production Orale (PO) is one of the four language skills that must be mastered by French language learners in the FBS Unimed French Language Education Study Program, because speaking skills are a means of expressing the contents of the mind through verbal speech. Speaking is an oral language process expressing thoughts and feelings, reflecting on experiences, and sharing information. If someone has good speaking skills, he will gain social benefits (social interaction activities of individuals) and professional benefits (use of language to make questions, convey facts and knowledge, explain, and describe) [1].

Based on observations of 2017 school year students at the FBS Unimed French Language Education Study Program, only 5 students out of 20 students were active while learning to speak while other students were more silent and less inclined to speak when asked to answer questions in simple French. Students feel difficulties when they want to express ideas, ideas and feelings; difficult pronunciation of French words or sentences with good pronunciation; difficulty in constructing correct simple sentence structures. Error constructing sentences in speaking is shown in the following table.
Table 1. Error constructing sentences in speaking

<table>
<thead>
<tr>
<th>Error Construction of Sentences in speaking</th>
<th>Correct Construction of Sentences</th>
</tr>
</thead>
<tbody>
<tr>
<td>*Elle va à la campus</td>
<td>Elle va au campus ‘She goes to campus’</td>
</tr>
<tr>
<td>*Je me lave</td>
<td>Je me lave ‘I take a bath’</td>
</tr>
<tr>
<td>*Il y aura beau temps</td>
<td>Il fera beau temps. ‘The weather will be sunny’</td>
</tr>
</tbody>
</table>

In addition, from the results of the *Production Orale* (speaking) on examination competency test for semester 5 students in 2017 using the assessment of the standard French language test B1 level DELF (*Diplome d'Etudes de la Langue Française*) namely the assessment of French language skills in European systems for all learners French in the world, 70% of students score less than 60 (bad category), 20% of students score above 80 (good category), and 10% of students score above 90 (very good category).

Mastery of good speaking skills will deliver someone as an intelligent, creative and communicative individual. The problem is that not all students of French Language Study Program at FBS Unimed French Language Education have good speaking skills and even tend to not have motivation in learning. Whereas learning French speaking skills has been attempted with a variety of techniques, for example with the *jeux de rôle* (role playing) technique or the *jeu de créativité* (creative play) technique, etc. In addition, the learning model provided in learning to speak French is through a communicative approach. However, the learning model does not seem to have produced a maximum value in the B1 DELF level category. Therefore, it is necessary to find a solution to improve students' speaking skills in French, which is in the form of a study on the development of Blended learning models based on local Batak culture in a foreign and expected system that is expected to improve the competence and learning outcomes of students speaking.

Based on the problems above related to the 5th semester students 'speaking skills, a research was conducted to develop a blended learning model to improve French students' speaking skills. This development research really needs to be carried out as an effort to provide a solution to the problem of speaking skills of French students. It is expected that through the development of effective, interesting, and efficient French speaking (speaking) blended learning models, improvement in French speaking skills can be realized. The learning model is a specific approach in teaching, which in this case will be used as a blended learning model by integrating elements of the Batak culture of *Dalihan Na Tolu* which is one of the local wisdoms in North Sumatra.

The term *Dalihan Na Tolu* which is a Batak traditional philosophy that has been for hundreds of years, has a literal meaning of a three-legged stove made of stone which illustrates the 3 important positions of every Batak person in his community. The existence of this community consists of 1) the *hula-hula or tulang* (uncle), 2) the side of a clan called *dongan tubu* and 3) the sister called *bora plus bere and ibebere* (nieces and nephews). The use of the stove system with three legs can be seen when the Batak people hold an event such as a wedding, birth, or death and other celebrations, the implementation of which must be discussed first by involving the three parties. In speaking learning, this system is used by dividing students into groups as a picture of a transitional *na tolu*. 

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In the table above, there are examples of error construction in speaking and their correct counterparts:

- *Elle va à la campus* is incorrect and should be *Elle va au campus*.
- *Je me lave* is incorrect and should be *Je me lave*.
- *Il y aura beau temps* is incorrect and should be *Il fera beau temps*.

These examples highlight common errors students might make when speaking French and provide a correct version for comparison.
Speaking learning activities (PO) by integrating *daliihan na tolu*’s transitional system is to find solutions to a problem in the group that must be discussed and decided through mutual agreement. Among these three elements, the problem is always expressed or raised by the body of *Dongan Tubu*. However, the one who is always given the opportunity to give an opinion at the beginning of a conversation in a discussion is *boru*. Each party in the group is led by a competent spokesperson, so for the *Boru* party group played by students whose abilities are below average led by a spokesperson whose abilities are above average, and the *Dongan Body* is a student whose abilities are being led by a spokesperson whose abilities are also above average, and the *hula* is a group of students whose abilities are above average, led by a highly competent spokesperson. This means that any discussion that requires broader insight, the *hula-hula* who will provide solutions to problems that arise to members of the group *dongan tubu* and *boru* and bere / *ibebere* groups.

Learning through the Blended Learning Model is meaningful as a learning pattern that contains elements of mixing, or combining one learning pattern with another learning pattern. In connection with the elements of local culture that are integrated into the Blended learning model based on the *Daliihan na Tolu* Batak culture studied based on recent study that the learning strategy by promoting culture-based education (folklore culture) needs to be developed in schools, because it is considered to motivate students to learn more actively to provide added value and positive for him [2].

Learning models are conceptual frameworks that describe systematic procedures in organizing learning experiences to achieve learning goals. It is not new to the education community that the teaching and learning process in the classroom requires an appropriate approach and learning model so that pleasant learning conditions for learners can be created so that the material can be conveyed effectively and efficiently with learning objectives that are expected to be achieved optimally. Learners in the era of Information and Communication Technology (ICT) are students who were born and developed in the digital age and are classified as millennial generation. The influence of IT today is very big, technology is something that students want to master. The use of internet media, cell phones and sending messages via SMS has become the daily consumption of people both in cities and villages to convey information to each other. The students already know and use social media Facebook, Line, Instagram, WhatsApp, Twitter, and others that illustrate that students are now very technologically literate globally throughout the world.

Various models of approaches are used in learning, one of which is the blended learning model. The term etymologically blended learning consists of two words namely blended which means mixture and learning which means learning. One of the latest educational issues in the development of globalization and technology is Blended learning. Blended learning is a model that can be applied precisely and involves students actively associated with Information Technology (IT).

Mixed are the two main elements, namely learning in the classroom (classroom lesson) with outside the classroom (online learning). Blended learning model has 4 different concepts, namely: a) Blended learning is learning that combines or combines various web-based technologies, to achieve educational goals, b) Blended learning is a combination of various learning approaches (such as behaviorism, constructivism, cognitivism) to produce an optimal learning achievement with or without learning technology, c) Blended learning is also a combination of many learning technology formats, such as video tapes, CD-ROMs, web-based
training, films with face-to-face learning, d) Blended learning combines learning technology with actual work task orders to create a good influence on learning and work [3].

General speaking can be interpreted as a delivery of intent (ideas, thoughts, and contents of one's heart) to others by using spoken language so that the intent can be understood by others [3]. By speaking, the intentions of the speaker will be understood by the listener.

Speaking is s'exprimer oralement, c'est transmettre des messages, généralement aux autres, en utilisant principalement la parole comme moyen de communication, that is, speaking is conveying messages to others, which basically uses language as a communication tool [4]. Speaking skills referred to in this research development are students able to express their ideas, opinions, feelings to others verbally by using French in accordance with the context (related to the theme). Students are able to pronounce words or sentences correctly, vocabulary selection, use of grammar, fluency, and understanding of messages or information conveyed by the speaker to the interlocutor so that communication goals can be achieved.

Through the language learning process students are also expected to have the ability to communicate including discourse competence, namely the ability to understand and produce oral or written text that is realized in the four language skills namely listening (compréhension orale), speaking (production orale), reading (compréhension écrite), and writing (production écrite).

The Batak ethnic group as one of the tribes found in North Sumatra has a very thick cultural and kinship system. The Dalihan na tolu system as a pattern of Batak kinship has a value that is no less important than the other system that is well known today for the Indonesian nation and state, namely the Democracy system. The Batak kinship system places one's position with certainty from birth to death in 3 positions called dalihan na tolu. The word dalihan can be translated as "furnace", meaning which, tolu means three which contain the same meaning, "3 important positions" in the kinship of the Batak people. Integrating the Batak culture of Dalihan na tolu in learning French speaking skills is one of the efforts to provide solutions to problems that might occur among students, to civilize them to give opinions politely and politely and to respect their friends when giving input or ideas, proposals, and opinions on a problem in order to find an agreed solution. On recent research on Mathematics learning models based on Batak culture-based problems (PBM-B3), developed through the learning model enables students to construct mathematical knowledge through problem solving that comes from facts and the Batak cultural environment, by applying Dalihan Na Tolu's social interaction patterns as learning strategies [5]. Research on improving French speaking ability using jeux aims to find out how to improve French speaking ability using jeux [6]. Jeux is one of the teaching techniques that can be used in teaching Expression Orale II courses. The results of the study showed that the use of Jeux can improve students' French speaking ability.

2 Research Method

Research on the development of blended learning models in the Production Orale course (speaking) French based on Batak local culture Dalihan NaTolu aims to improve French speaking competence in 5th semester students with the Plomp development model [7]. The learning model developed is a blended learning model combining face-to-face learning with online / offline learning that is designed using video media in the Youtube application. This learning delivery strategy is done with face-to-face learning 70% and online / offline learning
for learning purposes understanding and developing concepts are done online but for the purpose of learning in the form of skills that require learning to practice speaking processes, then the chosen form of learning is offline. The source of the research data were 20 students in the fifth semester of 2017 learning year at the FBS Unimed French Education Study Program who were taking the Production Orale level B1.

The learning design model was developed using the Plomp model through four phases, namely (1) Development Planning and Design, (2) Model Development using the Dalihan Na tolu syntax, (3) Expert Test, (4) Limited and extensive class trials [7].

Data collection techniques used is the initial test of speaking skills, expert test sheets, questionnaires and tests. The instrument used was an expert validation sheet, while for students used a questionnaire with closed and open answers, French speaking skills test equivalent to B1 was used to find out the improvement in learning outcomes.

Data analysis is done through validation and testing by calculating the score obtained to assess the quality of the learning model developed. The data collected in this study are in the form of qualitative data, namely a score with a scale of 1-5 (score 1 for very less, score 2 for less, score 3 for sufficient, score 4 for good, and score 5 for very good) for the initial assessment test instrument on student speaking competence. In the assessment of students' speaking skills used Échelle de Harris assessment (Évaluation de l'entretien dirigé) with components of prononciation (pronunciation), grammaire (grammar), vocabulaire (vocabulary), aisence (fluency), and comprehension, expert assessment and student assessment related to applied learning, strengths and weaknesses of learning [8]. Qualitative data scores are converted into quantitative data using a conversion reference using a Likert Scale. The results of the pretest and posttest were analyzed with comparative analysis which compares the results of the initial conditions with the conditions after learning with the model that has been developed.

3 Results and Discussion

Findings

The results of the study were obtained to answer the problem formulation related to the development process of learning model of production based on the Batak culture of na tolu, which was carried out through the investigation phase, the design phase, and the realization or construction phase as the first problem, while the test, evaluation, and revision phases will be carried out to answer second problem. Meanwhile, the third problem is to obtain a picture of improving student learning outcomes through speaking skills tests using CECR assessments equivalent to B1 DELF. Document analysis is carried out to complement and clarify the results of information, namely by observing, recording and collecting what is implied and written in each document or archive that is the source of the data. The process of developing a blended learning model in the learning of Production Orale (PO) level B1 DELF based on Batak culture in a fluctuant way is done gradually through problem analysis and needs analysis. There were 20 students in semester 5 in 2017 that were studied.

The process of developing a Blended learning model based on the Dalihan na Tolu Batak culture in learning to speak French is carried out through an investigation phase, a design phase, and a realization or construction phase.

The first meeting was to obtain preliminary data on French speaking ability level B1 DELF through an observation sheet containing an assessment of speaking skills related to
pronunciation, grammar, vocabulary, fluency, and comprehension. In addition, to obtain data on student needs for the blended learning model, questions are given to 5th semester students on speaking learning or Production Orale (PO) related to exprimer des opinions (expressing opinions). In this investigation phase, students are still left in a U-shaped sitting position, no grouping has been done. Furthermore, researchers asked questions related to exprimer des opinions to obtain information on how students express their opinions or ideas in French. Out of 20 students, 6 gave the right answer using the expression of moi, à mon avis, and je pense que. While 14 other students tend not to give responses, lack the courage to give answers, and lack of knowledge of other expressions that can be used to express opinions in French. The researcher then explains several other expressions that can be used to express opinions in French, for example quant à moi, moi personnellement, à mon point de vue, and je crois que.

After obtaining information at the investigation stage based on observations and observations about the knowledge and competence of 5th semester students in expressing opinions (exprimer des opinions) in speaking skills, then the students were given a topic with the theme Comment réussir à l’examen du DELF B1. Students are still in the original position, there is no group forming, each asked to give their opinions according to related themes. At this stage, 40% of students give answers using expressions that are better than before, but when students speak in French, there are still speaking mistakes that are not in accordance with the system of pronunciation and grammar of French as in conjugation of the verb. In addition, there are 7 to 8 students who are hesitant and halting in speaking so the ideas conveyed are unclear. Vocabulary selection is also an obstacle for students in expressing opinions. The results of observations and investigations conducted through video recording at the first meeting illustrate the condition that learning to speak French is more varied and can motivate students to improve their competence in learning French. Based on this first meeting, the results were obtained that there were 5 students who were smart and would be used as spokespersons in each group for the design of the second meeting in learning to speak French with a transitional system

The second meeting the students were introduced to a blended learning model that would be used in the learning process of speaking (PO) associated with the na tolu dadap system as one of the local cultures in North Sumatra. The researcher explains the mechanism in blended learning with na tolu’s transitional system which is used as a PO learning model. In this learning model, students are grouped into three groups, namely the first group as the hula party, the second group as dongan tubu, and the third group as boru party, and the bere / ibebere group which is part of the boru party as illustrated below.

![Fig 1. Syntax system in DalihannaTolu](image-url)
In the Dalihan na Tolu system model is used as one of the techniques in learning to speak. Students are divided into three groups for talking about Comment réussir à l'examen du DELF B1 to find a solution to a problem that arises in the group that must be discussed and decided through the results of the discussion according to mutual agreement by giving their respective opinions using the expression exprimer des opinions in French. Each party in the group is led by a competent spokesperson.

Among the three communities in the before-mentioned question, problems were raised by Dongan Tubu (6 students, 1 student as a spokesperson). However, those who are always given the opportunity to give an opinion at the beginning of a conversation in a discussion (dialogue) are boru parties (7 students, 1 as a spokesperson) and bere / ihebere (4 students). The results of opinions, suggestions, input from the boru party were further discussed by Dongan Tubu to obtain mutual agreement, and the last party to provide input and advice was hula (3 students, 1 as a spokesperson). As for the Boru party group played by students whose abilities are below average led by a spokesperson with abilities above average, and the Dongan Body is a student with moderate ability, led by a spokesperson whose abilities are also above average. Meanwhile, the hula is a group of students with above average competence, led by a competent spokesperson. This means that any discussion that requires broader insight, the hula-hula who will provide solutions to problems that arise to members of the group dongan tubu and boru and bere / ihebere groups.

Students who have been grouped into three communities namely hula-hula (3 people), dongan tubu (6 people) and boru and bere / ihebere (11 people) then engage in dialogue with fellow groups whose respective roles have been determined to express opinions to problems that arise in the group. Theme 1 about Comment réussir à l'examen B1 (how to succeed in the B1 exam) begins with the researcher's explanation of the situation that will be discussed in the student group in the discussion.

The dongan tubu group started talking about the B1 exam problem that would be faced in a few weeks, and the problem that arose was related to their preparations that were not yet available to deal with it so that the dongan tubu asked for their opinion first from the boru and bere / ihebere parties. Opinions, ideas, and proposals boru parties, bere / ihebere by using the expression of moi selon, à mon point de vue, moi personnellement, je pense que, etc., are conveyed to the body of Dongan who immediately discuss it again with their groups. In the group discussion, they also provide opinions, ideas, or proposals using expressions of how to express opinions, such as à mon opinion, quant à moi, à mon avis, etc. All opinions from boru, bere / ihebere and dongan tubu are then conveyed to the hula-hula. Various opinions, ideas or proposals conveyed by both parties dongan tubu and boru to the hula were remodeled again by the hula-hula, henceforth also given input and advice by the hula-hula to then be conveyed back to the other two parties so there is an agreement to accept the suggestions and ideas of the parties should be carried out by all parties.

Observations in the second meeting learning related to the theme Comment réussir l'examen B1 showed that students were competent to use expressions in exprimer des opinions, but there were still some errors in constructing sentences that were grammatically appropriate, for example in determining which modes were indicative, subjective, or conditionnel. In addition, difficulties are still seen when conjugating verbs to determine the time suitability between the present and passé periods. In addition, there are 60% of students who do not have a pronunciation in accordance with the French pronunciation system. At the third meeting, learning blended with the system of transitional na tolu with the theme Un cadeau de surprise pour l'anniversaire du prof (a surprise gift for a teacher's birthday). It is
still the group of dongan tubu who started talks on the theme of birthday gifts which will be given as a surprise for a teacher. The problem that arises is what gifts will be given so that the body is asking for opinion from the boru and bere / ibebere parties. Some opinions, ideas, and proposals boru parties, bere / ibebere by using the expression of selon moi, à mon point de vue, moi personnellement, je pense que, etc., were conveyed to the body of dongan tubu who immediately discussed it again with his group. In dongan tubu group discussions, they also provide opinions, ideas, or proposals using expressions of how to express opinions whether they agree or disagree, such as je crois que, à mon opinion, à mon avis, etc. All opinions from boru, bere / ibebere and dongan tubu are then conveyed to the hula-hula. Various opinions, ideas or proposals conveyed by both parties dongan tubu and boru and bere/ ibebere to the hula-hula were refatted again by the hula-hula, henceforth also given input and suggestions by the hula-hula to then be conveyed back to the other two parties so there was an agreement to accept suggestions and ideas from the hula parties which further enriched the students' knowledge in this meeting by using the expressions of je suis d'avis que, je trouve que, d'après moi, je suis d'accord, etc.

