

Testing The Feasibility of Statistical Analysis Book That Assisted with the SPSS Software

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Abstract. The purpose of this study was to test the feasibility of statistical analyze books assisted by SPSS software in order to improve students data analysis skills in applying the concept of learning Statistics with the Computer Program. This research is Research and Development. The students of the building engineering education study program who take statistics courses are the subjects of this study, while statistical analysis books are the objects of this research. Statistical analysis books will be validated by experts (media experts, material experts, and lecturers). Based on the results of the feasibility test that has been carried out, shows that this teaching materials is feasible to be developed and practically used as an effort to increase the data analysis ability of students in the field of statistics.

Keywords: Feasibility, Statsitics, Book Design

1 Introduction

Statistics plays an important role in the research, both in in modeling, formulating hypothese, and tool development and the instrumentof data collection, the preparation of research design, and sampling and in the data analysis. Statistics is a collection of methods to obtaining and analyzing data in taking conclusion by doing tests in the field of scientific so that many problems and the statement of science can be solved factually [1], [2].

Data analysis is a process or effort to process data into new information so that the characteristics of the data become easier to understand and useful for solving problems, especially those related to research. Data analysis can also be interpreted as an activity carried out to convert data from research results into new information that can be used to make conclusions. In general, data analysis is carried out to explain the data in the study so that it is easier to reach, then conclusions will be drawn. The conclusion of the analysis of the data obtained from the sample made based on hypothesis testing.

One way to help students improve their data analysis skill in statistics in analyzing research data is by utilizing various supporting software. One of the supporting software that can be used is Statistical Product and Service Solution (SPSS). SPSS is a computer application program that has high statistical analysis capabilities and a data management system in a graphical

environment using descriptive menus and simple dialog boxes so that it is easy to understand how to operate. Through the use of SPSS software, we can use almost all types of data files and use them to create reports in the form of tabulations, charts, plots of various distributions, descriptive statistics and statistical inferential analysis [3]. Through computer software, learning activities become unlimited (Fey and Heid). In other words, the potential for the use of computer technology as a medium for learning statistics is enormous. Through the use of SPSS software students can apply the concepts given in a data processing with the help of computer media to solve real problems.

The building engineering education study program of Universitas Negeri Medan has statistics as a compulsory subject that students must take. Implementation in the field of statistics has four aspects of his goals to be achieved, these are: (1) impart theoretical statistical knowledge to students; (2) provide practical skills in the form of statistical calculations; (3) provide an overview and experience of how to solve problems in everyday life based on the problems encountered; (4) train students to communicate the results of their research both in written reports and verbally [4]. It is therefore expected that students will be able to develop quantitative and qualitative information in this subject. Statistical analysis explains situations, conditions, or facts while giving meaningful conclusions.

In fact, it has been shown as a field fact that the data analysis ability of students in civil engineering courses is relatively low. Based on an analysis of student responses obtained in a data analysis competency test in which 27 students of the building engineering course at University Negeri Medan participated, it was shown to achieve an average score of student data analysis competence. The inference score is 21.25, a standard deviation of 7.01 from the ideal maximum score of 60. Student data analysis strength is 35.427%. These results suggest that the students data analysis ability is low. A student's poor data analysis skills have a dramatic impact on their learning statistics results.

Based on the observation from the learning process, interview and experience of researcher together with other lecturers as lecturers that take the subject of statistics, there are several things that are suspected of causing the low of students data analysis skill, that is one of them is the learning resources that are used, the students use textbook that has been compiled by the supporting lecturers. The textbook is dominated by the presentation of material and contain sets of procedures in which each problems take the students to one correct answer. So that the students only need to memorize the procedures that have been taught and teach exercises that are given without need to think about why they have to use the formulas or procedure to solve the problem. This causes the students experience difficulties in learning statistics at the higher target. In other words, there ihards still a lack of learning resources that are used by the students at this time.

Seeing the problems from the observations above, one solution to answer these problems is to provide teaching materials in the form of statistical analysis books assisted by SPSS software which is easy to understand as a companion book in understanding the material to be studied. It is taught in such a way that the accompanying books make the learning process smoother and more efficient and can be used for activities to strengthen memory, understand concepts, think critically and improve hard skills. [5]. The book should not only contain material but also be in the form of a collection of cases and solutions to learning problems that are often encountered in the world of education, all aimed at improving the data analysis of students in the field of

statistics. The combination of teaching materials in the form of statistical analysis books will make students able to study independently and be more active in honing their abilities in solving various problems that are learned and obtained.

