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Development of Blended Learning-Based Mathematics Learning Devices Viewed from The Learning Styles of Students at SMP Muhammadiyah 2 Mariyai, Sorong District

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ABSTRACT

Learning mathematics at school still has low learning outcomes. There are students who have different learning styles who catch learning faster by using an auditory style or prefer to use the senses of hearing, visual or more focused by using the senses of sight and kinesthetic which are more likely to use the senses of taste so that the teacher must be able to create learning styles that suit the needs of students. The aim of this research is to develop an effective, practical, and valid Blended Learning-based mathematics learning tool in terms of students' learning styles. This study uses the Research and Development method. R & D research is writing that describes the development of a learning device product in stages. The results of the research show that the level of validity of developing mathematics learning tools based on Blended Learning in terms of the learning styles of students is said to be valid because they obtained scores of 0.75 and 0.8, the percentage of effectiveness was 73% for small-scale trials and 77% for large-scale trials, and the level of practicality of device development learning mathematics based on Blended Learning in terms of the learning styles of students is very practical based on the positive responses from the interview results.

Keywords: *Device Development, Blended Learning, Learning Style*

INTRODUCTION

Mathematics education is part of national education which has a very important role for the development of science and technology. Therefore, mastering and utilizing modern technology requires a sufficiently strong mastery of mathematics (Septiari, 2013). possible by educators starting from the lower level of education to the higher level. The learning process must be in accordance with the learning objectives to be achieved. One of the objectives of learning mathematics is that students can have the ability to solve problems (Mulyasa, 2013). In addition, operationalized education is the learning objective of the field of study given by the teacher in class, including learning mathematics which

leads students to have the ability to think objectively, critically, carefully, analytically, and logically so that they are able to get the learning results as expected.

Mathematics subjects have a very important role in the field of Education (Ibrahim et al., 2019). This shows that the position of mathematics in everyday life is very important. Rizal (2018) states that human activities are related to mathematics, for example housewives and traders, they carry out mathematical activities according to their needs. Therefore mathematics is mandatory to learn (Ibrahim et al., 2019). Riansyah & Sari (2018) say that mathematics is considered an essential lesson so that mathematics is a subject that must be taught at the basic level (Rufaidah, 2019).

The main ability that every student must have to achieve the goals of mathematics education is the ability to read, write and do arithmetic which is based on the ability to use thinking processes. The role of a teacher is very important to get the purpose of a lesson. Teachers have the main task of educating, teaching, directing, guiding, training, assessing and evaluating students starting from early childhood education to higher education. A teacher must have professional skills that support the performance of a teacher. According to Sodijarto (2013) the professional abilities of teachers include (1) designing and planning learning programs, (2) developing learning programs, (3) managing the implementation of learning programs, (4) assessing learning processes and outcomes, (5) diagnosing factors that influence success learning process. "This is supported by research conducted by Mariono (2018) that empowerment of teachers' abilities which includes educational qualifications, training on syllabus and lesson plans and upgrading of writing scientific papers on teachers has a positive effect on teacher performance."

Mathematics learning tools or what is often referred to as the curriculum is an important part of a learning process, as well as a guide for teachers in carrying out the learning process in the classroom. The results of research conducted by Rahmi Ramadhani regarding the development of mathematics learning tools that are oriented to problem based learning models show that learning tools are very influential for students' mathematical problem solving abilities. The results of research on the development of realistic mathematics learning tools to teach junior high school mathematics problem solving abilities state that the products of realistic mathematics learning tools that are good or valid for students in solving math problems are very effective to use. This aims to find out to what extent the learning material has been presented, what indicators are to be achieved, to what follow-up actions will be carried out by the teacher. In addition, learning tools aim to assist students in participating in the mathematics learning process. Learning devices are a collection of learning resources arranged in such a way where students and teachers carry out learning activities (Fitriani, 2014).