The observations in the third meeting learning related to the Un cadeau de surprise pour l'anniversaire du prof theme showed that students were competent to use expressions in expressing des opinions, and were able to construct sentences that were grammatically appropriate, for example in determining which mode (mode) was indicative mode, subjectivity, or conditionnel. It appears that students have been more careful in determining the use of mode and time. Although there are still difficulties faced by students because of their inaccuracy or ignorance when using the word Si ‘if’ as a form of giving suggestions or invitations to something that must be followed by verbs when imparfait. At this meeting the students seemed more enthusiastic and motivated to express their ideas in the form of proposals, statements agreeing or not with the ideas put forward by the groups of boru and bere / ibebere, dongan tubu, and the hula-hula. In addition, when speaking, 80% of students have made improvements in their pronunciation, even students have been able to provide corrections to other students when listening to pronunciation that is incorrect, giving rise to different meanings, for example for the word vous [vu] ‘you’, spoken by students to be [fu] ‘crazy’. After observation, the researcher gave an explanation related to the difficulties and errors of students in speaking skills (PO) of the blended learning model with a cross-examination system to be improved and further refined at the next meeting[9].

Observations in the fourth meeting learning related to the Passer le week-end ensemble theme show that 85% of students are competent to use expressions in exprimer des opinions, and are able to construct sentences that are grammatically appropriate, for example in determining which modes are indicative, subjective, or conditionnel. It appears that students have been more careful in determining the use of mode and time. Students are still enthusiastic and motivated to express their ideas in the form of proposals, statements agreeing or not with the ideas put forward by the groups of boru and bere / ibebere, dongan tubu, and the hula-hula. After observation, the researcher gave an explanation related to the difficulties and errors of students in speaking skills (PO) of the blended learning model with a cross-examination system to be improved and further refined at the next meeting.

To obtain a blended learning model that can improve French language-based speaking skills (PO) based on local culture of the transitional system with a valid exprimer des opinions theme, the students’ activity was showed on a video, validation (expert testing) with expertise in the field of academic education is qualified and has experience in research field. The validation questionnaire was given to the material validator as well as the French language validator, and the video validator which was a learning medium for speaking included three
aspects namely aspects of media quality, aspects of language use, and aspects of media layout. Research on the development of a Blended learning model based on the *Dalihan na Tolu* Batak culture that has been developed is suitable for use in the learning process. This is because the learning model developed is a valid, practical and effective model[10]. Data obtained from material validation obtained a value of 3.3 with a valid category. In the validation of the language obtained an average value of 3.5 with a valid category. The validation of the learning model video obtained a value of 3.7 with a very valid category.

Local culture-based learning models that have been declared valid, then product trials are conducted. The product trial in the form of French speaking learning video B1 level themed *Exprimer des opinions* was conducted to obtain practicality data on a local culture-based learning model. The practicality of the model was obtained from the questionnaire data of student responses with closed answers (8 items) and open answers (1 item) with the following results: 98% felt new to the learning model presented, 100% were happy with the learning model of learning based on Batak culture with a system *nd transition na tolu*, 100% stated the learning model developed makes it easier for students to understand the learning material, 98% were happy with the system of speaking learning models associated with blended learning, 100% could understand the mechanism in the local Batak culture-based learning model *dadap na tolu*, the learning model presented, the more motivating to learn to speak French, this learning model can improve learning achievement, be interested in local culture-based learning models, and be happy with the use of cross-cultural based learning models through video.

Open answer questions are asked about how the responses or impressions while learning to use local culture-based blended learning models in speaking skills, including the answers given are interesting learning models to increase interest in learning French, interesting and very easy to understand both by Batak tribe students itself or not the Batak tribe, it is very interesting because students are given the opportunity to evenly give opinions in French, a learning model that is exciting, impressed and more challenged to take part in speaking in French.

After the questionnaire data, student responses are collected and then analyzed. The results of the analysis become a benchmark or reference the level of practicality of the learning model developed. The level of practicality of local culture-based learning models obtained from student responses obtained a very practical category with an average score of 89.5% gain, pretest and post test results when learning with students' local culture-based blended learning models before and after using culture-based learning models. The local Batak system is a transitional *na tolu* which is effective with an average student final grade of 80 in the Good category. The cognitive outcomes of students in speaking skills improved after using a local culture-based blended learning model.

4 Conclusion

Based on the results of the development of local culture-based blended learning Batak on a transitional system with the theme of *Exprimer des opinions* that have been carried out, it can be concluded that: material validation obtained a value of 3.3 with a valid category. In the validation of the language obtained an average value of 3.5 with a valid category. Video learning model validation obtained a value of 3.7 with a very valid category. Local culture-based learning models that have been declared valid, then product trials are conducted. The
product trial in the form of French speaking learning video B1 level themed *Exprimer des opinions* was conducted to obtain practicality data on a local culture-based learning model.

1) The development of a blended learning model based on local Batak culture is a transitional system that needs to be done using the Plomp development model.

2) The validity level of local culture-based learning video Batak in the transitional system but the results of the material expert test are 3.3 with a valid category and the language expert test is 3.5 with a valid category, the results of the learning video design expert test are 3.7 with a very valid.

3) The level of practicality of local culture-based teaching materials obtained from student responses obtained a very practical category with an average score of 85%. The level of effectiveness of the blended learning model was declared effective, with an average final grade of 80 in the Good category. The students' speaking competence increased in the system of pronunciation, grammar, fluency, and understanding after following the local culture-based learning model of Batak *dalihan na tolu*.

The Batak local culture-based blended learning model is effectively used in the learning process of speaking skills at level B1, it is hoped that French language teachers use it in three other linguistic competencies.

It is hoped that French KDBK lecturers can develop learning models in other sub-themes in the *Réception Orale* (Listening), *Français de Tourisme* (French Tourism) courses, and *Production Écrite* (Writing) courses[11].

5 References


Effectiveness of Fiscal Policies in Controlling Inflation in Indonesia with the Seemingly Unrelated Regression Model

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Abstract. The purpose of this study is to see how effective fiscal policy in controlling inflation in Indonesia. The fiscal policy variables used are tax revenue, government spending, and foreign direct investment (FDI). The data used are secondary data types ranging from 1982 to 2018. Based on the results of research using the Seemingly Unrelated Regression (SUR) model, shows that fiscal policy variables measured through tax revenues, FDI, and government spending have a significant effect on the development of the inflation in Indonesia. Tax revenue is having a substantial impact on government spending. Likewise, FDI has a significant impact on the money supply in Indonesia during the observation.

Keywords: Fiscal Policy, Inflation, Indonesia

1 Introduction

In a country like Indonesia, there is very often turmoil in maintaining the stability of economic activity. The economy in Indonesia has always been an essential thing because if the economy is in an unstable condition, financial problems will arise, such as low economic growth, high unemployment, and high inflation, and the decline in the value of the rupiah. Many people feel that the prices of goods and services for necessities today are higher than the costs of these goods and services one or two years ago.

Inflation is an economic problem that cannot be ignored because increases can have a far-reaching impact. Therefore inflation is the main target in government policy. The high rise is significant to note because of its effects on the economy, which can lead to instability, slowing economic growth, unemployment, which is always increasing, and the declining value of the currency.
Figure 1 above shows the inflation growth data in Indonesia, which were active from 2000 to 2018. From 2000 to 2008, the inflation rate in Indonesia experienced a sharp increase and decrease. The highest inflation occurred in 2006, amounting to 13.1%. The cause of the high inflation rate is less conducive to domestic security triggered by government policies that raise fuel prices, electricity, and telephone tariffs [2]. From 2009 to 2018, inflation in Indonesia is still fluctuating, but the increase or decrease is not so sharp. The lowest inflation occurred in 2018 at 3.19%.

Inflation targeting, the monetary policy framework is implemented with an approach based on the price of commercial quantities. However, the value of inflation that occurs is often not following the predetermined target. It is influenced by policies carried out, both in the monetary and fiscal fields. This research was conducted specifically to see how effective fiscal policy is in controlling inflation in Indonesia with the SUR model approach.

Inflation

In economic theory, the definition of inflation, "Inflation occurs when the general level of prices is rising," or in other words, inflation occurs when the level of prices, in general, continues to increase [3]. It does not mean that the costs of various types of goods go up by the same percentage. The important thing is that there is a general increase in the price of goods continuously for a specified period.

An economy is said to have experienced inflation if the following three characteristics are met, namely: 1) an increase in prices, 2) a general increase in prices, and 3) continue continuously. Several indicators can be used to determine whether an economy is hit by inflation or not [4]. These indicators include:

a. Consumer Price Index (CPI)
   CPI is the price index most commonly used as an indicator of inflation. The CPI presents the price of goods and services consumed by the public in a certain period.

b. Wholesale Price Index (IHPB)
   It is an indicator that describes the price movements of commodities traded at the producer level in a particular area in a certain period. If the CPI observed is the final goods
consumed by the public, the CPI found is raw goods and intermediate goods, which are input for producers.

c. GDP Deflator
The deflator is comparing the level of nominal economic growth with real growth.
To measure the rate of increase in the level of general prices or inflation, the following general formula used:

\[ I_t = \frac{H_{Ut} - H_{Ut-1}}{H_{Ut-1}} \]  

(1)

Where:
- \( I_t \): Inflation rate in a period (or year)
- \( H_{Ut} \): The actual prevailing price in the period \( t \)
- \( H_{Ut-1} \): The actual general cost in the period \( t-1 \).

The wholesale trade index measures the rate of inflation using many goods at the level of large traders. Thus the calculation includes the price of raw materials, prices of raw materials, and prices of finished goods. Measuring inflation with the GDP deflator is by calculating the value of goods and services included in the calculation of net national income. The formula for calculating GDP deflator is:

\[ \text{GDP Deflator} = \frac{\text{GNP Nominal}}{\text{GNP Rill}} \times 100 \]  

(2)

Fiscal Policy
Fiscal policy is the use of government spending and taxation in influencing the economy. When the government decides to purchase goods and services, payment of shared transfers, or tax collection, the government is involved in fiscal policy [5]. Fiscal policy can also change aggregate demand. The ability of fiscal policy to influence output by influencing aggregate demand makes it a potential tool for economic stabilization.
During a recession, the government can carry out an expansive fiscal policy, so that output can return to normal levels and make unemployed workers back to work. When inflation occurs, the government can run a surplus budget so that it helps slow down the economy.

Relationship of Government Spending on Inflation
According to Keynes, if the government implements a comprehensive fiscal policy, namely by increasing government spending, it will encourage price increases or will trigger inflation. In other words, an increase in government spending through expansionary fiscal policy will promote the economy of the real sector to grow. The productivity of the economy will then have an impact both on increasing demand for production input goods and consumer goods, thereby raising the price level.

Relationship of Money Supply on Inflation
The quantity theory of money is a theory which states that there is a direct relationship between changes in the money supply and changes in the price of goods. The connection noted that the amount of products is directly proportional to the money supply (\( MV = PT \)). In the majority, the inflation rate influenced by the money supply. Increasing the money supply in the community tends to increase consumption through spending. It will cause price increases due to increased demand from the public, and over time this will trigger inflation.
3 Research Method

The model used in this study is Seemingly Unrelated Regression (SUR), with quantitative material using secondary data over 37 years, from 1982 to 2018. Arnold Zellner introduced the Seemingly Unrelated Regression (SUR) Model in 1962. Zellner stated that SUR is a multivariate regression model (multiple regression), and is part of multiple linear regression. SUR is a model that consists of several equations, and the variables are not bi-directional. Still, between these equations, there is a correlation between these commonality errors known as peer correlations. The SUR model consists of several unrelated equation systems, meaning that each variable (dependent and independent) exists in one order.

SUR Model Equations:

\[
\begin{align*}
\text{Inf} &= a_{10} + b_{11} \text{LogTax} + b_{12} \text{LogGov} + e_1 \\
\text{Inf} &= a_{20} + b_{21} \text{LogFDI} + b_{22} \text{LogJUB} + e_2 \\
\text{Inf} &= a_{30} + b_{31} \text{LogTax} + b_{32} \text{LogFDI} + e_3 \\
\text{LogGov} &= a_{40} + b_{41} \text{LogTax} + e_4 \\
\text{LogJUB} &= a_{50} + b_{51} \text{LogFDI} + e_5
\end{align*}
\]

Where :

\[
\begin{align*}
\text{Inf} & = \text{Inflation} (%) \\
\text{Tax} & = \text{Tax revenue} \\
\text{Gov} & = \text{Government final consumption expenditure} \\
\text{FDI} & = \text{Foreign Direct Investment} \\
\text{JUB} & = \text{Money Supply} \\
a & = \text{Constant} \\
b & = \text{Coefficient} \\
e & = \text{Error term}
\end{align*}
\]

4 Results and Discussion

One of the problems that often occur in developing countries such as Indonesia is maintaining stability and economic growth. Economic security is related to the balance of the price level, national income, and increase in employment opportunities [6]. The series of policies can be carried out by the government to stabilize the economy; one of them is through fiscal policy.

The following are data on tax growth rates, FDI, government expenditures, and the money supply in Indonesia for the period 1983 to 2018.
Based on Figure 2 above, for 36 years, from 1983 to 2018, visible developments in the FDI rate fluctuate quite sharply. The highest FDI growth rate in 1999 reached up to 700%, while the lowest growth rate in 1998 reached up to -100%. The rate of tax growth, government expenditure, and the money supply have been relatively stable for 36 years. The highest tax growth rate in 1990 was 40%, and the lowest in 1986 was -15%. The highest growth rate of government expenditure in 2009 was 15%, and the lowest in 1998 was -15%. The highest growth rate of the money supply was in 1998 at 62% and the lowest in 2002 at 4%.

To find out the estimation using the SUR model, the results of processing using Eviews are as follows:

Table 1. SUR Estimation Results

<table>
<thead>
<tr>
<th>Estimation Method: Seemingly Unrelated Regression (Sample: 1982 - 2018)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coefficient</td>
</tr>
<tr>
<td>--------------</td>
</tr>
<tr>
<td>C(1)</td>
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<tr>
<td>C(2)</td>
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<td>C(3)</td>
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<td>C(4)</td>
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<td>C(12)</td>
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<tr>
<td>C(13)</td>
</tr>
</tbody>
</table>
4.1 Equation 1 (Inflation)
Based on the SUR estimation results in Table 1 above, the first equation formed is:

\[ \text{Inf} = 726.1576 + 6.464256 \text{LogTax} - 27.66206 \text{LogGov} + e_1 \]  \hspace{1cm} (8)

Equation 8 shows that tax revenue has a positive and significant effect on inflation in Indonesia, with a coefficient of 6.464256 and a probability of 0.0000 < \( \alpha = 0.05 \). It means that if tax revenue increases by 1%, it will increase inflation by 6.464256%.

While the variable government expenditure has a negative and significant effect on inflation in Indonesia with a coefficient of -27.66206 and a probability of 0.0000 < \( \alpha = 0.05 \). It means that if government spending rises by 1%, it will reduce inflation by 27.66206%.

The coefficient of determination of equation 8, as shown in Table 1, is 0.277795, which means that together tax revenues and government spending can explain inflation by 27.78%, and the remaining 72.22% is explained by other variables not included in the estimation model.

4.2 Equation 2 (Inflation)
Based on the SUR estimation results in Table 1 above, the second equation formed is:

\[ \text{Inf} = 38.89372 - 3.037734 \text{LogFDI} + 1.050919 \text{LogJUB} + e_2 \]  \hspace{1cm} (9)

Equation 9 shows that FDI has a negative and significant effect on inflation in Indonesia with a coefficient of -3.037734 and a probability of 0.0000 < \( \alpha = 0.05 \). It means that if foreign direct investment increases by 1%, it will reduce inflation by 3.037734%.

The money supply has a positive and significant effect on inflation in Indonesia, with a coefficient of 1.050919 and a probability of 0.0005 < \( \alpha = 0.05 \). It means that if the money supply rises by 1%, it will raise inflation by 1.050919%.

The coefficient of determination of equation 9, as shown in Table 1, is 0.212129, which means that together the FDI and the money supply can explain inflation by 21.21%, and other variables outside the estimation model explain the remaining 78.79%.

4.3 Equation 3 (Inflation)
Based on the SUR estimation results in Table 1 above, the third equation formed is:

\[ \text{Inf} = 41.44808 + 0.627772 \text{LogTax} - 2.460419 \text{LogFDI} + e_3 \]  \hspace{1cm} (10)
Equation 10 shows that tax income has no significant positive effect on inflation in Indonesia with a coefficient of 0.627772 and a probability of 0.0903 > \( \alpha = 0.05 \). While the FDI variable has a negative and significant effect on inflation in Indonesia with a coefficient of -2.460419 and a probability of 0.0000 < \( \alpha = 0.05 \). It means that if foreign direct investment rises by 1%, it will reduce inflation by 2.460419%.

The coefficient of determination of equation 10, as shown in Table 1, is 0.170127, which means that together tax and FDI income can explain inflation by 17.01%, and other variables outside the estimation model tell the remaining 82.99%.

