

## DEVELOPMENT TEACHING MATERIALS OF MATHEMATICS BASIC CONCEPTS BASED ON INTERNALIZATION OF ISLAMIC VALUE TO INCREASING CONCEPT UNDERSTANDING ABILITY

Oleh:

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### ABSTRACT

Understanding the correct concepts can avoid misconceptions in basic mathematical material. There is still a mathematical misconception among PGSD students due to the low understanding of the concept. Lecturing the basic mathematical concepts as a subject that must be taken by PGSD students can be done by internalizing Islamic values in it. The concepts in mathematics are full of the values they contain including Islamic values. Therefore, it is necessary to have teaching materials on the basic concepts of mathematics based on the internalization of Islamic values. This study aims at 1) to determine the characteristics of teaching materials on the basic concepts of mathematics based on the internalization of Islamic values, 2) to improve understanding of mathematical concepts through learning with teaching materials on the basic concepts of mathematics based on the internalization of Islamic values. This research is a development research. Analysis of the data used included the validity analysis of teaching materials, analysis of practicality of teaching materials, analysis of the effectiveness of teaching materials, descriptive statistics, and Gain normalization tests. Improving the understanding of student mathematical concepts can be seen in the average score of 61.54 pretest and the post-test average score of 85.41. From the normalized gain test calculation shows an increase of 0.62 in the medium category. From the results of the study it is expected that the teaching materials of the basic concepts of mathematics based on the internalization of Islamic values can be applied in learning through various learning innovations with student centered.

**Keywords:** *Teaching materials of mathematics basic concepts in Elementary, Internalization of Islamic values, concept understanding Ability.*

### Introduction

On the subject The basic concepts of elementary mathematics will be studied several important concepts about mathematical material. It is expected that students do not have the wrong concept as their provision when they will teach later. In addition to that goal, in the affective realm the basic concepts of elementary mathematics can be developed in several characters such as discipline, hard work, responsibility and others. Understanding the correct concepts in students will avoid misconceptions in basic mathematical material. Understanding Mathematical concepts are thoughts in understanding mathematical concepts so that he can

restate the concept, classify objects according to certain characteristics, provide examples and not examples of concepts, present concepts in mathematical representation, use certain procedures and apply concepts to problem solving in the process of learning mathematics ( Mawaddah & Maryanti, 2016: 79). So important is the understanding of concepts in mathematics learning, which these abilities need to be possessed by prospective teachers.

According to Sardiman AM (1996: 42 - 43). Comprehension can be interpreted as mastering something with thoughts. Because learning means having to understand mentally the meaning and philosophy, intentions and implications and applications, causing students to understand a situation. Understanding the meaning / capture of meaning is the ultimate goal of each study.

Polya (in Sumarmo, 2005) suggests four levels of understanding namely mechanical understanding, inductive understanding, rational understanding, and intuitive understanding. Mechanical understanding, if students can remember, apply formulas routinely and calculate them simply. Inductive understanding, if you can apply formulas or concepts in simple cases or in similar cases. Rational understanding, if it can prove the truth of a formula and theorem. Intuitive understanding, if you can predict the truth with certainty before further analysis.

Not only concepts in mathematics are full of the values they contain. Mathematics and Islam are not two different things. However, mathematics and Islam are two things that are mutually integrated. In Islamic teachings, very much contains the concept of numbers. Like reciting prayers, calculating zakat, inheritance (faraidl) and so on. In mathematics it also contains Islamic values. For example, the concept of mathematical logic turns out to be contained in Surat Al-Ashr and so on. Therefore, it is very logical if mathematics learning is associated with Islamic values. This is according to what was conveyed by Abdussakir (2017) that the application of affective mathematical domains requires the internalization of values to students including the values of faith and goodness through a strategy of internalizing Islamic values.

Internalizing positive values in mathematics learning is not something new. The affective domain of mathematics learning requires the internalization of values to students. The study related to the internalization of Islamic values in mathematics

learning was carried out by Abdussakir (2005,2006,2007,2009). He began trying to introduce the concepts of mathematical and Islamic integration and internalizing Islamic values through analogies and interpretations of mathematical concepts. Kohar (2010) discusses mathematical learning formulas that integrate Islamic values. Kurniati (2015) tries to offer ways of learning mathematics integrated with Islam to instill Islamic values. La Jaama (2015) tried to internalize the value of the truth of intentions and ways and sincerity through analogy. Nihayati (2017) tries to integrate Islamic values through set learning.

