

Developing Students' Numerical Literacy Through Social Culture Context Tools

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ABSTRACT

This research development created Islamic integrated-mathematical learning kits based on HOTS, i.e. lesson plan and student worksheet. The subject was set for seventh-grade junior high school students at MTs Hidayatullah Batakte, West Kupang. The learning kits in this study were made using Plomp model development through the preliminary research phase, development or prototyping phase, and assessment phase. Instruments in this research were validation sheet, assessment sheet, student responsive questioner, and learning outcomes test. The value of validation according to the average score of Lesson Plan was 4.1 (good category). Moreover, the value of validation according to the average score of The Student Worksheet was 4.3 (good category). These learning kits got practice criteria based on the average score of learning implementation assessment was 4.6 with very good category and student responsive questioner have 96.2%. These learning kits have effective criteria based on mastery learning presentation classically with 85.7%. It can be concluded that Islamic integrated-mathematical learning kits based on HOTS are valid, effective, and practical. These learning kits are feasible for learning mathematics on the material of the Set in VII grade MTs Batakte, West Kupang.

Keywords: *Mathematical learning kits, Islamic-integrated, HOTS, Numerical literacy.*

1. INTRODUCTION

At MTs Hidayatullah Batakte West Kupang, the learning kits used are downloaded from the internet and have not been developed. The implementation of learning has not been associated with Islamic integration. Mathematics learning in the classroom also does not use student worksheets. The main source of learning Mathematics in the classroom is a textbook that is only owned by the teacher, after which the material and sample questions will be recorded by the students.

The use of the student worksheet in the learning process may change the pattern of learning from a teacher-centered learning pattern to a student-centered learning pattern. The student-centered learning pattern is more about for students because they may become subjects in learning. Students may find a concept by themselves through a series of activities that they do so that they do not need to memorize the concept but are directly involved in the activity of finding the concept [1] [2]. It shows that the use of the student worksheet has an important role in the implementation of the learning process.

Students should have the ability to think when they solve mathematics problems. One of the thinking skills that should be possessed by students is higher-order thinking skills. The thought process is a process that is carried out by a person in recalling the knowledge that has been stored in his memory for one moment to be used in receiving information, managing, and concluding something [3]. Higher-order thinking skills are the ability to connect, manipulate, and transform existing knowledge and experience to think critically and creatively to make decisions and solve problems in new situations [4].

However, the fact that the Higher Order Thinking Skill (HOTS) of Indonesian students is still relatively low, can be seen from Indonesia's ranking in Trends in International Mathematics and Science Study (TIMSS). Indonesia's low ranking from the TIMSS results might certainly be caused by various factors, but one of them is because of the low HOTS of Indonesian students, according to the opinion of Winata Putra [5], [6] regarding TIMSS research which shows that it is still low. Indonesian students' achievement in mathematics, especially related to Higher Order Thinking Skill (HOTS) questions. The questions given to students at MTs Hidayatullah are still classified as Low Order

Thinking Skill (LOTS) and Middle Order Thinking Skill (MOTS) so far. HOTS-based learning kits are needed to support students to get used to contextual learning and require higher thinking skills. It has not been developed at MTs Hidayatullah Batakte.

Therefore, it is necessary to find out the results of Islamic integrated-mathematical learning kits based on HOTS for students.

2. METHODS

This research was designed as a research and development study using the Plomp development model which consists of 3 stages, the preliminary research, the prototyping phase, and the assessment phase. This research was conducted at MTs Hidayatullah Batakte West Kupang in grade VII with the material: The Sets. The participants were 14 students of grade VII MTs Hidayatullah Batakte West Kupang. Meanwhile, the object of this research is mathematics learning kits in the form of the lesson plan and the student worksheet.

Data collection techniques used in this study were interviews, observations, questionnaires, and tests. Instruments in this research are used to produce learning kits that meet the criteria of being valid, practical, and effective. The instruments used are validation sheets, learning implementation assessment sheets, student responsive questionnaire sheets, and learning outcomes tests. The data analysis technique in this study is the analysis of each data that has been collected which consists of the analysis of the results of expert validation, analysis of the results of research on the implementation of learning, analysis of student responsive questionnaire results, and analysis of learning outcomes tests.

3. RESULTS AND DISCUSSION

3.1. Description of the Preliminary Research Phase

The implementation of this stage is carried out to determine and determine the requirements for learning mathematics as a reference in developing products in the form of learning kits.

3.1.1. Needs Analysis

Based on the results of interviews with mathematics teachers at MTs Hidayatullah Batakte Kupang Barat, the learning resources used in the learning process are math books. Meanwhile, other teaching materials such as Student Worksheet have not been used. Mathematics learning that takes place in grade VII only uses the teacher's handbook of mathematics as a learning resource.

3.1.2. Curriculum Analysis

The curriculum used at MTs Hidayatullah Batakte is the 2013 curriculum.