Learning activities in the classroom must be modified as best as possible to create fun and effective learning. There are quite a lot of effective and good learning models to use in the mathematics learning process. However, if you want to develop contextual and open ended mathematics learning, one of the learning models that can be used is a blended learning based learning model. The results of research on the blended learning model by Dian Ningtiyas, (2017) state that the google classroom-based blended learning model is

more effective for learning mathematics outcomes. Research conducted by Rachmadyanti (2017) entitled belended learning through google classroom. Blended learning is a combination of two terms, namely blended and learning, the word belended means mixed, while learning means learning. The basic meaning actually contains mixed learning, experts agree that blended learning is a combination of conventional and online learning.

In addition to learning tools and effective learning models, a teacher must also be able to see the ability of students to receive learning because each student has different abilities, this is known as a learning style. Learning style is a way that is owned by individuals which explains how individuals learn or the ways taken by each person to concentrate on the learning process.

Risnawita, (2014) said that an individual's learning style can make the individual understand how to understand and remember the information that has been conveyed. In line with this opinion, Padmanaba (2018) argues that learning style is the preferred way of learning in terms of absorbing, managing, and processing information obtained either by remembering reasons and or solving problems. Hayati, (2011) said that learning style is the preferred way for people to learn.

Based on observations of teaching assistance in the MBKM program, researchers saw that students still had low learning scores and lack of activity. Activeness in learning mathematics itself is one of the criteria in critical thinking. In addition to the lack of liveliness of the students in this observation, the researcher saw that in learning, many students still like to play cellphones secretly and like to change seats while studying.

The results of interviews with mathematics education teachers said that the learning tools used for learning mathematics for this year had not been used in contrast to the previous school year where students were still using LKPD. The results of an interview with one of the students said that they preferred to use the LKPD to do assignments because in the LKPD there was already a method or explanation of the assignment to make it easier to do the assignment. The math teacher said that there were some students who preferred to use LKPD when giving assignments. This makes teachers feel difficult in conducting a lesson because each student has a different learning style. For this reason, teachers must be able to develop effective and enjoyable learning so that students and teachers can achieve the desired learning goals.

Learning mathematics at school still has low learning outcomes. There are students who have different learning styles who catch learning faster by using an auditory style or prefer to use the senses of hearing, visual or more focused by using the senses of sight and kinesthetic which are more likely to use the senses of taste so that the teacher must be able to create learning styles that suit the needs of students. At present, most of the world of education has used the 2013 curriculum in learning which has a student center learning spirit with most students using mobile phones when learning takes place. as revealed by Husamah, (2014) the use of technology in education, especially in learning systems has changed conventional learning systems into modern patterns mediated by information and communication technology.

The purpose of this research is to develop a mathematics learning tool based on Blended Learning in terms of effective, practical, and valid student learning styles

METHOD

The type of research used in this study is R&D (Research Development). According to (Sugiyono, 2016) Research Development (R&D) is a research method used to produce certain products by testing the effectiveness of these products. An effective development model demands compatibility between the approach used and the product to be produced. This planned development model follows the ADDIE rules developed by Branch Sugiyono (2016). ADDIE stands for Analysis, Design, Development, Implementation and Evolution.

This research was conducted at Muhammadiyah 2 Mariyai Middle School, Sorong Regency. The population of this study were all students. This research was located at SMP Muhammadiyah 2 Mariyai with the object of research being 40 students of class VIII. Collecting data using interviews, observation, and assessment of learning outcomes. Interview To obtain information about the potential and problems that exist in the research area, the researchers conducted interviews with Mathematics teachers at SMP Muhamadiyah 2 Mariyai. Observation Observations were made during the implementation of product trials, researchers also made observations on student learning independence. Observations at the product trial stage were carried out at each meeting and all observational data were analyzed qualitatively. Assessment of learning outcomes is carried out with the aim of obtaining data on student learning outcomes after carrying out belnded learning based learning. quizzes are conducted online using the Google Classroom application.

Data analysis techniques used in this study are qualitative and quantitative. Quantitative data were obtained from the results of interviews conducted with students after learning to obtain more in-depth evaluation results. The results of the interview were analyzed qualitatively and then a conclusion was drawn to see the practicality of the product being developed. Quantitative data was obtained from the results of validation by the validator and the results of the effectiveness test.