According to Andi Prastowo (2014) learning materials are all materials (information, tools, and texts) that are systematically arranged and used in learning to provide a complete map of the competencies a student has acquired and to plan and carry out learning increase. He also explained in his book that the form of teaching materials is divided into 4 (four) categories, namely firstly printed teaching materials such as handouts, books, modules, worksheets, brochures, leaflets, wall charts, models or mockups, both audio teaching materials such as cassettes, radio, vinyl records and audio CD, the three audio-visual teaching materials such as video compact disks and films, and the four interactive teaching materials such as interactive compact disks [6].

Based on the descriptions and problems described above, and pursuant to the RI Higher Education Act No. 12 (2012), section 41(1) states that learning resources in higher education settings must be provided, facilitated or owned by universities in accordance with: says it won't. A study program under development. Therefore, this study was carried out in order to develop a statistical analysis book to support her SPSS software in her statistics course in order to improve her data analysis skills for analyzing research data in her civil engineering education program at the University of Medan was carried out.

2 Research Method

2.1 Research Procedure

This study is a research and development (R&D) model from the Dick and Carey model [7]. Based on the procedure to develop the Borg & Gall model inherited from the Dick and Carey model, the flowchart of the research process of the develop Statistical Analysis Book That Assisted with the SPSS Software as shown in Figure 1 is as follows.

This article only presents the feasibility of the product to be developed, so the researcher limits it only to the feasibility testing stage by experts (material experts, media experts, and lecturers). The final product of this research and development is in the form of educational materials, thus a textbook in the form of a statistical analysis book. Testing of validators' products (materials, media and speakers) acts as a tool.

The product feasibility study is done by the validator department, which means that most of the statistical analysis book is evaluated based on the results of the tests conducted by the validators of the materials and media, and lecturer of statistics. Each with a minimum of a graduate degree and at least five years of work experience as a material expert in the field of statistics, a media specialist with experience in the field of graphics and design, and a member of the teaching team in the field of statistics.

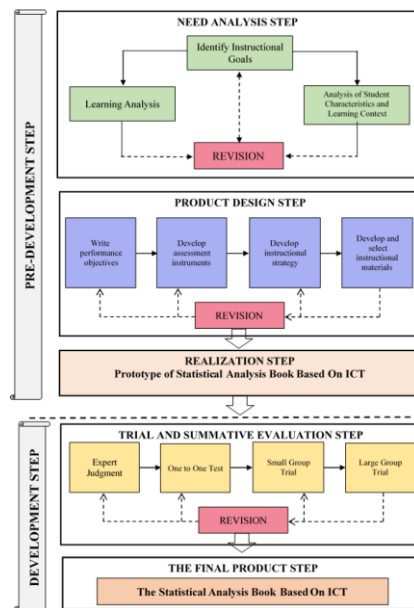


Fig 1. The procedures of research and development for the statistical analysis book

2.2 Type of Data

In empirical studies like this study, data can be either quantitative or qualitative. Words, descriptions, images, graphs, and so on are examples of qualitative data, while numbers and classes are examples of quantitative data. Statistics were used to analyze quantitative data, while ordinal numbers and classification were used to analyze qualitative data [8].

The instructor and the validator used the evaluation of the evaluation sheet to gather quantitative data [9]. The information is presented in the form of a scale with values ranging from 1 to 5, which indicate how well the product matches the evaluation sheet's description.

2.3 Research Instrument

All data on the feasibility of textbooks obtained from experts (expert judgment) use a questionnaire sheet in order to improve the textbooks that are being developed. Assessment is done by giving a score with value range 1 and maximum point 5 [10], [11]. The meaning of the point on the validity component of the statistical analysis books assisted by SPSS software is described in Table 1 below.

Table 1. Meaning of the feasibility component score of statistical analysis books assisted by SPSS software.