Lectures will run smoothly, of course, teaching materials are needed as a reference. However, teaching materials on the basic concepts of elementary mathematics are outstanding and there are still present mathematical concepts. Teaching materials that are integrated with Islamic values are not yet available in the market. Therefore, it is necessary to develop teaching materials on the basic concepts of elementary mathematics based on the internalization of Islamic values. Based on this background, this research was conducted by developing teaching materials on the basic concepts of mathematics in the nuances of internalizing Islam to improve understanding of mathematical concepts. On the basis of the description above, the main problems in this study that were formulated were: 1) What are the characteristics of teaching materials on the basic concepts of mathematics based on the internalization of Islamic values? and 2) Is learning using teaching materials the basic concepts of mathematics based on the internalization of Islamic values can improve students' mathematical concept comprehension abilities? The purpose of this study was to determine the characteristics of the Teaching Material Basic Concepts of Mathematics Based on the Internalization of Islamic Values and to improve understanding of mathematical concepts through learning with Teaching Materials Basic Concepts of Mathematics Based on Internalization of Islamic Values.

### **Research methods**

The research conducted is using the Research and Development (R & D) model (development research). Development research method is a research method used to produce certain products, and test the effectiveness of certain products. This study aims to produce new products through the process of developing research, and each product produced requires different research procedures, (Sugiyono, 2008;

Mulyatiningsih, 2012). In this study a teaching material will be developed on the subject of elementary elementary mathematics concepts based on the internalization of Islamic values, so as to improve understanding of the mathematical concepts of PGSD students.

In this research the steps taken are 1) Preliminary Study, at this stage field studies and literature studies are conducted. Field studies are conducted to find out the problems that occur in lectures on elementary elementary school concepts. Collection of field data relating to teaching materials, students' initial responses to courses. Literature study was conducted to find out the exact solution of the problems obtained through field studies. 2) Development phase. In the literature study carried out, a solution will be developed to be developed, namely teaching materials for elementary concepts of elementary mathematics with the internalization of Islamic values. After being developed as needed, the teaching materials were tested validally by experts, by using the teaching material validation sheet with predetermined criteria. After that it is evaluated and revised, then the teaching materials are tested on a small or limited scale. After that it is re-evaluated and refined, the last stage of this development is a hypothetical model or teaching material product as a temporary solution to the existing problem. 3) Validation Phase. At this stage consists of the application of teaching materials basic concepts of elementary mathematics with the internalization of large-scale Islamic values. The application is obtained that there is an increase in the ability to understand concepts and religious attitudes with teaching materials elementary elementary concepts of mathematics with the internalization of Islamic values. So the product applied is already the final product of this development research.

In product testing there are stages of developing teaching materials including: 1) Validation of Teaching Material Products where teaching materials are validated by the validator (Expert). When validating, the validator provides suggestions and comments regarding the aspects and criteria for teaching materials directly on the teaching material validation sheet. 2) Limited Trial (small group). In the implementation of the limited plan, the plan was carried out by involving 5 first semester students of the PGSD UNISSULA. This step was carried out to prove the validity and effectiveness in the field, then provide student response questionnaires

and provide tests to find out important findings, responses to progress made by students. 3) Extensive Trial. At this stage, the results of a limited trial were evaluated and revised teaching materials as needed, then a broad trial was conducted on all first semester students of the PGSD UNISSULA. This trial design was used to test teaching materials developed in the form of teaching materials for elementary elementary school concepts with the internalization of Islamic values. According to Sugiyono (2009: 76). Research design to test products developed using Pretest design - Posttest Control Desig. This research will be conducted in semester 1 of PGSD students in a private university in Central Java 2018/2019 academic year. The instruments used in this study are 1) interview guide, used to interview lecturers and students. This interview was conducted to find out the initial data relating to the potential and problems that occurred in the school. 2) Concept Understanding Test Questions. This test is to find out the completeness of students in the cognitive domain. Conducted to find out the understanding of students, the test instrument in the form of multiple choice questions and descriptions. 3) Questionnaire sheets, consisting of questionnaires validation of teaching materials used to determine the validity of teaching materials elementary mathematical concepts with the internalization of Islamic values through expert validators. And student response questionnaire sheets, lecturer response questionnaires were also used to determine student responses and lecturers' responses after the implementation of learning using teaching materials elementary elementary mathematics concepts with the internalization of Islamic values.

