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Effectiveness of Use of Islamic Integrated Mathematics LKPD Using A Scientific Approach to Prepare Students for KSM

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Abstract: This research aims to determine the level of effectiveness of the Islamic Integrated Mathematics Student Worksheet (LKPD) Using a Scientific Approach to Prepare Students for KSM Events, especially on fraction material for class VII students at MTs NU Raden Rahmat . This research is development research (*Research and Development*) using the 4D model and consists of 4 development stages, namely: the definition stage (*define*), the design stage (*design*), the development stage (*develop*), and the dissemination stage (*disseminate*) . At the development stage, a validation process and effectiveness test are carried out. The validity test was given to MTs mathematics teacher Raden Rahmat . At this stage, revisions are also carried out to produce valid media. This effectiveness test was carried out in class VII MTs NU Raden Rahmat using a research trial using a research instrument on the effectiveness of using LKPD. At the distribution stage, product trials were carried out and then KSM practice questions were given. The results of the development research show that the Islamic Integrated Mathematics LKPD Using a Scientific Approach to Prepare Students for KSM Events is included in the valid category as seen from the validity test score with an average value of 4.01. This LKPD is also considered effective as seen from the results of the effectiveness test with the effectiveness achievement score: From the response questionnaire, students obtained a score of 4.1 so it is classified as effective. Student activities in the learning process are effective with an average score of 3.95. The learning outcomes of MTs NU Raden Rahmat students are classified as effective with an average score of 4.6, with the average student achieving a minimum completion score of 75 with a percentage of 81%. From the KSM practice questions provided which consist of 10 questions, 70% of students can do the practice questions so that the LKP D can be used to prepare students for the KSM event.

Keywords: Effectiveness, Development Research, Islamic Integrated Student Worksheet (LKPD), KSM

Introduction

Mathematics is a branch of exact science, which includes the study of several topics such as shapes, numbers, shapes and spaces, formulas and related structures, and quantities and their changes. According to Hudojo (2005: 37) Mathematics is a tool for developing ways of thinking. Mathematics is one of the subjects that must be taken at several levels of education, starting from elementary school (SD) to high school (SMA). Therefore, an effective and quality Mathematics learning mechanism is an undeniable necessity so that the material or understanding of Mathematics concepts can be mastered by students both in the learning process and in solving a Mathematics problem. Mathematics learning does not only emphasize the ability to calculate, but also requires being able to master abstract mathematical concepts (Ibrahim and Suparni, 2008: 121).

Based on an interview on September 19 2023 with Mts NU teacher Raden Rahmat, it is known that the curriculum used is an independent curriculum because with this curriculum students are required and trained to think imaginatively, innovatively and responsively. A problem can be solved by training students to think logically. On the subject of association, sometimes educators use discussion methods assisted by LKPD to enable students to carry out activities dynamically and independently in learning and to help direct students in interpreting the knowledge they have learned to

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discover a mathematical concept or solve a problem.

student activity sheets are sheets containing tasks that must be carried out by students. Furthermore, Prastowo (2011: 204) stated in more detail that LKPD is printed teaching material in the form of sheets of paper containing material, summaries and instructions for implementing learning tasks that must be carried out by students which refer to the basic competencies that must be achieved.

Hosnan (2014 : 35) explains that a scientific approach is very relevant by using three leading learning theories, namely Bruner's theory, Piaget's theory and Vygotsky's theory. Bruner's learning theory, which is also called discovery learning theory, states that through the process of discovery, students will gain intellectual satisfaction and will strengthen their memory. Piaget's learning theory states that learning is related to the formation and development of schemas as a result of adaptation. Vygotsky's theory states that learning occurs when students learn to handle the tasks being studied but these tasks are still within the range of students' abilities. This is the reason why a scientific approach must be applied at every level of education in Indonesia.

In reality, Mathematics learning is usually carried out partially, not as an integrated part of other subjects, including Islamic Religious Education (Salafudin, 2015). Therefore, a mathematics learning formula is needed that integrates Islamic values in school mathematics topics (Kohar, 2012). The integration of Islamic values in Mathematics should be carried out thoroughly in Mathematics material at all levels of education (Kurniati, 2015, Mohd Amin, Yusof, & Haneef, 2010).

Every area of human life cannot be separated from Mathematics, therefore in Islam Mathematics is very important so that even in religious practice Muslims are introduced and required to understand Mathematics. According to (Mifetwil Jandra, 2022): "Allah created Mathematics as a language in the universe. For this reason, it is necessary for a Muslim to master Mathematics. Basically, if we want to have a dialogue with a nation, whether humans or animals, then master the language. Likewise, if we want to dialogue, understand or comprehend the Kauniyah verses, namely the universe, the universe and its contents, then the language we must master is Mathematics."
We can see in QS. Al-Kahf verse 25 which reads:

وَلَبِثُوْا فِيْ كَهْفِهِمْ ثَلٰثَ مِاۤئَةٍ سِنِيْنَ وَازْدَادُوْا تِسْعًا

Meaning: "And they lived in the cave for three hundred years plus nine years."