3.1.3. Student Analysis

Students in grade VII MTs Hidayatullah Batakte are 13-15 years old on average, with varying levels of mathematical knowledge. In this case, the knowledge of mathematics, students in grade VII MTs Hidayatullah Batakte Kupang Barat have several different levels of knowledge, namely high, medium, and low for each student. Meanwhile, the high-order thinking ability of students in grade VII is still low.

3.1.4. Material Analysis

In this study, the researcher chose the set of teaching materials with the consideration that the problems studied in the set were directly related to the daily lives of the students.

3.2. Description of the Development or Prototyping Phase

3.2.1. Lesson Plan and Student Worksheet Design

The lesson plan is designed according to the components in each lesson plan, namely: lesson plan identity, core competencies, basic competencies, competency achievement indicators, learning objectives, teaching materials, time allocation, learning methods, learning activities, assessment of learning outcomes, and learning resources.

The student worksheet is designed and compiled by applying Islamic integrated learning. It contains material, sample questions, and HOTS practice questions.

3.2.2. Lesson Plan and Student Worksheet Validation

The validators chosen by the researchers in assessing the feasibility of the lesson plans were one lecturer of Mathematics Education from a university and one teacher of mathematics at MTs Hidayatullah Batakte West Kupang. Meanwhile, the results of the lesson plan validation by the two validators above have been recapitulated in the following Table 1.

Based on the recapitulation of the results of the Lesson Plan validation in the table above, the average total score of the assessment is in the good category. The

Table 1. Lesson plan validation result

The Assessed Aspects	Item No	Score by Validator		Criteria Average	Aspect Average	Category of Aspect Average
		1	2			
Identity of Lesson Plan	1	5	4	4.5	4.5	Good
	2	5	4	4.5		
	3	5	4	4.5		
	4	4	4	4		
Indicators/ Learning Objective	5	4	4	4	4	Good
	6	4	4	4		
Material Selection	7	4	4	4	4	Good
	8	4	4	4		
	9	4	4	4		
	10	4	4	4		
Learning Activities with a Scientific Approach	11	4	4	4	4	Good
	12	4	4	4		
	13	4	4	4		
	14	4	4	4		
	15	4	4	4		
	16	4	4	4		
	17	4	4	4		
18	4	4	4			
19	4	4	4			
Selection of Media/Learning Resources	20	4	4	4	4	Good
	21	4	4	4		
	22	4	4	4		
Assessment of Learning Outcomes	23	4	4	4	4	Good
	24	4	4	4		
Average Total Score					4.1	Good

average total score 4.1 means that the lesson plan developed has been declared valid. Meanwhile, the conclusion from the two validators stated that the lesson plan developed was valid with minor revisions.

Learning kits trials were conducted to determine the value of practicality and effectiveness. The following are the results of the implementation learning assessment carried out by mathematics teachers in grade VII MTs Hidayatullah Batakte West Kupang on learning assessments using the developed learning kits.

Based on the recapitulation of the results of the student worksheet validation in the table above, the average value of each aspect of the assessment is in the good category. The average value of the total validator rater is 4.3 which is in the good category, so the student

worksheet developed has been declared valid. Meanwhile, the conclusion from the two validators stated that the student worksheet developed was valid with minor revisions. The advantage of the developed student worksheet is that it contains Islamic values [7], [8]. Islamic material is described according to the existing set of mathematical material, such as in the set there is a discussion about the concept of the set taken from Q.S. Al-Mu'min verse 78.

Table 2. Student worksheet validation result

The Assessed Aspect	Item No	Score by Validator		Criteria Average	Aspect Average	Category of Aspect Average
		1	2			
Identity of Lesson Plan	1	4	4	4	4.2	Good
	2	4	5	4.5		
	3	4	4	4		
	4	4	4	4		
	5	4	5	4.5		
	6	4	4	4		
	7	5	4	4.5		
Indicators/ Learning Objective	8	5	4	4.5	4.3	Good
	9	5	4	4.5		
	10	4	4	4		
	8	4	4	4		
	9	4	4	4		
	10	4	4	4		
Learning Activities with a Scientific Approach	11	4	4	4	4	Good
	12	4	4	4		
	13	4	4	4		
	14	4	4	4		
	15	4	4	4		
	16	4	4	4		
17	4	4	4			
Contextual	18	4	5	4.5	4.5	Good
Evaluation and Feedback	19	4	5	4.5	4.3	Good
	24	4	4	4		
Average Total Score					4.3	Good

3.3. Description of the Assessment Phase

Learning device trials were conducted to determine the value of practicality and effectiveness. The following are the results of the recapitulation of the assessment of the implementation of learning carried out by mathematics teachers in grade VII MTs Hidayatullah Batakte Kupang Barat on learning assessments using the developed learning kits.