Point	Meaning
Point 5	Very Feasible/ Very Suitable/ Very Complete/ Very Good

Point	Meaning
Point 4	Proper/ Suitable/ Complete/ Good
Point 3	Quite Proper/ Quite Suitable/Quite Complete/ Pretty Good.
Point 2	Less Proper/ Less Suitable/ Less Complete / Not Really Good.
Point 1	Unproper/ Unsuitable/ Incomplete/ Not Good

2.4 Technique of Data Analysis

The steps used to determine the accuracy criteria of the project book are (1) information in the form of a questionnaire in the form of points obtained from the opinion of expert judgment through a score sheet consisting of 5 points as in the Table 1, (2) Information in the form of notes received by the expert through the validation form; (3) the total score obtained in the following studies was analyzed using a quantitative descriptive scoring method that describes and explains each item used.

The feasibility analysis of the Statistical Analysis Book assisted by SPSS software used the categorization of Very Feasible, Feasible, Quite Feasible, Unfeasible, and Very Unfeasible, which was obtained by determining the number of scores obtained from the respondents and then compared with the total ideal score. Giving a feasibility score like this is called the Respondent Achievement Level (TCR) formula. The TCR calculation is as follows :

$$TCR = \frac{Skor\ rata-rata}{Skor\ ideal} \times 100\% \quad (1)$$

with, TCR = Respondent's Level of Achievement

Next, the results of TCR are converted into categories of achievement levels according to Fadhilah, Z Mawardi Efendi, and Ridwan (2018) it is shown in Table 2 below to determine whether or not a research product is feasible [12].

Table 2. Criteria for the level of feasibility of learning devices

Respondent's Level of Achievement (%)	Perception Level
$80 < TCR \leq 100$	Very Feasible
$60 < TCR \leq 80$	Feasible
$40 < TCR \leq 60$	Quite Feasible
$20 < TCR \leq 40$	Unfeasible
$TCR \leq 20$	Very Unfeasible

In this study, the statistical analysis book is considered to be valid if it fulfills the qualitative criteria with a minimum of good. The ability to use a Likert scale does not allow neutral object statement. So that there are only two statements for the Likert scale, these are positive item statement and negative item statement as shown by [13] [10] in [11] and grouped in Table 3 below:

Table 3. Response category

Response Category	Category
Very Positive Attitude	Quartile 3 $\leq X \leq$ maximum score
Positive Attitude	Quartile 2 $\leq X <$ Quartile 3
Negative Attitude	Quartile 1 $\leq X <$ Quartile 2
Very Negative Attitude	minimum score $\leq X <$ Quartile 1

The minimum score that is obtained by each respondent is multiplied by the number of respondents, the Quartile 1 is the minimum total score divided by the median, the Quartile 2 is the maximum and minimum sums are divided by two, the Quartile 3 is the sum of the maximum scores divided by the median, and the maximum score obtained by each respondent multiplied by the number of respondents.

The practical information of this book of statistical analysis consists of the research data of the teacher of statistics. Before determining the implementation criteria, the minimum value, quartile 1, quartile 2, quartile 3 and the maximum value of the project book are determined. Similar to validity testing, a subject is considered viable if it meets minimum quality criteria for positive classification.

3 Result and Discussion

3.1 Composing of Statistical Analysis Book

Textbook must have a clear point of view, especially about the principles that are used, the approach that is adopted, the method that is used and the teaching techniques that are used. Textbook as filler material must present a good source of material. The arrangement is orderly, systematic, varied, and rich of information. In addition, it must have a strong appeal because it will affect student's interest to the book. Therefore, the textbook should challenge, stimulate, and support the activity and creativity of the students [14], [15].

Textbook is also called learning materials. The main criteria in the selection of learning materials are competency standards and basic competencies. It shows that the learning materials that are selected should contain learning materials that really support the achievement of competency standards and basic competencies. Textbook analysis is needed to obtain quality textbook. Textbook assessment includes aspects of the quality of book content, conformity to the curriculum, language that is used, presentation, readability, graphics, and book safety [16], [17].

Textbooks are prepared based on consideration of the initial understanding of lecturers who take Statistics courses with computer applications. Textbooks that are prepared based on the concept of data analysis skills consist of three main aspects, namely practice, repetition, and education [18].

The three main aspects of data analysis ability in the Statistics with Computer program course are described in the form: (1) Practical aspects, namely by doing project assignments at the end of each chapter in the textbook; (2) The repetition aspect, namely by doing substantial tasks from problems or cases that occur in the construction world in the field of statistics; (3) The

educational aspect is the way students follow the subject to completion or by attending a webinar course about the material that has been studied while studying in the course.