4.4 Equation 4 (Government Expenditures)

Based on the SUR estimation results in Table 1 above, the fourth equation formed is:

\[
\text{LogGov} = 23.41059 + 0.310485 \text{LogTax} + e_4
\]  

Equation 11 shows that tax revenue has a positive and significant effect on government spending in Indonesia with a coefficient of 0.310485 and a probability of 0.0000 < \( \alpha = 0.05 \). It means that if tax revenue rises by 1%, it will increase government spending by 0.310485%.

The coefficient of determination of equation 11, as shown in Table 1, is 0.910375, which means that tax revenue can explain other variables outside the estimation model explain government expenditure of 91.04% and the remaining 8.96%.

4.5 Equation 5 (Money Supply)

Based on the SUR estimation results in Table 1 above, the fifth equation formed is:

\[
\text{LogM} = 10.65134 + 1.075776 \text{LogFDI} + e_5
\]  

From equation 12 shows that foreign direct investment has a positive and significant effect on the money supply in Indonesia with a coefficient of 1.075776 and a probability of 0.0000 < \( \alpha = 0.05 \). It means that if foreign direct investment rises by 1%, it will increase the money supply by 0.310485%.

The coefficient of determination of equation 12, as shown in Table 1, is 0.635032, which means that FDI can explain other variables outside the estimation model explain the money supply of 63.50% and the remaining 36.5%.

5 Conclusion

From the results of the research described above, it can see those tax revenues, FDI, and government spending have a significant effect on inflation in Indonesia during the 37 years of the observation period, from 1982 to 2018. It means that fiscal policy variables are quite effective in controlling inflation in Indonesia. The money supply also influences inflation positively and significantly. According to the theory, if the money supply in the community increases, inflation will trigger.

Tax revenue has a positive and significant effect on government spending. It means that when tax revenue increases, government spending also increases. Because taxes are the largest source of government revenue in Indonesia, government spending on development, and others
can also increase. FDI has a positive and significant effect on the money supply. When cash inflows increase, the money supply also increases, which can eventually lead to inflation.

6 References

A Quasi-Experimental Study of Dengue Hemorrhagic Fever Grade 1 and 2 Clinical Pathway Implementation in Universitas Sumatera Utara Hospital

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Abstract. Clinical pathways are essential to control cost and quality performance. The data of its implementation in USU Hospital was absent. This study aimed to assess the compliance of DHF CP implementation on diagnostic, treatment and hospital cost. This study was using quasi-experimental design. An intervention of CP socialization was conducted in 2019. The data were obtained from CP, Medical Record, financial unit, and Hospital Information System. A total of 100 DHF grade 1 and 2 cases were analyzed using SPSS. We found that the intervention improved the compliance of intravenous solution (p=0.096), drugs (p=0.001); reduced hospital adjusted cost (Rp. 481,165.42, p=0.002), laboratory cost (Rp. 205,535, p=0.012) and LOS (0.64 day, p=0.019). There was no statistical difference in laboratory test compliance (p =0.3) and drug cost (p= 0.113) between the CP groups. In conclusion, the implementation of DHF CP improved the overall hospital cost and variance of drugs.

Keywords: DHF, hospital cost, clinical pathways, cost control, quality control

1 Introduction

Within recent 50 years, the incidence of Dengue Hemorrhagic Fever in South East Asia Region is increasing 30 times. [1] It was estimated that 3.97 billion people were at risk of dengue infection and inhibited in 128 endemic countries.[2] A number of 390 million infections occur every year and 70% of the infected people live in Asia. [3]

The World Health Organization data shows that Indonesia is at the first place in Asia and the second place after Brazil in 2004-2010. [1] According to the Indonesian Ministry of Health 2018, its incidence was fluctuating from 2010 to 2017 with the rate of 65.7, 27.7, 37.3, 45.9, 39.8, 50.8, 78.9 and 26.1 per 100,000 populations, respectively. In 2017, 204,171 cases with 493 deaths. This number was significantly decreased from 2016 with 204,171 cases and 1,598 deaths. [4]

In North Sumatera, one of Indonesia province, DHF is still a major public health problem. The incidence was 18.5, 19.8, 21.2, 24.1, and 61.4 per 100,000 populations
between 2012 and 2015, respectively. The incidence rate in 2016 was above the national indicator. [5] According to Medical Record Unit of Universitas Sumatera Utara (USU) Hospital, DHF was considered as one of the top 10 diagnosis in 2016, 2017, and 2018 [6].

As one of the hospitals which provide national health insurance system service, USU hospital should manage their service procedure in order to control financial and quality performance to meet the patient’s demand. The service system should work optimally by using tools which is evidence based, providing detail and integrated instructions for caregivers. Clinical pathway (CP) is one of the tools that can facilitate the provision of the above aim.

CP is a structured integrated care plan which involves detail guidance based on evidence with measured outcome within certain time frame. It is used as a tool to identify differences that occur during the patient being treated [7]. It contains a clear and solid pattern that may be used as a reminder for the clinicians and other caregivers. Furthermore, it may improve critical thinking, develop interdisciplinary collaboration, provide optimal clinical outcome and decrease cost burden for patients and hospitals [8].

DHF grade 1 and 2 CP has been designed by Department of Internal Medicine of USU hospital since 2006. However, the practice was unclear and inadequate. This study assessed the implementation of this CP in 2018 and 2019. We analyze the differences after the socialization intervention and include CP conducted in 2019.

2 Research Method

This was an analytical explorative study by using quasi-experimental design. We held an intervention by conducting DHF grade 1 and 2 Clinical Pathway socialization in early 2019. We observed data of DHF patients admitted in Universitas Sumatera Utara Hospital in 2018 and longitudinally followed the cases in 2019.

The study was conducted within 10 months from January to October 2019 at Universitas Sumatera Utara Hospital by obtaining data from Medical Record Unit, Verification and insurance Unit (financial unit for national health insurance participant), Hospital Technology and Information System, and Medical Committee.

The sample of this study is a total of 100 DHF grade 1 and 2 cases, each 50 cases were obtained from 2018 and 2019 data, respectively. The inclusion criteria of this study were DHF grade 1 and 2 cases from Internal Medicine department with BPJS membership (JKN participant). We excluded patients below 18 years old and severe DHF cases.

Data of DHF grade 1 and 2 patients admitted in 2018 was obtained from Medical Record unit. We assessed the data by confirming to the verification and insurance unit (financial unit for BPJS participant) and Hospital Information System for hospital cost of each patient. DHF grade 1 and 2 Clinical pathway forms were collected from Medical Committee. In 2019, we held DHF grade 1 and 2 CP socialization to the integrated caregivers and requested that the CP forms inserted in patient’s Medical Record status. We observed the implementation longitudinally and matched the information provided on the CP forms by checking the Medical Record and Hospital Information System to assess the compliance of the integrated process, diagnostic examinations, therapy, and length of stay. The cost of accomodation, laboratory, drug, and medical intervention were
provided in Hospital Information System. BPJS rates (National Health Insurance coverage) and total hospital cost were provided by verification and insurance unit.

The table below shows compliance indicators of the implemented DHF grade 1 and 2 CP in Universitas Sumatera Utara Hospital.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compliance of laboratory tests</td>
<td>Hemoglobin, hematocrit, trombocyte, white blood count, clotting time, bleeding time *</td>
</tr>
<tr>
<td>Compliance of intravenous solution</td>
<td>Ig M and Ig G anti Dengue**</td>
</tr>
<tr>
<td>Compliance of drugs</td>
<td>Ringer Lactat*</td>
</tr>
<tr>
<td></td>
<td>Paracetamol 10-15 mg/kg of body weight (IV)*</td>
</tr>
<tr>
<td></td>
<td>Ranitidin 50 mg/12 hrs (IV)**</td>
</tr>
<tr>
<td></td>
<td>Ondansetron 4 mg/8 hrs (IV)**</td>
</tr>
<tr>
<td></td>
<td>Paracetamol 10-15 mg/kg of body weight (oral)**</td>
</tr>
<tr>
<td></td>
<td>Omeprazole 20 mg (oral)**</td>
</tr>
<tr>
<td></td>
<td>Domperidon 10 mg (oral)**</td>
</tr>
</tbody>
</table>

* mandatory
** allowable

We adjusted the hospital cost by reducing total hospital cost with total accommodation price. The total accommodation price was obtained by multiplying LOS and accommodation rate (indicated by BPJS participant class) of USU hospital.

<table>
<thead>
<tr>
<th>Room Class</th>
<th>Accommodation rate (Rp. per day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VIP</td>
<td>500,000,-</td>
</tr>
<tr>
<td>1</td>
<td>250,000,-</td>
</tr>
<tr>
<td>2</td>
<td>150,000,-</td>
</tr>
<tr>
<td>3</td>
<td>100,000,-</td>
</tr>
</tbody>
</table>

Before the study was conducted, we obtained a health ethics permit from Ethics Committee of Medical Faculty Universitas Sumatera Utara No. 507/TGL/KEPK FK USU-RSIP HAM/2019.

The data were processed and analyzed using Microsoft Excell and SPSS with significant level of 95% and $\alpha$ of 0.05. Chi square test was used to analyze categorical variables: compliance of laboratory test, solution, drugs, and LOS. Independent t test were applied to calculate mean difference for numeric scale variables: LOS, adjusted hospital cost, laboratory cost, and drug cost.
3 Results and Discussion

This research was carried out from January to October 2019, with a total of 100 samples. We divided the data into two groups consisting of 'no CP' (50 data without CP) and 'with CP' (50 data with CP intervention).
3.1 Caregiver Compliance towards process elements in DHF Grade 1 and 2 Clinical Pathway

Table 3. Chi square test of laboratory test compliance among CP groups

<table>
<thead>
<tr>
<th>Group</th>
<th>Laboratory test compliance</th>
<th>Total</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>no</td>
<td>yes</td>
<td></td>
</tr>
<tr>
<td>no CP</td>
<td>21 (42%)</td>
<td>29 (58%)</td>
<td>50 (100%)</td>
</tr>
<tr>
<td>with CP</td>
<td>16 (32%)</td>
<td>34 (68%)</td>
<td>50 (100%)</td>
</tr>
<tr>
<td>Total</td>
<td>37 (100%)</td>
<td>63 (100%)</td>
<td>100 (100%)</td>
</tr>
</tbody>
</table>

Based on table 3, it was found that the proportion of laboratory test adherence was greater than those who did not comply either in no CP (58%) and with CP group (68%). There is no statistical different in laboratory test (p =-0.3) between the two groups.

Table 4. Chi square test of Intravenous solution compliance among CP groups

<table>
<thead>
<tr>
<th>Group</th>
<th>Intravenous solution compliance</th>
<th>Total</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>no</td>
<td>yes</td>
<td></td>
</tr>
<tr>
<td>no CP</td>
<td>22 (44%)</td>
<td>28 (56%)</td>
<td>50 (100%)</td>
</tr>
<tr>
<td>with CP</td>
<td>14 (28%)</td>
<td>36 (72%)</td>
<td>50 (100%)</td>
</tr>
<tr>
<td>Total</td>
<td>36 (36%)</td>
<td>64 (64%)</td>
<td>100 (100%)</td>
</tr>
</tbody>
</table>

After the intervention, the compliance of intravenous solution using Ringer lactate was significantly increased (p=0.096). Before CP socialization, Ringer lactate was used in 28 patients (56%). While after the intervention, it was used in 36 (72%) patients.

Table 5. Chi square test of drugs compliance among CP groups

<table>
<thead>
<tr>
<th>Group</th>
<th>Drugs compliance</th>
<th>Total</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>no</td>
<td>yes</td>
<td></td>
</tr>
<tr>
<td>no CP</td>
<td>37 (74%)</td>
<td>13 (26%)</td>
<td>50 (100%)</td>
</tr>
<tr>
<td>with CP</td>
<td>21 (42%)</td>
<td>29 (58%)</td>
<td>50 (100%)</td>
</tr>
<tr>
<td>Total</td>
<td>58 (58%)</td>
<td>42 (42%)</td>
<td>100 (100%)</td>
</tr>
</tbody>
</table>

After the CP intervention, the caregiver’s compliance in using indicated drugs mentioned in the CP was increased significantly (p = 0.001). Before the socialization of CP, compliance with drug use was only 26% and after the use of CP the compliance rate was 58%.
3.2 Direct hospital cost of DHF grade 1 and 2 patients

Table 6. Independent t-test of cost variables among CP groups

<table>
<thead>
<tr>
<th>Cost variables</th>
<th>n</th>
<th>mean ± sd</th>
<th>mean difference</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laboratory cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>no CP</td>
<td>50</td>
<td>540,015 ± 478831.3</td>
<td>Rp.205,535</td>
<td>0.012</td>
</tr>
<tr>
<td>with CP</td>
<td>50</td>
<td>334,480 ± 300293.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drug cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>no CP</td>
<td>50</td>
<td>301,515.3 ± 156536.8</td>
<td>Rp. 47,552.6</td>
<td>0.113</td>
</tr>
<tr>
<td>with CP</td>
<td>50</td>
<td>253,962.6 ± 140669.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjusted hospital cost*</td>
<td></td>
<td>2,248,200.9 ± 673753</td>
<td>Rp. 481,165.4</td>
<td>0.002</td>
</tr>
<tr>
<td>with CP</td>
<td>50</td>
<td>1,767,035.5 ± 815043.7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*adjusted hospital cost= total hospital cost after adjusted with accommodation cost per day (based on BPJS class) and LOS

Using independent t test, there is a significant difference in laboratory costs after the socialization of DHF grade 1 and 2 CP. The CP intervention reduced the laboratory cost to Rp. 205,535 (p = 0.012). Before the socialization of the CP, the mean cost of laboratory tests was Rp. 540,015 (SD= Rp. 47,8831.3). Whereas, after the socialization, it reduced to Rp. 334,480 (SD=30,0293.7).

This study also showed a difference of Rp. 47,552.6 in drug cost in CP group compared to the group without CP, but this finding was not significant (p = 0.113).

There was a very significant difference of the adjusted hospital cost between ‘with CP’ and ‘no CP’ group, with an amount of Rp. 481.165.42 (p = 0.002). The adjusted hospital cost referred in this study is after deducting the total hospital cost with accommodation variable. Accommodation variables are determined based on treatment class and LOS. The class of patient included in this study varied depending to their BPJS class. Other than that, USU hospital treatment cost was uniform.

3.3 Length of Stay of DHF grade 1 and 2 patients

Table 7. Independent t-test of LOS among CP groups

<table>
<thead>
<tr>
<th>Category</th>
<th>n</th>
<th>mean ± sd</th>
<th>mean difference</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>no CP</td>
<td>50</td>
<td>5.16 ± 1.4</td>
<td>.640</td>
<td>0.019</td>
</tr>
<tr>
<td>with CP</td>
<td>50</td>
<td>4.52 ± 1.3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Based on the table above, there was a difference in the length of stay (LOS) of 0.64 days after implementing CP compared, in which this difference was statistically very significant (p = 0.019).

Discussions

A clinical pathway serves as a method to gain a goal. It becomes as a tool to empower caregivers to put in balance between clinical and resource aspect of care. [9] However, a clinical pathway only functions as a guideline or map instead of mandatory procedures. It reflects the majority needed care and might not be applicable to all patients within defined population. [10]
In our study, the use of DHF grade 1 and 2 clinical pathway cannot proof the difference of compliance aspects in laboratory examinations. In this study, the compliance of the caregivers of the laboratory test has greater proportion either before or after the CP socialization. Descriptively, we assume that most of the caregivers already aware of standard laboratory tests available in USU hospital for DHF grade 1 and 2 cases. Furthermore, after the socialization of the clinical pathway, the laboratory cost showed improvement. This implied that the CP socialization is successful in reducing the laboratory cost.

The implementation of DHF grade 1 and 2 Clinical Pathway showed that caregivers reduced the variation in the therapy aspects. After the intervention of CP socialization, the caregivers put more compliance in using Ringer Lactat as the intravenous solution. Furthermore, this study also found that the variation of drugs also decreased. Before the socialization of DHF grade 1 and 2 CP, the caregivers tended to add more treatment variation among DHF grade 1 and 2 patients. Our finding of average drug cost was reduced to Rp. 47,552, descriptively, although the difference was not significant.

Our study showed that after the socialization of CP, the LOS decreased to 4.52 days from 5.16 days. This finding was similar to many studies, [11][12][13][14] the implementation of clinical pathway shorten the length of stay (LOS). Munoz et al. showed that, among 487 hip arthroplasty patients, there was significant decrease in LOS, which cut from a mean of 19.41 days to 10.12 days before surgical stay to 1.08 days [12]. The implementation of clinical pathways in the field of laparoscopic surgeries at a Japanese hospital implicated a significant reduction in hospital length of stay [13]. LOS was reduced after implementation of CP among congested heart failure patients [14].

In this study, the hospital cost after adjusted with accommodation cost showed significant improvement. After the clinical pathway socialization, the DHF grade 1 and 2 cases dropped from Rp. 2,248,200.9 to Rp. 1,767,035.5. The CP implementation is significantly cut Rp. 481,165.4 cost in average for the hospital cost. This may indicate that the hospital cost in DHF patients in previous period was not regularly controlled and lacked of coordination compared to the CP implementation era.