Based on this verse, it can be explained that the concept of Mathematics has been stated in the Al-Qur'an both directly and indirectly, and then the concept of Mathematics was developed by Muslim scientists, giving birth to branches of Mathematics which are applied in human life. Thus, it would be a lie to say that Mathematics is not related to the Koran. Because several studies have revealed that Mathematics is a science that cannot be separated from nature and religion, all the truth can be seen in the Koran.

The aim of this research is to determine the level of effectiveness of the Islamic Integrated Mathematics Student Worksheet (LKPD) Using a Scientific Approach to Prepare Students for KSM Events, especially on fraction material for class VII students at MTs NU Raden Rahmat

Materials and Methods

This research is a type of *Research* and Development research . This development research procedure was adapted from a development procedure using the 4-D Model which contains 4 stages, namely *define* (definition), *design* (design), *develop* (development) , *disseminate* (spread) (Thiagarajan in Lestari, 2018).
The 4D model which contains 4 development stages can be described as follows:

a. *Define* (Definition Stage)

This stage aims to validate and describe learning needs by analyzing the objectives and limitations of the material. At the *define stage* , the initial problem in the field is understood which is the basis and research needs to be carried out as a solution to a problem. Then analyze the

characteristics of the students, determine the KD and details of the learning material, arrange the tasks carried out by the students, and describe the learning objectives. At this stage, researchers conducted research at MTs NU Raden Rahmat Pasuruan with a sample of 15 class VII students in the odd semester.

b. *Design* (Design Stage)

This stage aims to design learning tools, the steps in the design stage are: identifying the tests that will be used, selecting the media to be used, determining the media development format, and creating an initial design of learning media that is adapted from the results of the *define stage.*

c. *Develop* (Development Stage)

This stage aims to produce learning tools that have been revised based on input from validators and data obtained from field trials. At the *develop stage* , an expert assessment is carried out with validation by the validator and product revisions according to the validator's suggestions. The development subjects were validators or experts, namely 2 MTs Nu Raden Rahmat teachers and 1 practitioner teacher.

d. *Disseminate* (Spreading Stage)

This stage aims to disseminate research products so that they can be utilized by parties who need them. At the disseminate stage , the research results are published through appropriate journal publication media.

The instrument used by researchers is the LKPD effectiveness sheet. This LKPD effectiveness sheet aims to determine the level of effectiveness of the LKPD being developed. The data collection technique used is in the form of a questionnaire or often called a questionnaire. A questionnaire is a technique for collecting data by asking several questions to sources or respondents (Herlina, 2019). The questionnaire in this research is a validation sheet assessed by experts in the field of mathematics and a student response questionnaire. There are 2 types of validation, namely, media expert validation and material expert validation. After the validation process is carried out, a trial process is carried out to determine the impact before and after treatment is given.

Then the data analysis process is carried out from the validator on mathematics learning media. The results of the validation study are used to improve mathematics learning media. The data analysis technique in this research is quantitative data analysis. The formula and criteria used in analyzing LKPD with a scientific approach can be seen in the following formula:

$$Va = \frac{TSe}{TSh} \times 100\%$$

Information:
Va: Validate every aspect of the product
TSe: Total score
TSh: The maximum possible score obtained

Media is said to be valid if the average percentage of product validation for each aspect gets an average score of > 75% (Akbar, 2013). Learning media is said to be effective if the media used is valid and appropriate.

Results and Discussion

Based on the research method, the results of this research consist of 4 stages, namely *define, design, develop, disseminate* (Thiagarajan in Lestari, 2018). Where at the *define stage* , an initial analysis process is carried out to find out the problems that exist in the school. At the definition stage, it was found that MTs Nu Raden Rahmat was a foundation that implemented an independent curriculum . Adapting KD to existing problems in class is one of the references for researchers to select and develop material. One of the materials that is a problem at school is geometry. Geometry is a branch of mathematics and is one of the learning materials in mathematics in elementary school. Geometry is closely related to the formation of abstract concepts. This learning cannot only be done by transferring knowledge or lectures, but must be done by forming concepts through a series of activities carried out directly by students (Nurhasanah et al., 2017). In studying geometry, students need a mature concept so that students are able to apply their geometric skills such as visualizing, recognizing various flat shapes and spaces, describing images, sketching shapes, labeling

certain points, and the ability to recognize the differences and similarities between shapes. geometry (Muhassanah et al., 2014).