Analysis of the data used in this study is descriptive statistics, namely calculating the results of tests of understanding concepts from beginning and end, calculating class average values, calculating the middle value (median), calculating the value of many frequencies (mode), and calculating completeness. While an increase in understanding concept analysis is calculated using normalized gain test. Valid and practical data analysis was also used in this study. The validator will give the results of the assessment of the teaching material which consists of several categories, according to the rubric of each indicator that the researcher has made. The validation sheet contains data that is the assessment of each validator on the teaching material analyzed based on the average score. The average score of each

validation is calculated by means of a score equal to the number of validator scores in each aspect divided by the number of assessment aspects, with the criteria that the learning device is said to be valid if the average score of each device is in good or excellent category . Practical analysis by calculating the analysis of the level of ability to manage learning. In order for the level of ability to manage learning to be known in managing learning from several meetings, the observational data was analyzed. Analysis of the ability data in managing learning observed by an observer, was analyzed using descriptive statistics by calculating the average value of each aspect observed in managing learning. The ability to manage learning is said to be good if every aspect that is considered to be in a minimal aspect is good.

The analysis of the results of the conceptual study consists of 1) Calculating the value of conceptual understanding. Understanding of mathematical concepts can be known by calculating the results of each test both from pretest and posttest, while to calculate the value, use the formula to compare the scores obtained with the maximum score multiplied by 100. 2) Calculate the grade average. The average value of the class is used to determine the level of understanding of the concept of students as a whole based on the results of the pretest and posttest each cycle carried out. The results of the class average values can be known by using the average calculation formula in general. 3) Calculate the median value. The Central Value (Median) is used to find out the mean value of the overall student score based on the results of the pretest and posttest in each cycle carried out. 4) Calculating Many Frequency Values (Modes). Many Frequency Values (Mode) are used to find out the value that often arises or the value most often obtained from the overall value based on the results of the pretest and posttest in each cycle carried out. 5) Calculating completeness. Overall Student Learning Completeness is used to determine the overall completeness of learning based on the results of the pretest and posttest in each cycle carried out. 5) Concept Understanding Capability Analysis. This analysis to determine the increase in concept comprehension ability, can be calculated using normalized gain test. The magnitude of the increase before and after learning is calculated by the normalized gain formula.

## **Results And Discussion**

Teaching materials are validated by validators (experts). Validation of selected experts is from the Lecturers. The three experts were chosen because they are experts in their respective fields that are closely related to the development of teaching materials to be developed. Experts consist of lecturers of Islamic Education who can validate by giving suggestions related to Islamic values that exist in teaching materials then lecturers of basic mathematical concepts in PGSD study programs are expected to be able to validate and provide suggestions related to the material of mathematical concepts. And experts who have experience in making teaching materials, with several studies made on teaching materials in the form of books, comics, and other teaching materials innovations. So that it is expected to be able to provide input or suggestions regarding how good and appropriate teaching materials will be developed in this study.

Suggestions and comments from the validator are used as references in improving teaching materials that are being developed. From the results of the evaluation of the validator the average results of the validation obtained a score of 3.87 means that it is included in the criteria of good. While the conclusions of each validator are almost the same, namely valid with revisions according to suggestions and comments. So that the instructional materials developed are valid and have been corrected according to the validator's suggestions.

Limited or small group trials were carried out by involving 3 students in the elementary mathematics concepts of elementary school in the PGSD study program. In this limited trial, only a few meetings were held. Students receive learning using developed teaching materials. After that, they were given a student response questionnaire regarding learning. And the comment sheet is related to the teaching materials developed. The results of the questionnaire responses of students in this limited trial obtained a score of 4.63 on excellent criteria. Suggestions and comments from the results of limited-scale trials remain as repairs before they are tested on a wide scale. Thus on a limited scale, teaching materials can be used properly. So that it can be used on a large group scale.

Based on the results of expert validation and the results of limited scale trials, the developed teaching materials were revised again and carried out improvements according to suggestions and input. After repairs, the next process is carried out,

namely a large-scale trial. In this trial conducted in the first semester of the lecture on elementary elementary school concepts. This trial was conducted in several meetings so that several chapters on teaching materials were delivered to the lecture to the fullest.

Whereas the ability to understand mathematical concepts. The results of descriptive statistical data based on posttest data given after lecturing the basic concepts of mathematics using teaching materials based on the internalization of Islamic values obtained results show that the average score for each understanding of mathematical concepts that have been given in posttest or after lecturing elementary elementary school concepts with using instructional materials based on the interpretation of Islamic Values reaching a value of 85.41, which shows the average value in the high or very good category. Likewise, other descriptive statistical results are median and mode on the digits 86.43 and 88, 57 which are also very high gains and are included in the criteria very well. However, the variance of the data on the conceptual understanding value is obtained quite high at number 25.17, indicating that there is still an uneven distribution of data, meaning that the acquisition in one class is uneven. But there is a high level of inequality, in that class there are still students who get low scores but some have reached quite high scores. More clearly can be seen in the minimum value obtained is 74.29 and the highest value obtained value of 92.86 so it is clear that the data deviation is still quite high. Nevertheless the value of understanding the concept has met the criteria because it has reached the indicator of success. So that the developed teaching materials can improve students' understanding of mathematical concepts.