4 Conclusions

Implementation of clinical pathway has positive impacts in reducing treatment variation, length of stay, and hospital cost. In our study, laboratory variation after the socialization of DHF grade 1 and 2 CP was not different. We assume that the caregivers already aware of standard laboratory tests available in USU hospital. We did not anticipate for the existence of comorbidities in this study. It is expected that the hospital should intensify the monitoring and documentation of the implementation of DHF Grade 1 and 2 Clinical Pathway. Further study should explore other aspects including comorbidity and patient outcome to assure the effectiveness of the CP implementation.
5 Acknowledgments

The authors wish to acknowledge Universitas Sumatera Utara Rector and Chief of Research Institution for the support of this study through Talenta Universitas Sumatera Utara Project under the Hospital Development Research Scheme Number: 492/UN5.2.3.1/PPM/KP-TALENTA USU/2019; as well as Universitas Sumatera Utara Hospital for the cooperation and authorities.

6 References

Implementation of Vocational Learning in Improving Interest of Entrepreneurship, Student Work Practices in The Public Education Study Program

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Abstract. This research intend to know differences in student entrepreneurship interest in learning to use vocational learning with conventional for students of the Public Relations Department. Hypothesis testing uses t-test to test the differences between the control and experimental groups after the implementation of vocational learning, the N-Gain test sees the significance of improvement. Based on the Independent t test, a significance value (p < 0.05) was obtained, indicating there was a significant difference between the control and experimental classes. N-Gain Score is 0.4937 (0.3 < 0.4937 < 0.7) so there is an effective level of understanding and the conclusion is there was a significant increase in interest after applying the vocational learning model. So using vocational learning model significantly higher than using conventional learning and increase in entrepreneurship interest in students is seen from the enthusiasm during the implementation of vocational learning and students begin to plan the form of entrepreneurship that is applied according to their abilities.

Keywords: learning model, vocational, interest in entrepreneurship

1 Introduction

Education has an important role in improving the quality of human resources owned. Efforts to improve the quality of education in accordance with the times and technology can improve Indonesia's dignity in the eyes of the world. One effort in improving the quality of education is to improve the quality of the learning process that can support the occurrence of an effective teaching and learning process and in accordance with the needs of students. The learning model must be well designed to obtain maximum learning outcomes adjusted to the learning needs and also the development of the times[1]. In the era of the development of the industrial revolution 4.0, the learning model must be able to improve one's expertise that can be applied in the world of work to be able to compete with other workers so that the vocational-based learning model is one of the appropriate choices. Vocational learning model is a learning model that emphasizes the process of providing assistance to individuals in the development of theory and practice with the aim of preparing individuals to be skilled in certain fields (in accordance with their talents, interests, and potential) in order to compete in the world of work, business and the industrial world that is carried out continuously [2]. A learning guide for students to be able to understand one particular subject that is designed is a vocational based learning model. In this case the subject that wants to develop the learning
model to the fieldwork students which is a subject that focuses on the development between theory and practice so as to increase student interest in demonstrating vocational skills possessed in the community. Fieldwork is a course for students majoring in public education in 7th semester. This course takes students to carry out learning theories while attending the college.

The learning model in fieldwork subjects is a vocational learning model that is useful as a provision that students will take when they go to the field, so that the vocational learning model that will be given is in the form of debriefing before participating in fieldwork activities, and when fieldwork is running students are required to be able to apply the vocational learning model that can be used in the field as an effort to educate the wider community as a target of community empowerment programs through street vendors. Students are required to have entrepreneurial skills that cover all aspects of work, both from traders, employers, private and government employees [3,4]. Creative efforts and innovation by developing ideas and gathering resources to find opportunities and improvements in life that called an entrepreneurship[5,6].

The purpose of this research was to determine the forms of the application of vocational learning models and their differences with conventional learning models in the fieldwork courses for 7th semester students of the Department of Public Education.

2. Research Methods

This research is a quantitative study using the action research method with an emphasis on numerical. The subjects in this study were all students with registration number 2016 of Public Education Study Program who were taking part in fieldwork. Samples were taken by random sampling technique by taking 2 groups who participated in street vendors in the Tanjung Rejo Village and Binjai after being given treatment in each group.

The implementation variable in this study was the increase in students’ interest in entrepreneurship after the application of the vocational learning model. Interest is measured using a pre-test questionnaire given before applying the model and post-test after applying the vocational learning model [7]. Data analysis uses normality test, homogeneity test and hypothesis test. The questionnaire was tested for validity on 64 students (correlation coefficient ≥ 0.32) and its reliability test (α cronbach> 0.83).

3 Results and Discussion

The step taken is to compare the average learning outcomes between two groups, average post-test questionnaire from both groups. The average pre-test questionnaire with the post-test can be seen in the table 1.

Based on table 2 the data in the independent sample T test obtained a significant value (2-tailed) 0.000, it means that there is a significant difference between the control class and the experimental class. This shows that there is a significant influence on the different treatments given to each class. So, it can be concluded that there are significant differences in the implementation of vocational learning models towards increasing entrepreneurial interest in fieldwork students of the Department of Public Education at Medan State University.
The learning model must be adapted to the learning needs so that learning goals can be achieved properly. Vocational learning models are provided to increase student entrepreneurial interest so as to increase willingness in entrepreneurship. Pre-test was carried out on both treatment groups using a questionnaire. This questionnaire is a closed questionnaire with four answer choices. The number of statements in the questionnaire was 33 statements.

After doing a pre-test, then the learning process is carried out with material skills to make souvenirs (key chains, hijab brooches, flowers, and flower vases) from acrylic material and make meatballs from milkfish. Learning in the treatment group uses the vocational learning model while learning in the comparison group only uses conventional learning models or does not add to the vocational learning model. The duration of learning time for the two groups is the same, namely 4 meetings for the material. The experimental group was given learning which directly practiced how to make souvenirs from acrylic material 3 times and made meatballs from milkfish 1 time. While in the control group when the learning process was not given direct practice, only given material on how to make souvenirs from acrylic and making meatballs from milk fish. What can be observed in this stage is that students in the experimental class are more enthusiastic about the skills material compared to students in the control class.

Similar to the pretest, the post-test in this study was also conducted on both treatment groups using a questionnaire. This questionnaire is in the form of a closed questionnaire with four answer choices. The number of statements in the questionnaire was 33 statements. The results of the post-test are then examined and a hypothesis test is conducted to draw a conclusion whether the vocational learning model can increase the interest of entrepreneurship in 7th semester students who are taking the fieldwork course.
Improved understanding of student learning outcomes can be interpreted using Normalized Gain (N-Gain). Improving the understanding of student learning outcomes in the learning process are not easy, using absolute gain (the difference between the initial test score and the final test) is less able to explain which are classified as high gain and which are classified as low gain. According to Hake, R. R. (2002 normalized gain (N-Gain) is formulated in the form of an equation as below:

\[ g = \frac{\text{skor posttest} - \text{skor pretest}}{\text{skor maksimal ideal} - \text{skor pretest}} \]

The interpretation criteria are:
- \( g \) - high if \( g > 0.7 \)
- \( g \) - moderate if \( 0.3 < g \leq 0.7 \)
- \( g \) - low if \( g \leq 0.3 \)

From the calculated N-Gain Score the following results are obtained:

Table 3. Results of Calculating the N-Gain Score

<table>
<thead>
<tr>
<th></th>
<th>Class</th>
<th>Statistic</th>
<th>Std.Error</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>,4937</td>
<td>,05613</td>
</tr>
<tr>
<td>95% Confidence Interval for Mean</td>
<td>Lower Bound</td>
<td>,3753</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Upper Bound</td>
<td>,6122</td>
<td></td>
</tr>
<tr>
<td>5% Trimmed Mean</td>
<td>Upper Bound</td>
<td>,5231</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Median</td>
<td>,5167</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Variance</td>
<td>,057</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Std. Deviation</td>
<td>,23816</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Minimum</td>
<td>,339</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maximum</td>
<td>,799</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Range</td>
<td>,139</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Interquartile Range</td>
<td>,199</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Skewness</td>
<td>-2,578</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Kurtosis</td>
<td>8,914</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mean</td>
<td>,0775</td>
<td></td>
</tr>
<tr>
<td>N-gain 95%</td>
<td>Lower Bound</td>
<td>,0436</td>
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</tr>
<tr>
<td></td>
<td>Upper Bound</td>
<td>,1115</td>
<td></td>
</tr>
<tr>
<td>5% Trimmed Mean</td>
<td>Upper Bound</td>
<td>,0791</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Median</td>
<td>,0765</td>
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</tr>
<tr>
<td></td>
<td>Variance</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Std. Deviation</td>
<td>,06823</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Minimum</td>
<td>,089</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maximum</td>
<td>,219</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Range</td>
<td>,299</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Interquartile Range</td>
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</tr>
<tr>
<td></td>
<td>Skewness</td>
<td>-2,399</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Kurtosis</td>
<td>1,048</td>
<td></td>
</tr>
</tbody>
</table>
From the table above it is known that the value of the N-Gain Score is 0.4937, where in this case it can be concluded that $0.3 < 0.4937 < 0.7$. So that there is an effective level of understanding by using a vocational learning model to increase student entrepreneurship interest in the Public Education Department in fieldwork subjects with a moderate degree of effectiveness.

4 Conclusion

Based on observations and tests during the study, findings on the implementation of learning, and analysis of student entrepreneurial interest before and after the application of vocational learning models for fieldwork courses for students of the Department of Public Education can be summarized as follows:

1) The ability of students to master the basic concepts of entrepreneurship and recognize the characteristics or character of entrepreneurs before learning is quite different, although it is less significant.
2) The ability of students to master the basic concepts of entrepreneurship and recognize the characteristics or character of people whose interest in entrepreneurship after learning has increased significantly and is different from before.
3) The enthusiasm and sincerity of students at street vendors when learning to use the vocational learning model is higher than students who take learning with conventional models.

The success in learning in the fieldwork courses using vocational learning models can be an alternative for designing and implementing good learning. Based on the results of this study, the suggestions that can be submitted are as follows:

1) With this research, it is expected that lecturers can use the vocational learning model to be applied to other lecture material related to the Application of Student Entrepreneurial Ability. The aim is to continue to motivate students to study because entrepreneurial lecture material has a very fundamental long-term impact especially for conducting research in the Public Education Department.
2) For lecturers, experimental research can provide stimulation to improve teaching competence of lecturers, especially in developing the application of learning approaches in the classroom.
3) For similar researchers, it is recommended that in conducting other studies pay more attention to the variables in research that are experimental and non-experimental. Non-experimental variables tend to influence research results, for example: student learning environment, student learning facilities and infrastructure, lecturer competence in teaching, and student learning motivation. Should pay attention to things that can affect internal validity and as much as possible to control the control variables so that the results of the study can describe the results of the interventions provided and can improve further research.
5 References


Development of Taxation Practicum Materials Based on Latest Tax Regulations to Increase the Competency of Accounting Students' Departments

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Universitas Negeri Medan, Indonesia1,2,3

Abstract Tax is the biggest source of funding for the state in organizing government. From year to year, revenue from the tax sector continues to show an increase. In the context of efforts to increase tax revenue, the government made a fundamental change by creating a new taxation system, namely by changing the new taxation law. This was done to adjust to the level of social and economic life of the Indonesian people as well as the pace of national development that had been achieved. In addition, the old taxation system has not been able to move the roles of all layers of tax subjects whose role is to produce domestic revenues that are needed to realize the sustainability and increase of national development. The results showed the assessment according to experts of the material is "quite feasible / interesting / motivated" with a score of 83.33%. The results of the assessment according to the design experts are "quite feasible / interesting / motivated" with a score of 80%; while the results of the assessment of media experts are "quite feasible / interesting / motivated" with a score of 79.16% while the use of teaching material products shows an increase in student learning outcomes, as indicated by the difference in the mean pre-test and post-test scores of small groups is 2.5 and large groups are 2.72. This means that the use of teaching material products from the development can increase student scores by 25% and 27.2%, while the results of student assessment of taxation practice modules in small groups are 82.23% and large groups are 84.57%.

Keywords: Teaching Materials, taxation practice, Taxation Regulations, Competence

1 Introduction

Tax is the biggest source of funding for the state in organizing government. From year to year, revenue from the tax sector continues to show an increase. In the context of efforts to increase tax revenue, the government made a fundamental change by creating a new taxation system, namely by changing the new taxation law consisting of Law No. 28 of 2007 concerning General Provisions and Methods for Taxation, Law No. 7 of 1983 which was perfected into the Income Tax Law no. 36 of 2008 concerning Income Tax and Regulation of the Minister of Finance Number: 101/PMK.010/2016 concerning the latest PTKP rates as well as Regulation of the Director General of Tax Number PER-32/PJ/2015 concerning PPh 21 rates for Taxpayers (WP) who have a Principal Number Taxpayer (NPWP) and does not have a TIN. UU no. 8 of 1983 which was perfected into Law No. 18 of 2000 concerning Value Added Tax of Goods and Services and Sales Tax on Luxury Goods and PP No. 81/2015 concerning Provisions regarding the types of goods that are exempt from VAT and PP No. 74 of 2015 concerning. Law No. 12 of 1985 which was refined to become Law No. 12 of 1994

This was done to adjust to the level of social and economic life of the Indonesian people as well as the pace of national development that had been achieved. In addition, the old taxation system has not been able to move the role of all layers of tax subjects whose role is to produce domestic revenues that are needed to realize the sustainability and increase of national development.

Taxation is not enough just to be known, but it must be understood and comprehensively understood from the aspects of tax law, the basis of taxation, taxation, tax disputes, and taxpayer rights. Therefore, the Directorate General of Tax (DGT) of the Ministry of Finance encourages understanding of tax among students, because students are considered to have a strategic role in boosting future tax revenues that are prospective workers. As prospective workers or employers, understanding students is not enough in terms of theory alone. Taxation is one of the fields of science that is easier to understand with real accounting practices.

The development of tax practicum teaching materials is one of the efforts made to be able to improve the practicum ability of students because taxation is one of the fields of science that is not sufficiently studied from the theoretical side only, but taxation is easier to understand with real bookkeeping practice, so that the competencies possessed by students are able to answering the needs of stakeholders and not experiencing lag in terms of the latest tax regulations. For the lecturers that responsible for practicum, an important task that must and needs to be done is to design and manage a practicum activity so that the instructional objectives are clear, the contents and sequence of activities are well directed, relevant to the demands graduate professional assignments later and are designed in such a way as to be an interesting and enjoyable learning experience for students, not just torture and boring instead [1].

Competence of tax practicum courses is to produce students who are able to understand taxation provisions, calculate taxes, do reporting and complete tax administration completeness, filling annual tax returns for individuals and entities. This taxation practicum will train cognitive and affective skills. In cognitive skills students can train themselves so that theories can be understood and various theories can be integrated and can apply theories to real situations through the practice of solving taxation cases. Affective skills aim to enable students to learn and to plan activities independently and in collaboration. These skills are needed to realize the competency of tax practicum subjects.

Based on the problems and findings above, it is necessary to compile a teaching material that is able to integrate practice skills and taxation theory, so that it can help students to play an active role in the learning process and the level of thinking is not only at the remembering, memorizing, and students are more fluent and able to make and resolve tax cases properly. For this reason, researchers wanting to develop teaching materials on tax practice must adjust the latest tax regulations and raise the latest tax issues and adjust them to graduate competencies. It is expected to ultimately produce graduates who are competent in the field of taxation and in accordance with stakeholder needs.

Literature Review

Teaching materials are media and learning resources, which have a strategic position because teaching materials prepare guidelines for students both for the benefit of independent learning and in scheduled face-to-face activities, also equipped with methods and evaluations, and guidelines for students. Good teaching materials are: (1) can arouse student interest in
learning, (2) have a clear purpose instructional, (3) present material with a good structure, (4) provide opportunities for students to practice and provide feedback to students, and (5) create two-way communication [2]. In addition to the above to stimulate student creativity and interest in learning, teaching materials are designed as attractive as possible including the use of colors, shapes, font sizes and thickening of letters, boxing and lines are also needed to clarify the message content. Tax is the main legal field. The tax issue is a matter of the state which means that it concerns all the people residing in the territory of the Republic of Indonesia. Tax law has recently been transformed into a separate branch of science which means that tax law is a source of inspiration both scientific and popular. In connection with changes in the structure of society, Indonesian taxation law undergoes changes and is adapted to a new spirit or reformation spirit in the era of globalization, therefore Indonesian taxation law is not only important for education but also needs special attention from the people's leaders and politicians.

The impact of globalization, increasing the competitiveness of nations and adjustment to the economic level of Indonesian people cause changes in laws or taxation cases. This means that the way taxes are regulated must be adjusted to the needs of the community as a reaction to changes in the economic life of the community itself.

This research is a research and development or Research and Development (R&D). The development carried out in the form of Tax Practicum Teaching Materials. Development of Tax Practicum Teaching Materials follows the Dick and Carey Model. If the ten steps of the Dick & Carey development model and follow the stages of developing instructional media properly, it will be able to produce an educational product that can be accounted for.

**Development of Subjects for Tax Practicum Subjects**

This research is a research and development (R&D) type. The development carried out in the form of Tax Practicum Teaching Materials. Development of Tax Practicum Teaching Materials follows the Dick and Carey Model. If the ten steps of the Dick & Carey development model and follow the stages of developing instructional media properly, it will be able to produce an educational product that can be accounted for. The ten steps of developing the Dick & Carey teaching material model are described as follows.

![Fig 1. Dick & Carey's Instructional Design Development Model](image)

Information: _____ : stage line

-------- : feedback and revision lines
These steps are not standard things that to be followed, the steps taken can be adjusted to the needs of researchers. To produce interactive learning products that have good planning, learning design is needed.