FINDING AND DISCUSSION

The learning model used is Blended Learning which utilizes the use of Google Classroom. Learning devices created using the Blended Learning learning model which is a combination of direct learning and online learning. Researchers develop learning tools and research instruments needed. The learning tools made include 1) Learning Implementation Plans (RPP), 2) teaching materials in the form of LKPD which contain material as well as practice questions and discussions which are published in Google Classroom. and 3) quiz questions published in Class VIII Google Classroom.

The learning device is validated first by the validator to improve the quality of the learning device before being tested. The purpose of validation is to find out whether the learning tools used are appropriate, to find out the shortcomings of the learning media, and

to find out whether the research instruments are appropriate. The following is a table of validation results after revision.

Table 1. RPP Validation Results Cross Tabulation of the Two Validators

No.	Validators 1	Validators 2	cross tabulation
1.	3	4	D
2.	3	4	D
3.	2	3	B
4.	3	3	D
5.	3	3	D
6.	3	4	D
7.	3	3	B
8.	2	3	B
9.	3	3	D
10.	2	3	D
11.	4	3	D
12.	3	3	D

Based on the results of the 2 x 2 cross tabulation, it is then included in the Gregory formula.

$$Vi = \frac{D}{A + B + C + D}$$

$$Vi = \frac{9}{0 + 3 + 0 + 9} = 0{,}75$$

so it can be concluded that the RPP instrument meets the very high category of content validity criteria.

Table 2. LKPD Validation Results Cross Tabulation of the Two Validators

No.	Validators 1	Validators 2	Cross Tabulation
1.	3	3	D
2.	3	3	D
3.	3	3	D
4.	4	3	D
5.	3	3	D
6.	3	3	D
7.	2	3	B
8.	2	3	B
9.	3	3	D
10.	3	3	D

Based on the results of the 2 x 2 cross tabulation, it is then included in the Gregory formula.

$$Vi = \frac{D}{A + B + C + D}$$

$$Vi = \frac{8}{0 + 2 + 0 + 8} = 0{,}8$$

so it can be concluded that the LKPD instrument meets valid criteria.

After the instrument was declared valid, it was then tested at SMP Muhammad 2 Mariayai. The trial was carried out twice, namely on a small scale and on a large scale. Small scale 15 students and large scale 35 students. The process of carrying out trials on a small scale was carried out in two meetings. Each meeting was held in the first hour for 90 minutes. then the class is divided into 3 groups with different learning models. In the first group, an online learning model is used which will use a visual learning style. The second group with offline learning, namely listening to explanations from the teacher in this group the learning style used is an auditory learning style and the third group uses discussion learning where students will use a kinesthetic learning style. After being declared effective on a small scale trial, it is then tested on a large scale with the same implementation. The results of the effectiveness trials by students are

Table 3. Effectiveness Trial Results

Trial scale	Number of pass	Percentage	Category
Small scale	11 out of 15 students	73%	effective
Large scale	27 out of 35 students	77%	effective

Based on the results of the effectiveness trials, the development of Blended Learning-based mathematics learning tools in terms of the learning styles of students was declared effective because in small-scale trials they obtained a presentation of 73% which was on a scale of 70% ≤ P ≤ 80% with the effective category. Then proceed with large-scale trials with a presentation of 77% declared effective because on a scale of 70% ≤ P ≤ 80% with the effective category.

Based on the calculation, the practicality analysis is based on the results of interviews with students and observation sheets on the implementation of learning. The results of the student interviews the researchers found that the value of the student interviews was very positive, this was because the answers from the students were very happy with the learning being done, which meant that the learning used was practical.

CONCLUSION

Based on data analysis on testing of Blended Learning-based mathematics learning tools in terms of the learning styles of students developed both from validator assessments, effectiveness testing, and practicality testing it can be concluded that the development of Blended Learning-based mathematics learning tools in terms of learning styles of students uses the development model ADDIE which consists of analysis, design, development, implementation, and evaluation. The level of validity of the development of Blended Learning-based mathematics learning tools in terms of the learning styles of students is said to be valid because it obtains values of 0.75 and 0.8, the percentage of effectiveness is 73% for small-scale trials and 77% for large-scale trials, and the level of practicality of developing mathematics learning tools based on Blended Learning in terms of the learning styles of students is very practical based on the positive responses from the interview results.

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