

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, in

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 ($\pm 80\%$) 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:

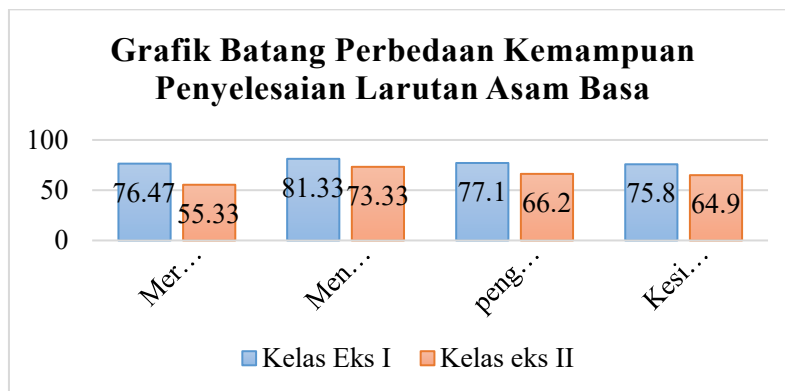


Fig 1. Graph of Differences in the Acid Solution Solution

Furthermore, the character values obtained are the conclusions obtained:

Table 1. Differences in the Integration of Student Character Values

Character Value Integration	Experiment Class I	Category	Experiment Class II	Category
Spirit	100	Very good	100	Very good
Empathy	92,2	Very good	81,1	Very good
Critical Thinking	75,6	Good	53,3	Enough
Communicate	72,2	Good	71,1	Good
Responsibility	88,9	Very good	93,3	Very good
Team Work	90	Very good	93,6	Very good

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).

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