define process becomes a reference for the next research process, namely the *design process* at the design stage, which at this stage is adapted to the *define stage.* This process is carried out by preparing material, practicing questions and the form of the LKPD being developed. The LKPD is first arranged in word form and then arranged in Canva form to make it more attractive. The following are the results of the LKPD that was developed:

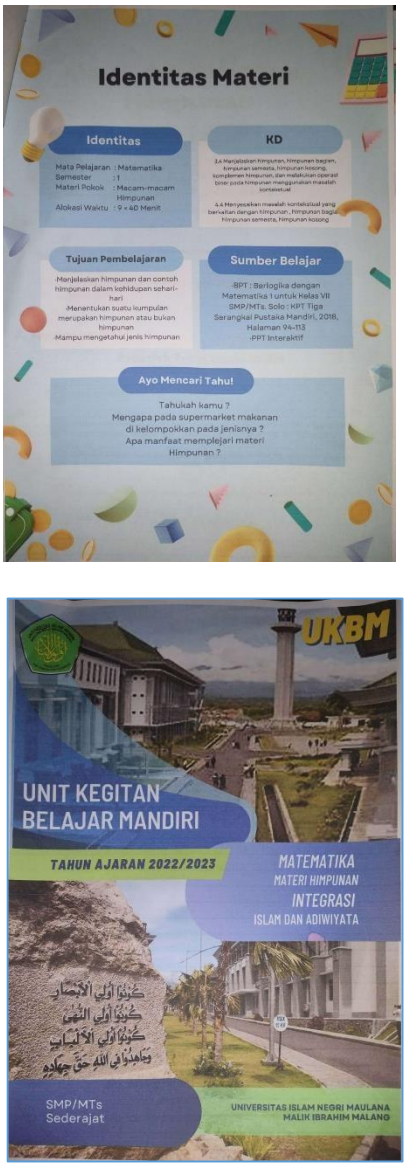

Figure 1 . LKPD used

The LKPD contains material on integration with Islamic values, one example is integration related to the meaning of water from two tanks in a tank. bath with a block volume adjusted to the size of the two bowls for purification. Apart from that, there are several KSM practice questions given in the LKPD. KSM question practice is given with the aim of facilitating students in practicing KSM questions. The next stage is *the development stage.* At the development stage, several processes are carried out, namely validation, practice and trial processes.

a. Validation

The first validation was carried out by a material expert, from the assessment by the material expert , the validation process obtained a validation value of 90,62%this amount which can be seen from the assessment results using the formula:

$$Va = \frac{145}{160} \times 100\% = 90{,}62\%$$

So based on the results of the material expert validation assessment with the assessment criteria "very valid". Apart from that, comments from material expert validators become a reference for the revision process of the LKPD being developed. The following are comments from material expert validators:

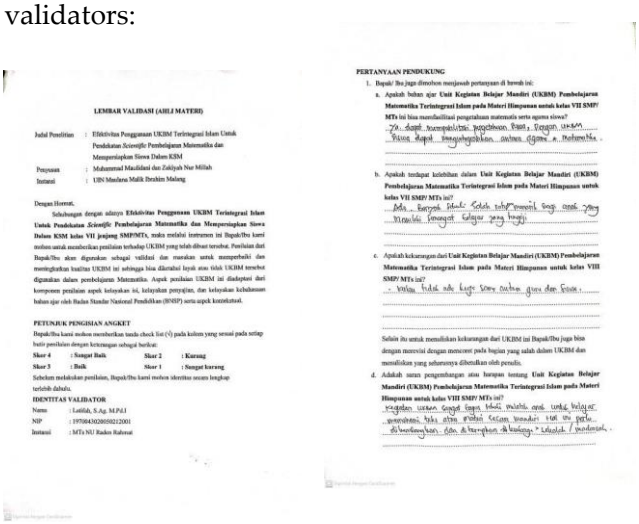

Figure 2. Material expert validator comments .