2 Research Methods

This research was conducted at the Faculty of Economics, Universitas Negeri Medan in the odd semester of the 2019/2020 school year for students taking taxation practicum courses. At the development stage of learning media, targeting in this case are lecturers, instructional media experts, instructional design experts, subject matter experts and students who assess learning media that have been developed based on the criteria, as follows: (1) evaluators are based on the expertise they have, (2) evaluators who carry out evaluations are determined based on the ability of practitioners / lecturers with the classification of experts in the field of study. Assessments are also obtained from students for the response to the use of teaching material that was developed. The development of learning strategies and teaching materials in this study uses a development model adopted from Dick, Carey [3]. The stages of development implementation consist of: 1) Pre-Development 2) Development of teaching materials and learning strategies 3) Product reviews and trials 4) Processing and analysis of data and application of learning strategies and teaching materials[5,6].

Analysis of the data of this study uses quantitative descriptive analysis. All data collected were analyzed using descriptive statistical techniques that were separated quantitatively by categories to sharpen the judgment in drawing conclusions. This analysis is intended to describe the characteristics of the data in each variable and will make it easier to understand the data for the subsequent analysis process. Qualitative data in the form of statements that are not feasible, less feasible, and feasible are converted into quantitative data with a rating scale of 1 to 4. Data analyzed using trial analysis with quantitative analysis using Gain scores[7].

3 Results and Discussion

This research and development aims to produce taxable teaching materials that are in accordance with the latest tax regulations. The development of learning strategies and teaching materials in this study uses a development model adopted from Dick and Carey. The stages of development implementation consist of: a) Pre-Development b) Development of teaching materials and learning strategies c) Review and trial of products and development of teaching materials; and d) data processing and analysis stage.

Test the effectiveness of the material experts include aspects of the feasibility of the content, the feasibility of language, and the feasibility of graphic. The feasibility test process is carried out to find out whether the material presented in teaching materials is in accordance with the competency standards and basic competencies of taxation subjects and semester learning plans, the language used is easy to understand and graphics / tables are in accordance with the subject matter. Average total assessment from experts this learning material obtained 83.33% results. In accordance with the percentage scale, the results fall into the quite feasible / attractive / motivated category.

Test the effectiveness of media design experts Learning aims to get input and advice on the design of tax practicum textbooks in developing tax practicum teaching materials in
accordance with the latest tax regulations that are generally accepted in Indonesia in order to increase understanding of concepts / materials and mastery of tax practices in making / producing the company's annual tax report on the tax practicum course at the Universitas Negeri Medan Faculty of Economics accounting study program. The average total rating of the learning design expert on the taxation practicum textbook design was 80%. In accordance with the percentage scale, the results fall into the quite feasible / attractive / motivated category.

The effectiveness test of instructional media experts includes aspects of non-visual communication that can lead to mutual benefits so that they are able to solve a problem because teaching materials are central to the development of knowledge of understanding a material / concept for students. The average total rating of the instructional design expert on the design of textbooks with solving this problem obtained 79.16%. In accordance with the percentage scale, the results fall into the sufficient / attractive / motivated category to be used.

After the product of teaching material is tested its effectiveness by material experts, design experts and media experts, it is then revised according to the suggestions or comments of the validators. The revised product then enters the student trial phase as the end product user. Teaching materials developed were tested on 6 students called small groups representing accounting students in the second semester who took taxation practicum courses with the criteria of 2 high, medium and low ability students respectively. The assessment aspects given in small group trials include aspects of content eligibility, graphic aspects, and aspects of benefits. The average total assessment of students in the small group test on the design of this taxation practicum textbook obtained 82.23% results. In accordance with the percentage scale in table 4.1, the results fall into the "quite feasible / interesting / motivated" category.

The assessment aspects of small and large group tests for students are also carried out by holding pre-test and post-test. The mean / mean pre-test score of the small group was 5.83, and the mean / post-test mean score was 8.33, or an increase of 2.5. This means that the use of the product materials development results can improve the scores of students by 25% dan average / mean scores of pre-test a large group was 5.61, and the average / mean score of post-test is 8.34, or an increase of 2.72. This means that the use of teaching material products developed results can increase student scores by 27.2%. While the results of the assessment on the questionnaire according to the small group about the design of this taxation practicum textbook obtained 82.23% results and the large group obtained 84.57% results. In accordance with the percentage scale, the results fall into the quite feasible / interesting / motivated category.

4 Acknowledgements

From year to year, revenue from the tax sector continues to show an increase. In the context of efforts to increase tax revenue, the government made a fundamental change by creating a new taxation system, namely by changing the new taxation law. This was done to adjust to the level of social and economic life of the Indonesian people as well as the pace of national development that had been achieved.
5 References


Teaching Material Development of Educational Research Methodology with ADDIE Models

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Abstract. The purpose of this study is to produce teaching materials based on project based learning in the Research Methodology course. It also aims to determine the effectiveness of teaching methodology courses with a project based learning approach and find out students' responses to teaching materials developed in the form of textbooks and learning videos. The development procedure used in the development of this teaching material is the ADDIE Model Romiszowski. The model consists of five steps, namely: (1) analysis (analyse), (2) design, (3) development (development), (4) implementation and (5) evaluation. Based on the results of research and development can be concluded several things as follows: (1) Development of research methodology textbooks based on Project Based Learning using ADDIE models. The analysis phase (Analyze) begins with conducting syllabus analysis, student analysis, concept analysis, task analysis. The design phase are carried out by preparing instruments, choosing the format and initial design of teaching materials, the results of teaching materials are obtained in accordance with the needs of students in the form of textbooks based on Project Based Learning and learning videos. The development phase is done by developing teaching materials into 12 learning activities that are equipped with video learning from each chapter then validated by material experts with a total score of 4.07 while learning media experts with a total score of 4.08 with categories valid and revised according to expert advice.

Keywords: Teaching Materials, Development, ADDIE Models

1 Introduction

The quality of teaching and learning process is influenced by lecturers, students, teaching methods, teaching materials, the use of learning media, and other factors that support the teaching and learning process. Among these factors teaching material is an important factor in helping the development of students to learn independently in accordance with the abilities and speed of each student.

Teaching material is a set of material that is arranged systematically so that lecturers and students can use it in the lecture process in a comfortable environment and environment for learning. Teaching materials take many forms. The form of teaching materials or learning materials include: (1) Printed materials such as: textbooks, books, worksheets, brochures, handouts, leaflets, wallcharts; (2) Audio Visual such as: video / film, VCD; (3) Audio like; radio, cassette, audio CD, PH; (4) Visuals: photos, drawings, models / models; (5) Multi Media: interactive CD, computer based, internet [1].
Teaching materials are all materials (be it information, tools, and texts) that are arranged systematically that presents a complete figure of the competencies that will be mastered by students and used in the learning process with the aim of planning and studying the implementation of learning [2]. Further explained teaching material is information, tools and texts needed by the teacher / instructor for planning and studying the implementation of learning [3].

The teaching materials referred to are written and unwritten materials. The teaching material group consists of integrated writing, audio visual, electronics and interactive media groups. A teaching material at least includes study instructions (student / lecturer instructions), competencies to be achieved, supporting information, exercises, work instructions that can be in the form of worksheets (LK), and evaluations. Teaching materials or instructional materials generally consist of knowledge, skills and attitudes that students must learn in order to achieve predetermined competencies. In detail, the types of learning materials consist of knowledge (facts, concepts, principles and procedures), skills and attitudes or values [4].

From some of the opinions above it can be concluded that teaching material is a unit consisting of a series of learning activities arranged systematically to help students achieve the goals that have been formulated with effective results, or in short it can be said that teaching materials are curriculum packages provided for students studying independently. Teaching material is arranged systematically so that it has specific objectives, preliminary section, main and closing section, conclusions, according to the level of student ability. The research objective is to produce teaching materials for Research Methodology courses in the form of textbooks that are equipped with learning videos.

2 Research Methods

This research is development type of research. Research and development (R&D) methods are research methods used to research to produce certain products, and then test the effectiveness of these products [5]. This research develops new products in the form of teaching materials for research methodology courses.

This research will be carried out in the Medan State University economic education study program located at Jl.Willem Iskandar Pasar V Medan. The research subjects in this study were students of economic education study programs enrolled in the 2019/2020 school year. The class that the researchers chose was Class B Semester V, amounting to 41 students.

The feasibility analysis of teaching materials is obtained through data validation involving several experts to evaluate the product as a basis for revising the initial product. Data collection tools used in the form of validation sheets provided to experts. Validation sheets are given to experts in the form of a Likert scale.

<table>
<thead>
<tr>
<th>Table 1. Validation Value Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Answer Category</td>
</tr>
<tr>
<td>Very good</td>
</tr>
<tr>
<td>Well</td>
</tr>
<tr>
<td>Enough</td>
</tr>
<tr>
<td>Not good</td>
</tr>
<tr>
<td>Very bad</td>
</tr>
</tbody>
</table>
Then the mean score is searched by using the formula

\[ R = \frac{\sum_{i=1}^{n} V_i}{n} \]  (1) [2]

Information:
\( R = \) average of the results of an evaluation by the validator
\( V_i = \) score validator assessment results i-th
\( n = \) many validators

Furthermore the average obtained is adjusted to the following categories:

<table>
<thead>
<tr>
<th>Average (RTV)</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 \leq RTV \leq 5</td>
<td>Very Valid</td>
</tr>
<tr>
<td>3 \leq RTV &lt; 4</td>
<td>Valid</td>
</tr>
<tr>
<td>3 \leq RTV &lt; 2</td>
<td>Invalid</td>
</tr>
<tr>
<td>2 \leq RTV &lt; 1</td>
<td>Tidak Valid</td>
</tr>
</tbody>
</table>

3 Result and Discussion

Presentation of Development Results of teaching materials

The results of this study are (1) a textbook based on Project Based Learning (2) expert assessment of the content or material of textbooks, language assessment and presentation (3) student responses to textbooks that have been made, (4) observations of student enthusiasm class B semester V economic education study program in the learning process based on learning activities provided in the textbooks, and (5) the final student test results to see student achievements in the material provided. After doing ADDIE Model which consists of five steps, namely: (1) analysis (analyse), (2) design, (3) development, (4) implementation (implementation) and (5) evaluation (evaluation). Following is a description of each stage carried out.

1) Analysis Phase

This stage is carried out to analyze the needs in the lecture process and gather information relating to teaching material products that will be developed include: syllabus analysis, Student analysis, concept analysis and task analysis.

2) The Design Stage
a. Instrument Arrangement

The preparation of the criterion reference test at this stage, researchers compile instruments used to assess the validity of teaching materials to be developed (validation instruments), as well as compile instruments for student responses to products that are developed.

b. Format Selection

The preparation of test instruments and in accordance with the preparation of lecture objectives that serve as a benchmark for the ability of students who refers to Bloom's taxonomy. The next stage is the selection of the textbook format and the initial draft of the
textbook. The format of the textbooks contained in this study includes a description of learning outcomes, subject matter, material description, material summary, assignments, formative tests and answer keys. The supporting factor in the textbook is the introduction in which there are instructions for the use of textbooks to facilitate students in understanding the contents of the textbooks. This textbook is equipped with a cover, preface, table of contents and also a bibliography at the end of each subject.

c. Initial Design of Teaching Materials
In the design phase of developing semester lecture plans (RPS). From this stage the textbook development design was obtained which consisted of establishing basic competencies, indicators and subject matter according to syllabus and RPS. Preparation of test instruments and in accordance with the preparation of lecture objectives that serve as a benchmark for the ability of students who refer to Bloom's taxonomy. The next stage is the selection of the textbook format and the initial draft of the textbook. The format of the textbooks contained in this study includes a description of learning outcomes, subject matter, material description, material summary, assignments, formative tests and answer keys. The supporting factor in the textbook is the introduction in which there are instructions for the use of textbooks to facilitate students in understanding the contents of the textbooks. This textbook consist of cover, preface, table of contents and also a bibliography at the end of each subject. Based on the selected textbook components then do the writing of the textbook. Writing textbooks begins with attention to the syllabus of courses that have been designed in advance which is the main reference in preparing material in textbooks. Then proceed with developing the textbook material, which consists of a description of the material, summary, assignments and formative tests. Furthermore, at the final stage the design of the textbook display and layout is then printed and ready for validation by the expert. The design of teaching materials also follows the syntax of project based learning based on learning models. The theme of the problem was developed in accordance with the results of student observations at the school where the research will be held.

3) Development Stage
Development is the third step in implementing the ADDIE learning system design model. At this stage the design of textbooks in the form of mapping RPS to textbooks will be used as a guide to develop textbooks and develop learning videos.

a. Developing Teaching Materials
Before entering into the material, we must first arrange an introduction the introduction part is the explanation of teaching materials and Project-based learning stages and competencies to be learned. Furthermore, based on the analysis of the material in the RPS on the methodology courses, 12 learning activities were developed that are equipped with video learning.

b. Expert Validation
The validity of the teaching material seen is an assessment in terms of the material, learning media, and learning model experts. Researchers chose two validators to assess the design of textbooks and instructional media. Validation results from experts in the form of suggestions and comments are used to revise textbooks and learning videos that are made.
The following is the recapitulation of the results of expert validation seen from the aspects of content validity, language validity and validity of the presentation as shown in table 10 below:

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Average score</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content validation</td>
<td>4.05</td>
<td>Valid</td>
</tr>
<tr>
<td>Language validation</td>
<td>4.00</td>
<td>Valid</td>
</tr>
<tr>
<td>Presentation validation</td>
<td>4.13</td>
<td>Valid</td>
</tr>
<tr>
<td>Graphic Validation</td>
<td>4.10</td>
<td>Valid</td>
</tr>
<tr>
<td>Average total score</td>
<td>4.07</td>
<td>Valid</td>
</tr>
</tbody>
</table>

Based on table 3 above, the textbooks of research methodology with a total mean score of 4.07 are valid. This means that the textbook has validity and content, with language that is easy to understand and an interesting presentation and graphic.

Next will be elaborated the results of expert validation related to instructional media (learning videos) note that the average total score for media validity is 4.08 with a valid category, this means that from media validation with four assessment indicators with valid criteria used.

The next step taken by the researcher is the develop phase, namely revision. The validated textbooks were then revised according to the suggestions of the validator. As for what was suggested by the validator including: (1) Formative questions should include all material in the relevant chapter (2) as much as possible to quote from the second source (3) It should be made an example of the formulation of the problem and hypothesis from the existing research case (4) We recommend that the formula be given sequential numbers so easy identification. As for the media validator, it is better to reproduce images that are relevant to the material to encourage students to think critically and improve the layout to make it more interesting. Apart from that there are still a number of other suggestions which are not described in detail, but a revision process has been carried out according to the suggestions of the two validators to improve the draft research methodology textbook.

c. Limited Trial

Besides being validated by experts, questionnaires were also distributed to students to see responses to the design of textbooks. Input from validators and students are used to revise textbooks that have been made. Limited trials are trial textbooks that have been developed in small classes to get information on the implementation of teaching materials that have been developed and have been validated by experts. The limited trial activity begins with the distribution of teaching materials that have been validated by experts to students.

At the first meeting, the lecturer explained the flow of research carried out and explained the project-based learning to be carried out. This research was conducted on fifth semester students of economic education study program class B as many as 5 students to see the students' responses to the research methodology textbooks which had been compiled based on data obtained information that the total total score was 82.33. The assessment results are included in the practical category. So, the research methodology textbook is good and can be tested to the next stage.
Then from that will be described student responses to the media (video learning) obtained information that the average total score is 81.33. The assessment results are included in the practical category. So, the media (learning video) of the research methodology course is good and can be tested to the next stage.

4) Implementation Phase
   a. Peer Discussion
      Before being used for experiments in class, first discuss with colleagues who are able to study the methodology of research related to teaching materials that have been developed. Through these activities obtained some suggestions for improvement of textbooks and learning videos.

   b. Experiments in class
      The implementation phase is a follow-up stage from the development stage. In the implementation phase, researchers duplicate / print textbooks and conduct discussions with colleagues about the shortcomings that exist in the textbooks, and at the same time make improvements, then the last is to implement in class B semester V economic education study programs. Every learning activity in a textbook contains the stages of a project based learning model.

      The researcher will also conduct a post-test to test the ability and find out the learning outcomes of Class B students as many as 41 people after students do the learning by using a project based learning methodology book. Books can be said to be useful if student learning outcomes meet the Minimum Mastery Criteria of 80 and more or equal to achieving the requirements of textbooks said to be effective with 75% of students completing.

5) Evaluation Phase
   The formative evaluations carried out including:
   a. Evaluation at the analysis stage is carried out by filling out the evaluation instruments by the content expert. Content expert test is carried out to determine the suitability of the content of teaching materials based on project based learning in research methodology courses. Evaluasi Tahap Analisis
   b. Evaluation at the design stage is done by filling in the design evaluation instrument by the design expert. The aspects evaluated in the design stage are the selection of learning models, the design of the GSM and the design of the textbook.
   c. Evaluation of Development Phase
      Evaluation at the development stage is carried out by filling out development evaluation instruments by media experts. The aspect which is evaluated in the development stage is the accuracy in mapping the RPS to the textbooks and learning videos that are in accordance with the textbook content.
   d. Evaluation of implementation Phase
      Evaluation at the implementation stage is done by filling in the expert test questionnaire and student response questionnaire. Evaluation at the implementation stage is the final evaluation in the research methodology textbook.
Discussion

The development model used in ADDIE Model are (1) analyze, (2) design, (3) development, (4) implementation and (5) evaluation. Visually, the ADDIE Model stage results in an initial draft of the Project Based Learning methodology-based teaching textbook called the educational research methodology textbook and 12 learning videos. Furthermore, the draft textbook and the learning video are validated by 2 experts.

Expert validation was carried out on two aspects, namely the validation of the contents of the material and the learning media. The total score of assessment of content validity is 4.05 with a valid category. Whereas for language validation, the number of assessment scores is 4.0 with a valid category, the number of validation assessment scores for the presentation of textbooks is 4.13 with a valid category, validation of the graphic aspects of the number of assessment scores 4.10 with a valid category. The draft textbook as a whole is declared valid for use with an average total score of 4.07. This means that the assessment of the content of the material, language, presentation, and graphic textbooks are in the valid category for use with revisions in accordance with the validator's suggestion.