This teaching material has different characteristics than other teaching materials. Namely the internalization of Islamic values. In each chapter in the teaching material, the ayat Al quran is included which is related to the material and is related to the material. The link is viewed in terms of sociological and philosophical. There are moral values that are conveyed. Al-Qur'an as a view of the life of Muslims, of course, becomes a guideline for Muslims. The Qur'an contains all science and technology, but not many know it. Therefore, this teaching material presents the relation of mathematical concepts to the verses of the Qur'an. With the development

of teaching materials it becomes the best reference and reference material in conducting lectures with Islamic culture.

The hope is that this teaching material can make students have strong faith, because mathematical concepts are learned and scientifically proven and implicit in the religious teachings that they believe will make students have guidelines and instructions in their lives so that they can produce behavior that is commendable as similar research done by Hanif et al (2016: 2163) in the field of science.

Understanding of mathematical concepts is still a basic problem in the lectures on Elementary Elementary Mathematics, because this course is found in semester 1 where students are new students. In addition, their basic background with different high school education also influences the understanding of mathematical concepts. The understanding they have had is that there are still things that are wrong or are said to be misconceptions. Teaching materials developed are certainly expected to improve the value of student learning outcomes for the better. To measure this, the researcher gave the pretest and posttest. Pretests are given before learning with teaching materials based on the internalization of Islamic values. The content of the pretest includes 7 indicators of understanding the concept. The pretest results showed that the understanding of students' concepts of mathematics material was still low. It is seen that the average pretest is 61, 54 is still relatively low.

A supportive learning atmosphere is needed in learning (Ulia, N. 2018: 1). Therefore, in the lecture an Islamic atmosphere was formed in accordance with the teaching materials developed. That is to do learning with teaching materials based on the internalization of Islamic values. In learning, the lecturer conveys the concept through a moral message or connection with the verse of the Qur'an. This makes students better understand the real concept. After learning at the end of the lecture the postes were given about the ability to understand mathematical concepts. There are significant results between pretest and posttest as presented in Table 4.3 below.

**Table 4.3 Percentage of Concept Understanding**

No	Indicator	Pretest (%)	Postes (%)
1	Defines concepts verbally and in writing	61,32%	81,05%
2	Identify, make examples and not examples	53,42%	72,11%
3	Use models, diagrams, and symbols to present a concept	63,16%	91,05%
4	Change a form of presentation into another form	61,05%	87,63%
5	Get to know the various meanings and interpretations of concepts	62,63%	88,16%
6	Identify the characteristics of a concept and recognize the conditions that determine a concept	68,68%	85,79%
7	Compare and distinguish concepts	60,53%	92,11%
<b>Average of score</b>		61,54%	85,41%
<b>criteria</b>		enaugh	Very good

Based on Table 4.3 above, it can be seen that there are significant differences between pretest and posttest understanding of concepts. Based on the normalized gain test calculation, the score of 0.621 is included in the medium category. This means that the increase in understanding of concepts that occur because learning uses teaching materials the basic concepts of mathematics based on the internalization of Islamic values has been significant but is still classified as moderate.

Based on the above conclusions, the following suggestions can be given. The teaching materials that should be developed should not only be related to the verses of the Qur'an but more broadly such as loading hadith chunks, Islamic exemplary stories or even taking yellow book references / salaf books. So that the internalization of Islam related to the material of mathematical concepts gives more new knowledge. In order to improve the ability to understand concepts, the instructional materials that have been developed are good. But learning innovations need to be implemented. So learning is more interesting. Therefore, in the preparation of RPP the use of teaching materials basic concepts of mathematics based on the internalization of Islamic values combined with innovative and varied learning models.

## Conclusion

Based on the results of the research and discussion it can be concluded as berikut.

1. Teaching materials basic concepts of mathematics based on the internalization of Islamic values are teaching materials that are very necessary for lecturers and students. Teaching materials developed develop links to the verses of the Qur'an with the material of mathematical concepts that are packaged in such a way as to give related moral messages. Teaching materials have been tested for validity and practicality with valid and practical results based on expert validation tests and student response questionnaires.
2. Learning using Teaching Materials Basic Concepts of Mathematics Based on Internalization of Islamic Values can improve the understanding of mathematical concepts of UNISSULA PGSD students seen in the average results of the mathematical concept of comprehension 61.54 and the average mathematical concepts of 85 postural comprehension abilities. 41. From the normalized gain test calculation shows an increase of 0.62 in the medium category. And it can be seen that each concept understanding indicator experienced a significant increase.

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