Based on the table 3, the average value for each aspect of mathematics learning activities using the developed

learning kits is in the very good category. The total average score for twice mathematics learning meetings is 4.6 which is in the very good category. It means that the student worksheet developed has been declared valid. The learning mathematics using learning kits has been carried out very well.

Table 3. Analysis of learning implementation assessment results

The Assessed Aspects	Item No	Meeting		Criteria Average	Aspect Average	Category of Aspect Average
		1	2			
Preliminary Activities	1	4	5	4.5	4.5	Good
	2	4	5	4.5		
	3	4	5	4.5		
	4	5	4	4.5		
Core Activities	5	4	5	4.5	4.6	Very Good
	6	5	5	5		
	7	5	5	5		
	8	5	5	5		
	9	4	4	4		
	10	4	4	4		
	11	4	5	4.5		
Closing Activities	12	4	5	4.5	4.8	Very Good
	13	4	5	4.5		
	14	5	5	5		
Average Total Score					4.6	Very Good

In addition to the results of the assessment of the implementation of learning, another thing that becomes a reference for the practicality of the learning kits developed is the analysis of the results of student responsive questionnaires after using the learning kits.

Based on the results of the analysis of the implementation of learning and student response questionnaires obtained an average of 4.6 and 96.2% in the very good category, this learning device is declared practical. This shows that learning that triggers students to think at a higher level requires the use of learning strategies oriented to Islamic values, so that students have the opportunity to observe, ask questions, reason, try, and communicate [9].

The application of HOTS questions in learning mathematics can train students to think at the level of analyzing, evaluating, and creating. The HOTS question used in this student worksheet is the level of ability to analyze (C4). Based on the questions, students write down sets that may be formed based on the descriptions of the stories presented in this case, write down the universal set of the provided Qur'anic verses and set operations related to the Hijri month question so that in two-way HOTS learning between teachers and students,

students are given more opportunities to seek and find their way to solve problems, as well as in the measurement activities prioritize questions in the form of problems, information search, analytical, evaluative and decision making.

Table 4. Analysis of student responsive results

No	Name	Answer Comparison	
		Yes	No
1	A.S.S.	14	1
2	D.A.A.	15	-
3	F. P.R.	13	2
4	F.I.	15	-
5	F.A.	15	-
6	I.A. A.	13	2
7	K.A.R.	14	1
8	M. A.	15	-
9	M. B. H.	15	-
10	M. K. A.	13	2
11	M. M.	15	-
12	N. W. N.	15	-
13	P. Y. P.	15	-
14	R.	15	-
Total		202	8
Percentage of Student Positive Response		96.2%	

Table 5. Student's score

No	Name	Test Score	Criteria
1	A.S.S.	90	Complete
2	D.A.A.	100	Complete
3	F. P.R.	90	Complete
4	F.I.	85	Complete
5	F.A.	75	Complete
6	I.A. A.	95	Complete
7	K.A.R.	55	Not Complete
8	M. A.	75	Complete
9	M. B. H.	85	Complete
10	M. K. A.	75	Complete
11	M. M.	80	Complete
12	N. W. N.	80	Complete
13	P. Y. P.	60	Not Complete
14	R.	90	Complete

Assessment of the effectiveness of learning devices is carried out through the results of the analysis of student learning outcomes. The learning outcomes test

instrument was given to students after the learning device product trial was carried out for 2 meetings. The following is an analysis of the test results obtained by students in grade VII MTs Hidayatullah Batakte West Kupang.

Based on the table above, there are three out of eighteen students who did not complete learning mathematics using learning kits developed by researchers. Meanwhile, grade VII MTs Hidayatullah Batakte stated that there was a category of having completed learning, this was seen from the percentage of classical completeness which showed that there were 85.7% of students who had completed learning. One way to form noble character in learning mathematics is to design learning that is integrated with Islamic values [10], [11]. Coupled with HOTS-based questions can help students towards higher-order thinking skills and try to find solutions creatively so that new things are better and useful for their lives [12].

The results of this study are following research conducted by [13] and research conducted by [14]. The learning kits developed in the study have met the valid, practical, and effective criteria as seen from the results of validation, practicality questionnaires, and the percentage of classical student learning completeness.

4. CONCLUSION

The learning kits developed in this study were declared valid, based on the average score of Lesson Plan validation 4.1 meeting the good category, the Student Worksheet average score of 4.3 meeting the good category. The learning device has met the practical criteria, based on the average score of the learning implementation assessment, which is 4.6, meets the very good category and the student response questionnaire which reaches 96.2%. The learning device has met the effective criteria based on the percentage of classical learning completeness of 85.7%. So that this learning device is suitable for use in the learning process. The developed learning kits have been integrated with Islam, seen from the material and questions contained in the learning tools, so that it has implications for increasing students' thinking skills at each level of the cognitive domain through HOTS-based assessments.

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