Then validate the learning media in this case a learning video created using the camtasia studio application. From the results of the validation carried out by two experts obtained a mean total score of 4.08 with a valid category. This shows that the learning videos compiled as many as 12 videos are suitable for use in the next stage.

Here are some suggestions from the validator (1) We recommend that formative questions should include all the material in the relevant chapter (2) as much as possible to quote from the second source (3) We recommend that you make examples of problem formulations and hypotheses from existing research cases (4) We recommend that formulas are given serial numbers to make identification easy. As for the media validator, it is better to reproduce images that are relevant to the material to encourage students to think critically and improve the layout to make it more interesting. Apart from that, there are still a number of other suggestions that are not detailed, but a revision process has been carried out in accordance with the recommendations of the two validators for the improvement of the draft research methodology textbooks and learning videos.

In the next stage, draft textbooks and learning videos were given to five students called limited trials. The draft textbook is assessed based on the criteria contained in the assessment questionnaire and student responses totaling 4 assessment criteria. From the results of the assessment of five students obtained an average number of assessment scores of 82.33% with a practical category, while the responses of students to the learning video obtained an average total score of 81.33% with a practical category to use. From the comments and suggestions from students, the researchers did not make many revisions because most students gave comments that tended to be positive towards textbooks and learning videos. The product revision is carried out if the trial is still found errors or deficiencies [4]. Referring to the results of the student questionnaire, this textbook does not need to be revised anymore and can be used for testing to the next stage.

The next stage of the draft textbook is tested on the real class. The test was conducted on students in class B semester V of the economic education study program TA.2019 / 2020 with a total of 41 students. Trials conducted four times, learning activities using Project Based Learning textbooks, in which with this textbooks students are invited to learn by exercises, especially in writing research proposals as interesting as possible so that they are easy to remember. So that students are demanded to be more enthusiastic and enthusiastic in lectures. In this trial the researcher made observations on learning activities.
4 Conclusion

Based on the results of research and development it can be concluded several things as follows: (1) Development of research methodology textbooks based on Project Based Learning using the ADDIE model. The analysis phase (Analyze) starts with conducting syllabus analysis, student analysis, concept analysis, task analysis. The design phase are done by preparing instruments, choosing the format and initial design of teaching materials, the results of teaching materials are obtained according to the needs of students in the form of textbooks based on Project Based Learning and learning videos. The development phase (Development) is done by developing teaching materials into 12 learning activities that are equipped with video learning from each chapter then validated by material experts with a total score of 4.07 while learning media experts with a total score of 4.08 with categories valid and revised according to expert advice.

Furthermore, the results of the trial are limited to some students in class B semester V of the Medan State University economic education study program. The students' responses to the textbook with an average total score of 82.33 with a practical category. As for the media in the form of instructional videos with an average total score of 81.33 with easy to use categories. Implementation phase (Implementation), carried out by conducting experimental activities that are still in the process of completing the experimental stages. The last is the Evaluation Phase (Evaluation) by evaluating several stages of development as previously discussed.

5 References


Community Character Education Society 5.0 and Future Management

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Abstract. The progress and change of information technology that is so fast and fast must be balanced with character education and management in society 4.0, because without being balanced with character education and management in the future implementation of society 5.0, society tends to be exclusive and individualistic. With the progress and changes in information technology today, people feel they do not really need other human beings, because all work can be done through technology, on the one hand technological advances cannot be dammed and it is a necessity to be able to make a job easier and more efficient, but on the other hand others will give birth to ignorance and mutual disrespect between one individual and another individual, in this case the role of character education and future management, is needed in building towards society 5.0.

Keywords: Character Education, Society 5.0, Future Management

1 Introduction

Society 5.0 is an era of information technology that refers to a new type of society in which innovation in science and technology occupies the top place in all fields, in today's society 5.0, every human being is very dependent on technology in both information and communication and even almost every job using technology, with the aim that every job can be done easily and efficiently so that human labor is not needed [1]. Community education 5.0 today, every educator and educated person is very dependent on technology both in the field of information and communication and even almost every process of teaching and learning using technology, with the aim of streamlining programs and methods of learning with technology that are carried out easily and efficiently so that PBM (Learning and Teaching Process) goes according to the curriculum. This is where the University attempts to change learning patterns for future management in this technological era.

The Japanese Prime Minister officially launches "Society 5.0". This is a human-centered and technology-based concept. Society 5.0 achieves a high degree of convergence between virtual space and physical space. In the past information society (Society 4.0), people will
access database services in cyberspace through the internet and search, retrieve, and analyze information or data. In the concept of "Society 5.0" humans will play a bigger role by transforming big data into a new wisdom that ultimately increases the ability of humans to open opportunities for other humans to achieve a better and meaningful life [2]. This has an impact on education in the current management sphere which analyzes processes on educational patterns, builds conceptual frameworks of competent work, identifies underlying principles and builds management theory using a technological future management approach.

Facing society 5.0 era of the industrial revolution, in fact lecturers as stakeholder education in the delivery of material are not only based on curriculum guidelines, but must be able to give examples of the material delivered by utilizing current technological facilities. While students are not only required to understand the material presented but also must utilize technology. Character education has a higher meaning than moral education because character education is not only related to right or wrong, but how to instill habits about good things in life so that children have a high awareness and understanding and care and commitment to establish virtues in daily life [3].

In order not to lose the noble character of society in the era of 5.0 it is necessary to have efforts to maintain it through management to regulate the use of information technology in a good, intelligent and in accordance with needs, if the information technology is used intelligently then the value of the noble character can automatically be maintained, the value noble characters include attitudes of caring, tolerance, democratic, friendly and communicative[4]. The author has observed that in the absence of management and regulation in the intelligent use of information technology, the community tends to be exclusive, selfish, individualistic, and then indifference arises between one individual and another individual.

Educational Character of the Future

Character is the personality of a person formed from the internalization of various policies that are believed and used as a basis for perspective, thinking, acting and acting. Character terminology contains at least two things, namely values and personalities, these values can be developed through habits and role models. A person's habits are formed from actions carried out repeatedly every day, these actions are initially realized or intentional, but because so often the same actions are carried out, eventually the habit becomes reflexes that are not realized by the concerned [2]. Based on the quote above the character is a person's habit that is carried out spontaneously without the need for consideration and thought beforehand, and if the habit is carried out continuously then it will be a characteristic of someone who is very difficult to change again. Character is a way of thinking and behaving that characterizes each individual to live and work together, both within the scope of the family, community, nation and state”. It can be concluded that individuals with good character are individuals who can make decisions and are ready to take responsibility for the consequences of the decisions they make [3].

Character education has a higher meaning than moral education because character education is not only related to right or wrong, but how to instill habits about good things in life so that children have a high awareness and understanding as well as caring and commitment to establish virtue in everyday life [6]. Character Education is as a Pillar of National Awakening with Achievement of the Highest Achievement of good character. The theme reminds us all about the nature of education that has been emphasized by our Father of National Education, Ki Hajar Dewantoro, who today we commemorate his birthday as
National Education Day. Education, said Ki Hajar Dewantoro, is an effort to advance character (mental strength, character), mind (intellect) and the physical body of students [1].

**Future character formation**

Character building for the future of education cannot be done in an instant by giving advice to students, ordering, or instructing. Forming character patterns in students requires role models / role models in learning, patience, habituation, and repetition. The process of character education runs the flow of education experienced by students as a form of experience of personality formation through self-practice of the values of life, religion, and morals [1].

<table>
<thead>
<tr>
<th>No</th>
<th>Important Strategy</th>
<th>Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Welfare</td>
<td>Providing Educational Facilities and welfare of educators.</td>
</tr>
<tr>
<td>2</td>
<td>Policy in quality</td>
<td>Program major learning and quality requirements.</td>
</tr>
<tr>
<td>3</td>
<td>Management</td>
<td>Responsible for the implementation of Higher Education Management</td>
</tr>
<tr>
<td>4</td>
<td>Quality Organization</td>
<td>Authority and responsibility of the working group implementing the quality system</td>
</tr>
<tr>
<td>5</td>
<td>Publication and Marketing</td>
<td>Documented as marketing materials such as brochures, advertisements, leaflets, and leaflets</td>
</tr>
<tr>
<td>6</td>
<td>Entrance Selection</td>
<td>Documenting the results of the interview, interview, and the value of the registration selection</td>
</tr>
<tr>
<td>7</td>
<td>A curriculum design for periodic review to increase the relevance of the world of work.</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Implementation of the curriculum</td>
<td>Detailed assessment and graduation criteria</td>
</tr>
<tr>
<td>9</td>
<td>Learning Management</td>
<td>Implementation of curriculum programs, which are organized according to audit exposure in the role of the authorized team</td>
</tr>
<tr>
<td>10</td>
<td>Staff training and development</td>
<td>Establish procedures for staff selection, performance measurement, innovation improvement and career development policies</td>
</tr>
<tr>
<td>11</td>
<td>Monitoring and Evaluation</td>
<td>Achievement of review meetings, making achievement of internal audit</td>
</tr>
<tr>
<td>12</td>
<td>Administrative Arrangements</td>
<td>The process of controlling learning documents such as RPP and Syllabus and records of exam results and achievements.</td>
</tr>
<tr>
<td>13</td>
<td>Institutional Management</td>
<td>Review Having a way of evaluating the overall performance of Educators.</td>
</tr>
</tbody>
</table>
2 Research methods

The method used in this research is R&D method that is produced from this research is a policy about attitudes in the development of character society 5.0 especially in student education and how to manage the future that can better regulate the use of information technology intelligently in society and in accordance with global needs[5].

Data collection techniques in this study were participatory observation. In this observation the researcher was directly involved in daily activities with students of the Law School. As a sample being observed, 50 psychology study program odd semester students were used as research data sources, and analyzing data descriptively. Descriptive statistics can be used if the researcher only wants to describe the sample data and does not want to make conclusions that apply to the population where the sample was taken.

2 Results and Discussion

Character is the attitude of a person who is displayed in a manner that is continual, both the attitude in a positive form and in a negative form. The development and implementation of character education in the community of habituation and example is a very important factor, because it is an embodiment of the character itself. In Islamic terminology, character is better known as moral, moral structure must be based on divine knowledge, which is derived from human values and based on science, therefore character formation needs to be preceded with knowledge and can be sourced from religious, social knowledge and culture [2,7]. Based on the above quotation, it can be understood that character is identical with morals, so that characters are universal human behavioral values which include all human activities, both in the context of relating to God, with himself, with fellow human beings and with their environment, manifested in the mind, attitudes, feelings, words and deeds based on religious norms, law, karma, culture and customs. Good character is related to knowing the good, loving the good and act good. Knowing the good means being able to understand and distinguish between good and bad [3,8]. Knowing the good means developing the ability to conclude or summarize a situation and choose a good thing to do, and then do it.

If every individual knows good, and loves the good, then certain character values in society such as caring, honesty, mutual respect, mutual respect, tolerance, democratic, responsibility, friendly and communicative are very easy to develop and implement, because in essence in the development of character education is inseparable from moral knowledge, moral feelings, and moral actions, so that universal behavioral values that cover all aspects of life, both behavioral values related to God and behavioral values related to fellow human beings. In the context of society 5.0 character education and the development of universal behavioral values are important to do, and are a big agenda to be planned and implemented at this time and in the future, because the progress of information technology is so rapid and maybe the negative impact it causes can only be dammed by the application and development of character values in society.
Character education is a system of developing the values of Fitrah to school members which includes the components of knowledge, awareness and willingness and actions to implement them [2,9]. In character education in schools all components must be involved, including the education component itself, which includes curriculum content, learning and assessment processes, relationship quality, subject management, school management, implementation of non-curricular activities and activities, empowering facilities and infrastructure, as well the work ethic of all residents and the school environment. Character is a combination of morals, ethics, and morals [3]. Moral is more focused on the quality of human actions, actions, or behavior. Character education is the formation of a moral person by creating structures and environments that help the moral growth of individuals. This requires the public to actualize character education in educational institutions. 3. Research Results From the results of the study with 50 respondents, using the SPSS

Table 2. Simultaneous Test

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Regression</td>
<td>6076.771</td>
<td>3</td>
<td>2025.590</td>
<td>24.006</td>
<td>.000a</td>
</tr>
<tr>
<td>Residual</td>
<td>10716.023</td>
<td>127</td>
<td>84.378</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>16792.794</td>
<td>130</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Dependent Variable: Lecturer Performance  
b. Predictors: (Constant), Campus environment, discipline, learning motivation

This study has more than 1 independent variable, it is necessary to do the Anova test to test the effect of the independent variables simultaneously on the dependent variable. Based on table 4.3 above the significance value indicates the value of 0.000 with a calculated F value (24,006) greater than the F table (8.5). Thus it can be concluded that the campus environment variable, student discipline and learning motivation together influence the variable performance of lecturers at the tertiary institution and the effect is significant. In other words, the above model has fulfilled the feasibility of the model and character that is applied can be continued as applied to improve the quality of higher education management efforts to carry out community education 5.0 character community management.

Table 3. R Square Test

<table>
<thead>
<tr>
<th>Model Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>1</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Campus environment, Discipline, Learning motivation

Based on table 3 above the value of R Square is at the level of 0.362 which means that the variables of learning motivation (X1), discipline (X2) and campus environment (X3) contribute to the influence of lecturer performance (Y) by 36.2% and the remaining 63.8% influenced by other factors which cannot be examined in this study. Because the value of the contribution of the influence is still relatively small, (36.2%) it can be said that there is still a large research room that might contribute to the performance of lecturers on the assessment of
student character by looking at motivation to learn, discipline, and the environment in campus, so that the future management of the student will be created.

![Histogram](image)

Fig 1. Histogram

To test the normality of the bars there must be some on the curve shape, not shifting right or left.

3 Conclusion

Lecturer performance is very influential on the future character of students. Discipline and motivation to learn in society 5.0 have an impact on increasing the character of students. Factors underlying human character / behavior are based on religious, cultural, legal / constitutional norms, customs and aesthetics. Character education is a planned effort to make students know, care and internalize values so that students behave as human beings. Character education is a system of instilling behavioral values (characters) to school members which includes components of knowledge, awareness or will, and actions to carry out these values, both towards God Almighty (YME), oneself, others, the environment, and nationality so that we are human beings. Character education at the institutional level leads to the formation of school culture, the values that underlie behavior, traditions, daily habits, and symbols that are practiced by all school residents, and the community around the school. School culture is a characteristic, character or character, and the image of the school in the wider community (Character education training paper).
4 References


Difference of Science Process Skills and Learning Activity in Guided Inquiry and Direct Instruction

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Abstract. This study aims to determine the differences in science process skills and learning activities of students who are taught using the Guided Inquiry model and Direct Instruction integrated by practicum on colligative nature of electrolyte solutions. The sample was determined through purposive sampling technique, by taking 2 classes (XII MIA-1 as the experimental class-I which applied Guided Inquiry and XII MIA-2 as the experimental class-II which applied Direct Instruction. The data collection was done by pre-test and post-test for learning outcome with 20 multiple choice tests and for science process skills with six essay test. The results showed that there were differences in the average value of science process skills with t-count > t-table were 8.76 > 2.0345, while the difference in the average value of learning attitude were 88.54 (Very Good) and 77.43 (Good).

Key words: Guided Inquiry, Learning Activity, Scientific Process Skills

1 Introduction

One of the problems that happen in the world of education is the low quality of education in Indonesia. This is due to the weakness of learning process in education. Improving of the quality of chemistry learning can be done by the teacher through a variety of ways, one of the right ways are emphasize the student’s skill for mastering science as a process not just as a product. At this time chemical learning still emphasizes the product not the process. Even though, the good treatment for mastering science to student will produce good products [1].

Chemistry cannot be separated from scientific approach process [2]. Good mastery of chemical learning can be realized through science process skills [3]. Science process skills are procedural, experimental, and systematical skills of science as the basis of science and investigate the habits of scientific thought or the ability of scientific inquiry [4,5,6]. For this reason, it is important for chemistry teachers to have a good understanding of science process skills. Student who studies chemistry is to remember and understand the chemical concepts that had found by scientists. In fact, student can behave like a scientist in discovering the concepts of chemical. Students use the science process skills as basic skills to master chemistry [7].

Science process skills can be developed in a scientific approach-based learning [3]. Besides science process skills, student’s learning activities needs to be improved in the learning process. Learning activities are various activities that are given to student in teaching-learning situations with the aim that student get the specified content so that curriculum...
objectives can be achieved [8]. The most appropriate learning model for applying science process skills and activating student learning activities is the Guided Inquiry learning model.

Guided Inquiry is a learning model that can improve understanding of scientific concepts. Besides that, it can increase student’s mastering process in learning because they are involved in conducting investigations through practical activities. Teacher will guide their student for applying the real experiment, repair, classify, predict and communicate [7].

The Guided Inquiry learning model can enable student to move step by step in the chemistry learning process because students are guided to understand coherent processes, starting from problems, hypotheses, formulating problems, collecting data, results, and drawing conclusions under the guidance of teacher [3].

The Guided Inquiry learning model can overcome problems about the weakness of science process skills and learning activity. The advantages of learning inquiry models: Firstly, increase student’s motivation to learn and give students the opportunity to think carefully about ideas, problems, and questions. Secondly, provide opportunities for students to participate fully that will increase their curiosity in scientific field inside or outside the classroom. Thirdly, encourage students to have a spirit of initiative, patience, cooperation, unity, and making the decision. Student capabilities will improve to understand about science process skills, conceptual understandings, and relationships, and knowledge that enable them to explore in the real social environment [9,10,11].