The product of teaching materials in the form of the textbooks in the form of statistical analysis assisted by SPSS software that consists of 6 chapters are: (1) introduction; (2) descriptive analysis; (3) testing requirements analysis; (4) comparative analysis; (5) correlation analysis, and (6) non parametric analysis. The form of the display of the textbook is as shown in the Figure 2 below:



Fig. 2. The cover front and back view of statistical analysis book

The Statistical Analysis book format consists of a series of four-part presentations. This is the first part of the learning concept. This study plan gives students an overview of what they will learn in each chapter. The learning concept consists of her performance in this learning subject, partial performance in this learning subject, performance indicators, and goals in this learning. The second half is learning material. This study material provides theoretical study and application examples aimed at building a foundation for the theoretical concepts that students will learn to understand. The third part is the summary, which serves as a review of what the student has learned. Part 4 is a project task containing questions about the material learned, with the goal of developing a scientific disposition (data analysis skills) from what you have learned so that you can find and measure them.

3.2 Feasibility and Practicality of Statistical Analysis Book

This project book will be verified by two expert verifiers. These are material experts and media experts, lecturers as practitioners. The material expert validators are 3 (three) statistics experts, the media expert validators are 3 graphic design experts, and the practitioner validators are selected by the instructors of the target team.

Feasibility of Material Expert. Material feasibility studies are conducted by experts in the statistical field. This proof-of-concept uses a questionnaire to verify the validation of the completed product in the survey column. This validation questionnaire is taken from the reference of BNSP [19]. The material expert's feasibility aspects are as follows, he consists of three aspects. (1) the content of the feasibility aspect; (2) the feasibility aspect of the presentation; (3) language feasibility issues; Validation results are performed by three validators, as shown in Figure 3 below.

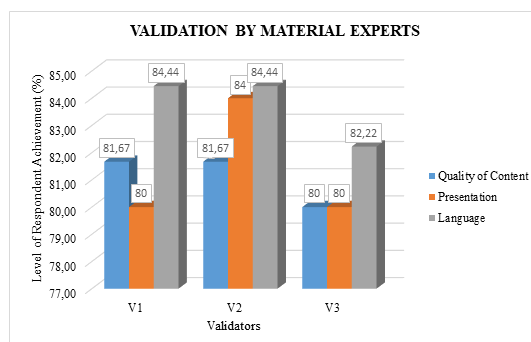


Fig. 3. The results of the validation by material expert

The Respondent achievement results, shown in Figure 3 above, show that Validator 1 scored 81.67%, 80%, and 84.44% on average for the aspects of content quality, presentation, and language, respectively. Data 2 had an average score of 81.67% respectively. , 84% and 84.44%. In addition, the average scores of the three validators for content quality, expression, and language are 80%, 80%, and 82.22%, respectively. , this value transformed in Table 3 yields a very practical category. From the score results (Figure 3), we can conclude that the draft of the Book of Statistical Analysis has been declared suitable for use in statistical education, although some points need to be corrected. Comments and suggestions from her three material expert verifiers on the statistical analysis design are shown in Table 4 below.

Table 4. Comments and suggestions from the validators of material expert about the draft of statistical analysis book

Validator	Comment
Validator 1	1. To be clearer, the pictures need to be enlarged and made in color so that they are clearer and more attractive 2. Some pictures and tables still lack explanation
Validator 2	1. Some table/figure numbers are not referenced in the tex 2. For test materials, analysis requirements need to be added
Validator 3	1. For the given Case to be more concrete

Feasibility of Media Expert. A feasibility study will be conducted by experts in the field of graphic design. This proof-of-concept uses a questionnaire to verify the validation of the product completed in the assessment rubric. This validation questionnaire is taken from the reference from BNSP [14]. The material expert's viability aspect consists of three aspects of him: (1) Aspects of book size. (2) The design aspect of the book cover. (3) the design aspects of the book content; The results of the validations performed by the two validators are shown in Figure 4 below.