The second validation was carried out by a media expert validator, from the assessment by the media expert the validation process obtained a validation value of 90,17% This can be seen from the assessment results using the formula:

$$Va = \frac{101}{112} \times 100\% = 90{,}17\%$$

So based on the results of the material expert validation assessment with the assessment criteria "very valid". Apart from that, comments from material expert validators become a reference for the LKPD revision process developed. The following is a comment from a media expert validator:

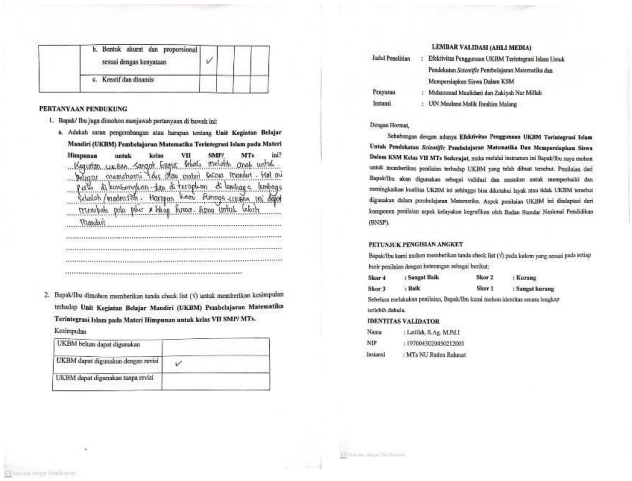

Figure 3 . Media expert validator comments .

Therefore, it can be concluded that the Islamic Integrated Mathematics LKPD Using a Scientific Approach is valid to be given to students.

Validation of LKPD is carried out by administering a validity assessment questionnaire which is given to the validator. The validator consists of two validators, namely learning media experts and material experts. The purpose of this validation process is to find out the shortcomings of the LKPD. Any deficiencies in the validity test results will be used as a reference for the revision process. Validation also shows whether the learning media is suitable for use or not . This is in line with the opinion of Maulidani (2023) in his research explaining that integrative learning media is valid and practical to be given to students. Apart from this, integrative learning media can facilitate students' mathematical literacy (Maulidani et al., 2023) . The next process is a practitioner test where the researcher gives this to find out that the LKPD given to students is practical.

b. Trials

This trial process was given to class VII students at MTs NU Raden Rahmat with a total of 15 students. The first trial was carried out with a learning process without using LKPD and providing KSM question practice. Then the next trial was carried out by providing learning LKPD. The LKPD provided does not only contain practice questions but there is material that is integrated with Islamic values. From the test results, students' enthusiasm when given LKPD was good. In the process of working on the practice questions, many students were able to complete the KSM practice questions given. Before being given the treatment the average student score in working on the practice questions was 47.18 and after being given the treatment the average student score 70.32. So there was an increase in the average score before and after the treatment was given to S students.

So that based on the assessment above, the LKPD obtains appropriate and valid criteria for development and there is an increase in the results of practice questions before and after being given action. Therefore, because the LKPD provided is valid and practical, it can be concluded that the LKPD is effectively used in the learning process. The availability of KSM practice questions on the LKPD can be used by students as a place to practice in preparing for the KSM event. This is in line with Mahfud's opinion in (Shalahuddin, 1986) strengthening this statement by explaining that learning media is an effective tool to be used in optimizing learning outcomes in learning activities. This statement is also strengthened by the opinion of (Rahma Diani, 2016) who explains that there is an influence on student learning outcomes after using worksheets using a scientific approach. This can be seen from the results of learning activities before and after using scientific-based worksheets, there is an increase in learning outcomes after using the learning media. So it can be concluded that there is an influence of the scientific approach on student learning outcomes.

Figure 4 . Work on LKPD by students

Conclusions

Conclusions from the results of research on the effectiveness of using Islamic Integrated Mathematics LKPD Using a *Scientific* Approach to Prepare Students for KSM, especially on fraction material for class VII students at MTs NU Raden Rahmat, namely Islamic integrated mathematics LKPD using a scientific approach to prepare students for KSM, especially on fraction material for class VII students MTs NU Raden Rahmat is categorized as effective based on the validity value from material experts of 90.62 % and from media experts of 90.17 % with very valid criteria . From the results of product trials, there was an increase in the results of the KSM practice assessment results. Description of LKPD that has gone through the effectiveness testing stage as follows:

a. LKPD has been prepared based on the requirements for preparing LKPD so that LKPD can help students achieve learning goals.

b. LKPD succeeded in making students carry out the learning process in accordance with the *scientific approach method* so that students obtained higher grades.

c. The LKPD succeeded in increasing the ability to understand Islamic integrated mathematical concepts in fraction material.

d. The learning results of the students showed that as many as 15 students completed classical completion. In the process of working on practice questions, there is an increase in the average student score before and after being given a treatment to the students. Before being given the treatment the average student score in working on the practice questions was 47.18 and after being given the treatment the average student score 70.32. This shows that the LKPD has appropriate and valid criteria to be developed and there is an increase in the results of practice questions before and after being given action. So it can be concluded that the Islamic Integrated Mathematics LKPD Using a Scientific Approach to Prepare Students for KSM is effective to give to Students and from the existence of integration material and KSM practice questions, this can be a facility for Students in practicing KSM practice questions.

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