Guided Inquiry is the right learning model to develop complete cognitive, affective and psychomotor aspects including learning models that are in line with the development of modern learning [12]. In fact, there are other models that can be applied practicum methods as Guided Inquiry model. This appropriate learning model is Direct Instruction integrated by practicum.

2 Research Method

General background of research

This research was conducted at Senior High School-5 Binjai in North Sumatra, Indonesia. Samples from this study were students of class XII MIA-1 and XII MIA-2 with 33 students in each class. The effectiveness of the Guided Inquiry learning model and Direct Instruction integrated by practicum implemented the practicum worksheets for students which had adjusted to each learning model. Statistical tests carried out included the normality test, homogeneity test and two-party t-test. The pretest value of science process skills was analyzed further using Alpha Cronbach’s validation. Finally 6 test essay questions were valid and reliable in science process skills. After a statistical test, it was found that the question was normal and homogeneous. The next step after being given treatment in the form of different learning models, both classes implemented final test so that the results of the post-test were obtained.

Sample of research

The population of this study was all students of class XII IPA at SMAN 5 in school year’s 2018/2019 as many as 206 students divided into six classes. The sample in this study was taken using a purposive sampling technique. The researcher determines the sample to be examined directly. The researcher deliberately determines the sample members because there are things to consider. The two classes are taught with the same teacher and the duration of
study was same but different study schedules. Samples which taken were 2 classes, XII MIA-1 class as the experimental class-I taught used the Guided Inquiry learning model and XII MIA-2 class as the experimental class-II taught by Direct Instruction integrated by practicum learning model.

**Instrument and procedures**

The test method was carried out twice, the pre-test and post-test (as the test instrument) and observation sheet of learning activities (as the non-test instrument). The form of the test used problem descriptions (essay) compiled based on 6 indicators of science process skills which consist of student’s skills in observing, grouping, formulating problems, designing experiments, formulating hypotheses and interpreting. While to measure the score of science process skills, essay test was consisting of 6 questions with assessments ranging from 20-15 each item questions answered right. The measure for learning activities used observation sheet with 6 indicators and 8 aspects and assessment ranging from 1-4 each aspect of learning activities.

**Data analysis**

Data analysis techniques for scientific process skill’s carried out include: tests of normality, homogeneity, and t-test of two parties. All of the tests were carried out in the experimental class-I and experimental class-II so that there could be a difference in the distribution of the results of normality, homogeneity and t-test values of the two parties in both classes. The data analysis for learning activities used descriptive analysis techniques during student learning activities in the both classes.

### 3 Results and Discussion

**Validity of Science Process Skills**

The application of science process skill question and observation sheet of student learning activities in the Guided Inquiry model and Direct Instruction have involved two expert validators consisting of one professor and one doctoral degree. The results of validation, reliability and level of difficulty and different power of each component of the science process skill indicators as shown in Table 1. As for the reliability, each component of the content validity is also reliable.

<table>
<thead>
<tr>
<th>No</th>
<th>Indicator of SPS</th>
<th>Validity</th>
<th>Different Power</th>
<th>Level of Difficulty</th>
<th>Reliability</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Applying Concept</td>
<td>Valid</td>
<td>Accepted</td>
<td>Medium</td>
<td></td>
<td>Used</td>
</tr>
<tr>
<td>2</td>
<td>Interpreting</td>
<td>Valid</td>
<td>Accepted</td>
<td>Medium</td>
<td></td>
<td>Used</td>
</tr>
<tr>
<td>3</td>
<td>Observing</td>
<td>Valid</td>
<td>Accepted</td>
<td>Medium</td>
<td></td>
<td>Used</td>
</tr>
<tr>
<td>4</td>
<td>Grouping</td>
<td>Valid</td>
<td>Accepted</td>
<td>Medium</td>
<td></td>
<td>Used</td>
</tr>
<tr>
<td>5</td>
<td>Designing Experiment</td>
<td>Valid</td>
<td>Accepted</td>
<td>Medium</td>
<td>$r_{11} = 0.822$</td>
<td>Used</td>
</tr>
<tr>
<td>6</td>
<td>Making Hypothesis</td>
<td>Valid</td>
<td>Accepted</td>
<td>Medium</td>
<td></td>
<td>Used</td>
</tr>
</tbody>
</table>
**Data Analysis of Research Results**

Based on the results of calculations, statistical data obtained from science process skills of students in experimental class-I and experimental class-II are summarized in Table 2.

<table>
<thead>
<tr>
<th>Class</th>
<th>Average Score</th>
<th>Deviation Standard</th>
<th>Varian ($S^2$)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-test</td>
<td>Post-test</td>
<td>Pre-test</td>
</tr>
<tr>
<td>Experiment I</td>
<td>26.52</td>
<td>89.58</td>
<td>7.65</td>
</tr>
<tr>
<td>Experiment II</td>
<td>26.30</td>
<td>78.42</td>
<td>6.94</td>
</tr>
</tbody>
</table>

The score of pre-test and post-test for experimental class-I and experimental class-II can be seen in Figure 1.

![Fig 1. The score of pre-test and post-test both of experimental class](image)

From the picture above, it can be seen that there are differences in the value of the pre-test and post-test experimental class-I compared with the experimental class-II. The experimental class-I has a higher pre-test and post-test value than the experiment class-II. The average value of student’s initial and final abilities in the experimental class-I and experiment class-II for each item about the indicators of science process skills are shown in Table 3.

<table>
<thead>
<tr>
<th>The Indicators of SPS</th>
<th>The Average Value Each Item</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Experiment-I</td>
</tr>
<tr>
<td></td>
<td>Pre-test</td>
</tr>
<tr>
<td>1. Observing</td>
<td>7.64</td>
</tr>
<tr>
<td>2. Grouping</td>
<td>4.27</td>
</tr>
<tr>
<td>3. Applying Concept</td>
<td>3.42</td>
</tr>
<tr>
<td>4. Interpreting</td>
<td>5.03</td>
</tr>
<tr>
<td>5. Designing Experiment</td>
<td>2.76</td>
</tr>
</tbody>
</table>
There were differences in the mean values of the pre-test and post-test in the experimental class I and experimental class-II for each item in the indicator of science process skills. From the results of the pre-test and post-test the science process skills of the students described per indicator showed that the initial abilities of the two sample groups were almost the same. The pre-test results showed that indicators of science process skills such as interpreting, conducting experiments, formulating hypotheses in experimental class-I were higher than experimental class II, while indicators observed, grouped and applied concepts to experimental class II students higher than experimental class-I.

After being given treatment in the form of two different learning models in the both of classes, different final results (post-test) were obtained. The average value each category of science process skills questions in the experimental class-I that uses the Guided Inquiry model is higher than the experimental class-II which uses a practically integrated Direct Instruction learning model. The most obvious difference is in aspects of student’s science process skills in conducting experiments. The experimental class-I students who applied the Guided Inquiry model in the SPS aspect designed the experiment to obtain a higher average score (17.33) than used Direct Instruction integrated by practicum (11.12).

The score of the science process skills of the two experimental classes was then analyzed from the post-test scores of the two experimental classes given after the end of the treatment so that the differences in percentage of science process skills were obtained. The difference in percentage of science process skills of students each aspect as in Table 4.

### Table 4. Difference in Percentage of Scientific Process Skills each Aspect

<table>
<thead>
<tr>
<th>Aspect of SPS</th>
<th>Experiment Class-I Guided Inquiry</th>
<th>Experiment Class-II Direct Instruction</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Applying Concept</td>
<td>84.09%</td>
<td>76.21%</td>
</tr>
<tr>
<td>2. Interpreting</td>
<td>91.92%</td>
<td>86.46%</td>
</tr>
<tr>
<td>3. Observing</td>
<td>88.89%</td>
<td>75.96%</td>
</tr>
<tr>
<td>4. Grouping</td>
<td>94.49%</td>
<td>72.73%</td>
</tr>
<tr>
<td>5. Designing Experiment</td>
<td>86.67%</td>
<td>72.73%</td>
</tr>
<tr>
<td>6. Making Hypothesis</td>
<td>93.74%</td>
<td>85.66%</td>
</tr>
</tbody>
</table>

Based on Table 4, the illustrated for the science process skill’s difference as has been shown in Figure 2.
To analyze differences in science process skills, in this study also carried out an assessment of differences in student learning activities. The assessment of student learning activities was carried out by three observers by filling in the observation sheet during the learning process taking place in the two experimental classes. The average value result of student learning activities obtained in the experimental class-I have been summarized in Table 5.

**Tabel 5. Tabulation of Assessment for Learning Activity in Experiment-I**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Observed Score</th>
<th>Score at meeting</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>I</td>
</tr>
<tr>
<td>Readiness to Learn</td>
<td>Preparation of tools and materials</td>
<td>91.67</td>
</tr>
<tr>
<td>Skills for using tools and material</td>
<td>Skills for use props</td>
<td>84.09</td>
</tr>
<tr>
<td></td>
<td>Mastery of practicum procedures</td>
<td>93.18</td>
</tr>
<tr>
<td></td>
<td>Timeliness for making observation</td>
<td>88.64</td>
</tr>
<tr>
<td>Team work</td>
<td>Solidarity in one team</td>
<td>92.42</td>
</tr>
<tr>
<td></td>
<td>The timeliness of the team completing the practicum</td>
<td>84.09</td>
</tr>
<tr>
<td>Work in group</td>
<td>Cleanliness of the place and laboratory tools instrument</td>
<td>87.88</td>
</tr>
<tr>
<td>Make conclusion</td>
<td>Apply the right conclusion of the lab report</td>
<td>88.64</td>
</tr>
</tbody>
</table>

To analyze differences in science process skills, in this study also carried out an assessment of differences in student learning activities. The assessment of student learning activities was carried out by three observers by filling in the observation sheet during the learning process taking place in the two experimental classes. The three observers assessed student learning activities based on the achievement of five indicators adjusted to eight aspects of student learning activities.

Based on the assessment, the results showed that all student learning activities had met the five indicators in the category of "Very Good" for three meetings. The average value of
student learning activities indicator obtained on the enthusiasm are 91.92; the indicator of skill for using laboratory tools is 87.80; the cooperation is 90.15; the group employment is 87.00 and the indicator concludes is 87.80.

The results of the research before, it obtained the achievement of the value of learning activities of students who were taught using the Guided Inquiry learning model in the first cycle of 100%. This proves that the Guided Inquiry model is very effective used to improve student learning activities, by showing better results than using a practically Direct Instruction integrated by practicum.

The student learning activities carried out in the experimental class-II in 3 meetings, the results showed that only five indicators get "Good" categories. The average value of student learning activities indicators obtained on the enthusiasm is 75.00 with "Good" category with the observed aspects being students' readiness in preparation of tools and materials (75.00). The results of the assessment of student learning activities obtained as in Table 6.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Aspects</th>
<th>Score each Meeting</th>
<th>Average</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Readiness to Learn</td>
<td>Preparation of tools</td>
<td>75</td>
<td>75.00</td>
<td>Good</td>
</tr>
<tr>
<td>Skills for using tools</td>
<td>Preparation of chemical material</td>
<td>72.73</td>
<td>71</td>
<td></td>
</tr>
<tr>
<td>and material</td>
<td>Skills for use props</td>
<td>74.24</td>
<td>73.43</td>
<td>Good</td>
</tr>
<tr>
<td></td>
<td>Timeliness for observation</td>
<td>78.03</td>
<td>76</td>
<td></td>
</tr>
<tr>
<td>Team work</td>
<td>Solidarity in one team</td>
<td>78.03</td>
<td>79.80</td>
<td>Good</td>
</tr>
<tr>
<td></td>
<td>The timeliness of the team completing the</td>
<td>81.06</td>
<td>81.69</td>
<td></td>
</tr>
<tr>
<td></td>
<td>practicum</td>
<td></td>
<td></td>
<td>Good</td>
</tr>
<tr>
<td>Work in group</td>
<td>Cleanliness laboratory tools instrument</td>
<td>85.61</td>
<td>83.4</td>
<td></td>
</tr>
<tr>
<td>Make conclusion</td>
<td>Apply the right conclusion in laboratory report</td>
<td>86.36</td>
<td>83.59</td>
<td>Good</td>
</tr>
</tbody>
</table>

The analysis assessment result of student learning activities in the two experimental classes as in Tables 6 and 7, graphs of the difference in achievement of the five indicators of student learning activities in the experimental classes I and II as in Figure 3.
The value obtained on the indicator of the skill using practicum tools is 73.43 with "Good" category with the observed aspects being the skill of using props (71.21) while the mastery of practicum procedures (72.98). The value obtained in the cooperation indicator is 79.80 under the "Good" category with the observed aspect being group collaboration in one team (79.80). The value obtained in the group work indicator is 81.69 under the "Good" category with the observed aspects being the timeliness of the team completing the practicum (80.05). The cleanliness of the place and practicum (83.34) and the indicator concludes the value obtained is 83.59 with "Good" category.

4 Discussion

The average value of science process skills (post-test) of students in the experimental class I was 89.58 while in the experimental class II was 78.424. These results indicate that the experimental class I taught using the Guided Inquiry learning model was better than the experimental class II which was taught by the practically integrated Direct Instruction model.

The high average science process skills in the experimental class I was because in the experimental class students were taught the Guided Inquiry model. These results occur because through the Guided Inquiry model, students allow learning through simple experimental activities by applying aspects of science process skills in it, so that the improvement of science process skills is very possible to be achieved through a practically integrated Guided Inquiry model. In this learning model students have a wide opportunity to observe, classify, plan experiments and hypothesize under the guidance and direction of the researcher. In addition, students who are taught with the Guided Inquiry model are used to working in teams when in class so students will easily communicate and cooperate during the practicum.
Based on the results of the study, it can be seen that learning with guided inquiry models is very suitable to be used to improve student learning attitudes. This is because the guided inquiry model provides opportunities for students the opportunity to find concepts or information independently under the guidance of the teacher. Students are guided to formulate problems, and carry out practical work independently to find concepts in learning.

A series of simple experimental activities carried out by students have been able to encourage curiosity, confidence and foster students' learning attitudes so that the three indicators of learning attitudes namely cognition, affection and konasi can be realized. The learning process by applying a guided inquiry learning model is also able to improve students' scientific attitudes because this model gives students the flexibility to also be able to think critically and actively participate in the class.

This is supported by recent research, suggesting that guided inquiry learning models can improve scientific attitudes and learning outcomes of students in class XI MIPA 3 Surakarta Public High School 5 in the 2015/2016 school year [11].

5 Conclusions

The Guided Inquiry teaching model is designed to improve science process skills and student learning outcomes. The implication of this study is that the Guided Inquiry teaching model can be an innovative solution to improve students' science process skills, because all students get the opportunity to make concept discoveries through simple experiments like a scientist. The implications of the success of students' science process skills can be observed through increasing student learning attitudes while studying the concept of colligative properties of solutions in the class. After treatment, there are significant differences between students who are taught with guided inquiry models and practicum-based Direct Instruction. The difference in the results of the science process skills of the students learned using the Guided Inquiry model and practicum Direct Instruction on the material of the colligative nature of the electrolyte solution, based on the results of hypothesis analysis using the two-party t-test found that tcount > t table is 8.761 > 2.035. Differences in learning attitudes of students who are taught using the Guided Inquiry model and practically integrated Direct Instruction on the material of the colligative nature of the electrolyte solution with a value of 88.54 (Very Good) and 77.43 (Good). Subsequent research on science process skills and student learning attitudes using different indicators is expected to explore the usefulness of science process skills to be applied in high schools to improve learning innovation in Indonesia.

6 References


Economic Fundamental Resilience of Emerging Market Muslim Countries: Is It Enabled To Predict ARDL Panels?

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Abstract. The research aims to discuss the issue of fundamental economic resilience of Emerging Market's Muslim economies in the long term. Data analysis using ARDL Panel Research results concluded in panel turns the amount of money supply to leading indicators for the control of Indonesia, Bangladesh, Malaysia, Pakistan, and UAE, Saudi Arabia, Turkey. Its position is stable in the short-run and long run. The leading indicator of the effectiveness of variables in the control of the fundamental resilience of Muslim emerging market countries is the investment seen from the stability of short-run and long-run, where the amount of money supply significantly controls Economic durability fundamentals.

Keywords: ARDL Panel, Fundamental durability economy, exchange rate, GDP

1 Introduction

The fundamental economic lozenges measured from Kokoro's strong macroeconomic variables are affected by internal factors and external factors. Economic fundamentals can be measured by inflation, exchange rates, and the acceptance of trade balance [1,2,3]. Literature that often occurs about economic fundamentals is the first appropriate measure in determining the fundamental economic indicators which are most capable of representing the early detection of a country's fundamental economic weakening [4]. One cause of the impact of declining economic fundamentals is detected by the delay effect of economic conditions. Flowers can affect the occurrence of a delay effect [5]. Hasibuan [6] interest rates as a fundamental economic price. Hai [7] mentions the exchange rate as a strong indicator of the fundamental Lemhanas. Oliner [8] concluded the reserves of DHE and Stock [4], Wimanda [9] Economic growth, net exports, and investments. While the financial services are expressed as the economic Lemhanas price of a country [10]. Emerging markets, especially Mulsum countries have a role in repenting in moving the economy. Research literary phenomena are seen from the following GDP:
The decline of Turkish GDP growth, Malaysia, Indonesia occurred in 2015, Turkey's GDP growth dropped to 859.79 billion US $ from 934.18 billion US $ previous year, Malaysia dropped to 296.43 billion US $ from 338.06 US $ previous year, and Indonesia dropped to 861.85 billion US $ from 890.81 billion US $ the previous year. Decreased economic resilience by the government spending factor, investment, and inflation [11]. To improve economic resilience, the export performance of exchange rate stability and non-traditional market expansion is required, including the improvement of commodity export structures [12].