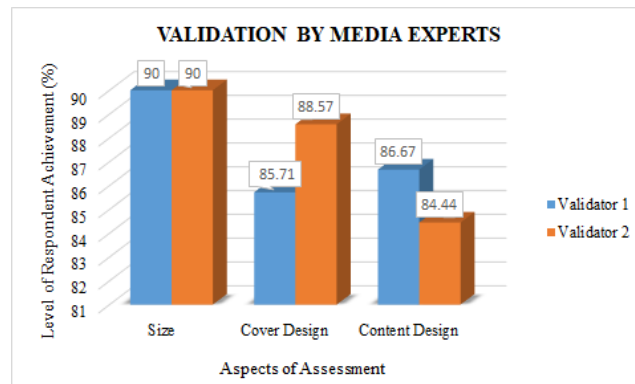


Fig. 4. The results of the validation by mediaexpert

According to the respondent achievement results shown in Figure 4 above, Validator 1's average scores for book size, book cover design, and book content design were 90%, 85.71%, and 86.67%, respectively, while Validator The average scores for 2 were 90% and 88.57%, respectively. and 84.44%. So when we combine and average the average validator scores, we get a score of 86.30%, and converting that score into Table 3 gives us a very useful category. From the score results (Figure 4), we can conclude that the draft of the Book of Statistical Analysis has been declared suitable for use in statistical education, although some elements need to be corrected. Comments and suggestions from her two media expert validators on the draft statistical analysis are shown in Table 5 below.

Tabel 5. Comments and suggestions from the validators of media expert about the draft of statistical analysis book

Validator	Comment
Validator 1	The color gradation on the cover is softer and avoids character variations
Validator 2	Color choices are designed to be as comfortable as possible, as they can affect the quality of learning

Practicality of Lecturer as User. A feasibility check for practical application is carried out by a team lecturer in the field of statistics. This testing is conducted to ensure that the materials produced are actually used and applied, implemented at an appropriate level, and practical. This test uses a questionnaire with scoring rubrics from the BNSP [19] reference. Aspects of this internship he consists of three aspects. (1) Material sides. (2) the presentation aspect; (3) the linguistics aspect. The results of the responses are displayed in the form of graphs as shown in Figure 5 below.

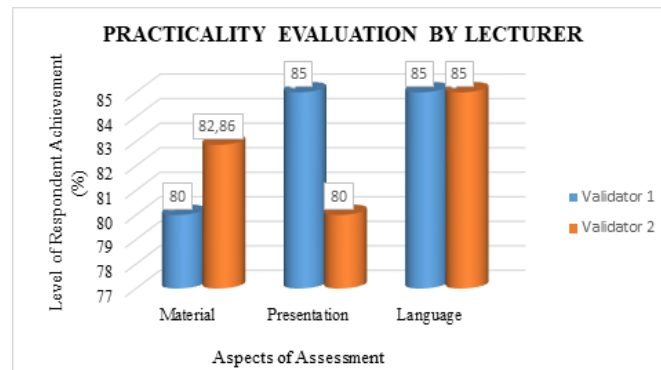


Fig. 5. The results of the practicality evaluation by lecturer

According to the respondent achievement results shown in Figure 5 above, Validator 1 averaged 80%, 85%, and 85% in material, presentation, and linguistics, respectively, and Validator 2 averaged 82.86% each, 80.57% and 85%. Therefore, if we combine and average the average validator scores, we get a score of 82.27%.

The total scores were then converted into Table 3 and given values for the positive attitude category (minimum = 22, maximum = 110, Q2 = 66, Q1 = 44.5, and Q3 = 88). Teaching materials can be developed from his three feasibility tests performed by three validators (media, teaching materials, practicality). Statistical Analysis books supported by SPSS software can be used by students to learn scientific data analysis skills in the field of statistics. It has been established that the use of learning media in textbook form must be practical and engaging [20]. It is also explained that if the presentation is interesting and comprehensible to the students, it can facilitate learning, so the text should also contain concrete examples [21]. It makes more sense that data analysis capabilities can be considered as the first basis for entry into the world of construction in the field of statistics [22].

4 Conclusion

The statistical analysis book of statistics that is assisted by the SPSS software that was developed meets the criteria for use in statistical learning to be used in order to improve students data analysis skills which are the learning outcomes to be achieved after the statistics lesson in class ends, indicated by expert judgments (material experts and media experts) and lecturer. In addition, the project analysis book was very accurate and practical, it can continue to be effective through some variables.

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