The risk of Muslim state inflation Emerging market, Indonesia's inflation rose to 5.36% from 5.13% the previous year, Saudi Arabia rose to 5.83% from 5.34% the previous year, Bangladesh rose to 11.40% from 8.13% the previous year, Malaysia rose to 3.17% from 1.62% the previous year, and Egypt rose to 22.3% from 20.9% the previous year. In low-income countries, the inflation Momentum (quarterly adjusted quarterly rate is declared at an annual level) dropped dramatically over the past year, from an average of 14 percent in 2011 to the current down of 1.6 percent in All three months until September 2012 before starting the trend of ascension in the last quarter of 2012. The sharp decline reflects the combined effect of
stabilizing the local food prices after 2011 years of drought-related price increases, tightening policies, and easing fuel supply and food disruptions during episodes of political turmoil in the Middle East and parts of the African Sub-Saharan. Shefeni [13] said that rising flowers impact inflation and economic decline. Sitaresmi [14] Interest rate pathways pursue a policy target of inflation. The tightening of the flowers protects the price volatility of Hussain [15], Hsing [16], and Shenglin [17]. Monetary policy must facilitate investments through appropriate interest rates, exchange, and currency mechanisms [2,13,18].

Fundamental resilience can be seen from the open economic theories by identifying macroeconomic variables, interest, investments, and trading balance such as net exports, foreign exchange reserves, and exchange rates.

The policy of pure discretionary and Rules in open economic fundamentals

Balance analysis begins with the results of a purely discretionary policy or a discretionary policy. Policymakers define monetary and fiscal policies by minimizing equations (1.3), i.e., Phase 3. The minimization is obtained by FOC equations (1.3) against monetary and fiscal targets [mP and gP] and random variables v, o, θ. Substituting equations (1.4 A) and (1.4 B) to the equation (1.3) to calculate the control of the instruments of the perfect policy, namely:

\[ E_{\omega, \theta}(L) = E_{\omega, \theta} \left( \frac{1}{1 + \alpha} \left[ \omega m^p + \theta g^p - \alpha E(\pi) + v \right] \right)^2 + \]

\[ E_{\omega, \theta} \left( \frac{\alpha}{1 + \alpha} \beta \left[ \omega m^p + \theta g^p - E(\pi) + v \right] - \alpha \beta y_T \right)^2 \]  \hspace{1cm} (1.5)

FOC equation (1.5) against the MP and GP with the operator expectations o and θ will produce the following equation:

\[ \left[ \omega m^p + \theta g^p - \alpha E(\pi) + v \right] = -\alpha^2 \beta [\omega m^p + \theta g^p - E(\pi) + v] + \alpha \beta y_T \]  \hspace{1cm} (1.6A)

(1 + \alpha^2 \beta) m^p + (1 + \alpha^2 \beta) (1 + \sigma_o^2) g^p = \alpha \beta y_T + (\alpha^2 \beta + \alpha) E(\pi) - (1 + \alpha^2 \beta) v

\[ \left[ \omega m^p + \theta g^p - \alpha E(\pi) + v \right] = -\alpha^2 \beta [\omega m^p + \theta g^p - E(\pi) + v] + \alpha \beta y_T \]  \hspace{1cm} (1.6B)

(1 + \alpha^2 \beta) (1 + \sigma_o^2) m^p + (1 + \alpha^2 \beta) g^p = \alpha \beta y_T + (\alpha^2 \beta + \alpha) E(\pi) - (1 + \alpha^2 \beta) v

The mP and GP solutions are obtained by substituted equations (1.6 A) to (1.6 B) or by application of the Cramer determinant method, namely:

\[ m^p = \left[ \frac{\alpha \beta \left( 1 + \alpha \right) y_T + (\alpha^2 \beta - \alpha) E(\pi) - (1 + \alpha^2 \beta) v}{\sigma_o^2} \right] \sigma_o^2 \]  \hspace{1cm} (1.7A)

\[ g^p = \left[ \frac{\alpha \beta \left( 1 + \alpha \right) y_T + (\alpha^2 \beta - \alpha) E(\pi) - (1 + \alpha^2 \beta) v}{\sigma_o^2} \right] \sigma_o^2 \]  \hspace{1cm} (1.7B)

The immaturity (1.7 A) and (1.7 B) explains the policy-making REACTION FUNCTION on the demand and aggregate shock and inflation expectations. At stage 1, uncertainty over v, o and θ resulted in inflation expectations being:
\[ E(\pi) = E_{\omega, \theta, \tau} [m^P + g^P] = E_{\omega, \theta, \tau} [\omega^P m^P + \theta g^P] \]

\[ E(\pi)_{\text{DIS}} = \frac{\alpha \beta (1 + \alpha) y_T}{(1 + \alpha) + (1 + \alpha^2 \beta \left[ \frac{\sigma^2_\omega \sigma^2_\theta}{\sigma^2_\omega + \sigma^2_\theta} \right]} \]  

(1.8)

From the equation (1.8), it is known that the uncertainty of fiscal policy instruments \([\sigma^2_\omega]\) Height] and the uncertainty of monetary policy instruments \([\sigma^2_\theta]\) high] will increase inflation expectations. Substitution of equations (1.8) to (1.7 A) and (1.7 B) will result in an optimal fiscal and monetary policy with a purely discretionary policy. The pure discretion policy explains that the target fiscal policy \([g^P]\) and the target monetary policy \([m^P]\) are optimal on:

\[ m^P_{\text{DIS}} = [A - A^T v^T] \sigma^2_\theta \]  

(1.9A)

\[ g^P_{\text{DIS}} = [A - A^T v^T] \sigma^2_\omega \]  

(1.9B)

Description:

\[ A = \frac{\alpha \beta (1 + \alpha) y_T}{(1 + \alpha) \left( \sigma^2_\omega + \sigma^2_\theta \right) + (1 + \alpha^2 \beta) \left( \sigma^2_\omega \sigma^2_\theta \right)} \]

\[ A^T = \frac{1}{\left( \sigma^2_\omega + \sigma^2_\theta + \sigma^2_\theta \sigma^2_\omega \right)} \]

Equations (1.9 A) and (1.9 B) explain that the optimal fiscal and monetary policy at a purely discretionary rate is determined by the shock of the aggregate demand and offer. Bidding surprises and positivity aggregate demand will lower monetary and fiscal policy targets, rather the shock of bidding and negative aggregate demand will increase monetary and fiscal policy targets.

The first component of the optimal fiscal and monetary policy is the \(A\) [non-contingent] constant and the slope of the Phillips \([\alpha]\). Curve. The combination of request shock and aggregate bidding \([V]\) is the stabilization component of each policy instrument. This means that the summation of fiscal and monetary policy stabilization components is the total proportion of bid surprises and aggregate demand. Therefore the shock of the aggregate demand and supply will decrease if the instrument's uncertainty of monetary and fiscal policy rises.

Expectations of inflation, money stocks growth, and government expenditure are determined by the precision of the combination of fiscal and monetary policy control \([\sigma^2_\omega, \sigma^2_\theta]\). Therefore, the increased uncertainty of policy instruments will reduce the use of a combination of fiscal and monetary policy. Monetary policy instruments can be controlled perfectly \([\sigma^2_\omega = 0]\). Then all policies will be controlled with monetary instruments \([g^P = 0]\), conversely if fiscal policy instruments can be controlled perfectly \([\sigma^2_\theta = 0]\) Then all policies will be controlled with the fiscal instrument \([m^P = 0]\). Therefore, uncertainty determines the activism and the composition of the combination of fiscal and monetary policy instruments.

The difference between the rule and the pure discretionary is crucial, where the rule policy is the determination of the policy before inflation expectations are determined. Therefore the type of rule policy is that policy adjustments affect expectations. Fiscal and
monetary policy rules are \( GP = G, mP = M \) and \( \sigma^2_0 = \sigma^2_\omega = 0 \). When the rule policy is applied, then the equation (1.8) is changed to \( E(\pi) = M + G \). From the equation (1.8) obtained:

\[
E(\pi)_{RUL} = \frac{\alpha\beta}{(1 + \alpha)} \left( 1 + \alpha \right) y_T = \frac{\alpha\beta}{(1 + \alpha) + (1 + \alpha^2 \beta)} \left( \frac{\sigma^2_\omega + \sigma^2_\theta}{\sigma^2_\omega + \sigma^2_\theta} \right) y_T
\]

(1.10)

This means that inflation expectations depend on the Phillips \([\alpha]\) curve slope and policymaker preferences \([\beta]\) so that \( E(\pi)_{DIS} > E(\pi)_{RUL} \). Minimization of expectations of losses against \( M \) and \( G \) results in the optimal fiscal and monetary policy at the condition \( M = G = 0 \). This implies that \([ m_R^p = 0 \) and \([ g_R^p = 0 \)] or expectations of the inflation rate at the discretionary policy are always higher than the rule policy. The difference in inflation expectations at the discretionary policy with rule policies is the inflationary bias so that the equation (1.8) can be defined as the inflationary bias of the discretionary policy. The combination of the surprising demand and aggregate offerings in the rule policy is fully transformed into aggregate output and the inflation rate, so the inflationary bias is zero in the rule policy.

2 Research Method

The ARDL panel Model is used in predicting the fundamental economy in the face of internal and external economic conditions of a country. An auto-reblock Distributed Lag (ARDL) Pesaran. The ARDL panel techniques test statistics that can compare with two critical values are asymptotic with the formula:

\[
\text{INF}_{\text{Indonesia}} = \alpha + \beta_1 \ln \text{TAX}_{it-p} + \beta_2 \ln \text{GOV}_{it-p} + \beta_3 \ln \text{PDB}_{it-p} + \beta_4 \ln \text{INV}_{it-p} + \beta_5 \ln \text{KURS}_{it-p} + \beta_6 \ln \text{SBK}_{it-p} + \beta_7 \ln \text{JUB}_{it-p} + \epsilon
\]

\[
\text{INF}_{\text{Bangladesh}} = \alpha + \beta_1 \ln \text{TAX}_{it-p} + \beta_2 \ln \text{GOV}_{it-p} + \beta_3 \ln \text{PDB}_{it-p} + \beta_4 \ln \text{INV}_{it-p} + \beta_5 \ln \text{KURS}_{it-p} + \beta_6 \ln \text{SBK}_{it-p} + \beta_7 \ln \text{JUB}_{it-p} + \epsilon
\]

\[
\text{INF}_{\text{Malaysia}} = \alpha + \beta_1 \ln \text{TAX}_{it-p} + \beta_2 \ln \text{GOV}_{it-p} + \beta_3 \ln \text{PDB}_{it-p} + \beta_4 \ln \text{INV}_{it-p} + \beta_5 \ln \text{KURS}_{it-p} + \beta_6 \ln \text{SBK}_{it-p} + \beta_7 \ln \text{JUB}_{it-p} + \epsilon
\]

\[
\text{INF}_{\text{Turkey}} = \alpha + \beta_1 \ln \text{TAX}_{it-p} + \beta_2 \ln \text{GOV}_{it-p} + \beta_3 \ln \text{PDB}_{it-p} + \beta_4 \ln \text{INV}_{it-p} + \beta_5 \ln \text{KURS}_{it-p} + \beta_6 \ln \text{SBK}_{it-p} + \beta_7 \ln \text{JUB}_{it-p} + \epsilon
\]

\[
\text{INF}_{\text{UEA}} = \alpha + \beta_1 \ln \text{TAX}_{it-p} + \beta_2 \ln \text{GOV}_{it-p} + \beta_3 \ln \text{PDB}_{it-p} + \beta_4 \ln \text{INV}_{it-p} + \beta_5 \ln \text{KURS}_{it-p} + \beta_6 \ln \text{SBK}_{it-p} + \beta_7 \ln \text{JUB}_{it-p} + \epsilon
\]

\[
\text{INF}_{\text{Saudi Arabia}} = \alpha + \beta_1 \ln \text{TAX}_{it-p} + \beta_2 \ln \text{GOV}_{it-p} + \beta_3 \ln \text{PDB}_{it-p} + \beta_4 \ln \text{INV}_{it-p} + \beta_5 \ln \text{KURS}_{it-p} + \beta_6 \ln \text{SBK}_{it-p} + \beta_7 \ln \text{JUB}_{it-p} + \epsilon
\]

\[
\text{INF}_{\text{Bangladesh}} = \alpha + \beta_1 \ln \text{TAX}_{it-p} + \beta_2 \ln \text{GOV}_{it-p} + \beta_3 \ln \text{PDB}_{it-p} + \beta_4 \ln \text{INV}_{it-p} + \beta_5 \ln \text{KURS}_{it-p} + \beta_6 \ln \text{SBK}_{it-p} + \beta_7 \ln \text{JUB}_{it-p} + \epsilon
\]

\[
\text{INF}_{\text{Mesir}} = \alpha + \beta_1 \ln \text{TAX}_{it-p} + \beta_2 \ln \text{GOV}_{it-p} + \beta_3 \ln \text{PDB}_{it-p} + \beta_4 \ln \text{INV}_{it-p} + \beta_5 \ln \text{KURS}_{it-p} + \beta_6 \ln \text{SBK}_{it-p} + \beta_7 \ln \text{JUB}_{it-p} + \epsilon
\]


3 Results and Discussion

Data analysis panel results of ARDL mentions

<table>
<thead>
<tr>
<th>Table 1. Output Panel ARDL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Short Run Equation</strong></td>
</tr>
<tr>
<td><strong>COINTEQ01</strong></td>
</tr>
<tr>
<td>D(INF(-1))</td>
</tr>
<tr>
<td>D(TAX)</td>
</tr>
<tr>
<td>D(GOV)</td>
</tr>
<tr>
<td>D(LNPDB)</td>
</tr>
<tr>
<td>D(INV)</td>
</tr>
<tr>
<td>D(LNKURS)</td>
</tr>
<tr>
<td>D(SBK)</td>
</tr>
<tr>
<td>D(JUB)</td>
</tr>
<tr>
<td>C</td>
</tr>
</tbody>
</table>

Testing over the ARDL panel should have a significant level negative slope basis. The value is negative (-0.78) in the direction of a significant probability (0.01 < 0.05). The overall outcome is known that a significant long-term influence on inflation in emerging Muslim countries is government expenditure, interest rates, and the amount of money supply. Then in the short-term amount of money supply that affects the stability of inflation. Leading indicators of the effectiveness of variables in the stability control of emerging market Muslim countries are the amount of money supply (Indonesia, Bangladesh, Malaysia, Pakistan and UAE, Saudi Arabia, Egypt and Turkey) judging by the stability of short-run and long-run, Where the variable amount of money circulating in the long term as well as short significant control of economic stability. The leading indicator of the country's effectiveness in the stability control of Muslim emerging market countries is namely Indonesia, Bangladesh (tax, government expenditure, amount of money supply, interest rates of credit and amount of money supply) and Malaysia (tax, Government expenditure, investment and the amount of money supply). Other countries e.g. UAE and Saudi Arabia's economic stability control are conducted by taxes, investments and the amount of money supply, whereas Egypt and Turkey are made through the amount of money supply. In panel, apparently the amount of money supply can be a leading indicator for the control of countries Indonesia, Bangladesh, Malaysia, Pakistan, UAE, Saudi Arabia, Egypt, and Turkey. Here's a summary of ARDL Panel results table:
Table 2. Summary of ARDL Panel

<table>
<thead>
<tr>
<th></th>
<th>Indonesia</th>
<th>Bangladesh</th>
<th>Malaysia</th>
<th>Pakistan</th>
<th>UAE</th>
<th>Arab Saudi</th>
<th>Mesir</th>
<th>Turkey</th>
<th>Short Run</th>
<th>Long Run</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pajak</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>GOV</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>PDB</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Investasi</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Bunga kredit</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>JUB</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Inflasi</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

*Source:* Data Processed, 2019

Here's a summary of the long-term stability of Muslim emerging markets

Fig 3. predicted the economic resilience of Muslim countries Emerging Market

Leading indicators of countries in the control of emerging market Muslims, namely Indonesia, Bangladesh (tax, government expenditure, money supply, interest rates of credit and money supply) and Malaysia (tax, government expenditure, investment and money supply). Countries: UAE and Saudi Arabia's economic stability control is conducted by taxes, investments, and money supply, whereas Egypt and Turkey are conducted through money supply. The Indonesian state is still strong in controlling price stability through the exchange rate stability. Bangladesh is still strong in controlling price stability through the durability of the money supply. Malaysia is still strong in controlling price stability [19]. The development of money supply as leading indicators of economic resilience in Indonesia, Bangladesh, Malaysia, Pakistan and UAE, Saudi Arabia, Turkey. Leading indicators of the stability control of emerging market countries are money supply (Indonesia, Bangladesh, Malaysia, Pakistan and UAE, Saudi Arabia, Turkey) [20]. Nwaozi [21] states money supply affects fundamental resilience. Mgadmi [22], money circulating positively on economic fundamentals then Hussain [15] supported Mgadmi [22] and Forhad [23]. The monetary policy approaches price affects inflation through interest rates and exchange rate channels [19,24,25].
4 Conclusion

The panel turns out to be the leading indicator for controlling the country of Indonesia, Bangladesh, Malaysia, Pakistan, and UAE, Saudi Arabia, Turkey. And the position is stable in the short-run and long run. The leading indicator of the effectiveness of the variables in the stability control of emerging market Muslims is the investment seen from the stability of the short-run and long-run, where the variable amount of money circulating in the long and short term is significant in controlling economic stability.

5 References


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