Development of Discovery Learning Based Interactive Multimedia on the Subject of Transformation for Class IX of MTs Negeri 3 Langkat

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ABSTRACT
This study aims to determine: (1) Knowing the interactive multimedia based on discovery learning on the subject of transformation that is developed is suitable for use as a learning medium. (2) Knowing the use of interactive multimedia based on discovery learning on the subject of transformation that was developed to effectively improve student learning outcomes. This type of research is research and development (Research and Development). The subjects in this study were students of class IX-7 MTs Negeri 3 Langkat, totaling 25 students. The research instrument is a test of mathematics learning outcomes as a result of student work, practicality questionnaires, and student responses after using discovery learning-based interactive multimedia. The results of this study indicate that 1) interactive multimedia can increase students^ interest in learning independently in understanding mathematics subject matter so that it has a good impact on improving student learning outcomes. 2) In the first trial there was an increase in the value with low criteria (g 0.3) and in the second trial there was an increase in the value with moderate criteria ($0.3 < g \leq 0.7$). Therefore, student learning outcomes using interactive multimedia are higher than student learning outcomes before using interactive multimedia as seen from classical completeness and learning time. The interactive multimedia used in the study proved to be effective in improving students' mathematics learning outcomes in grade IX.

Keywords: *Learning Development, Interactive Multimedia, Discovery Learning Models.*

I. INTRODUCTION

Education is held not only to equip students with various knowledges, but education must also be oriented so that students can live their lives well. Education based on Pancasila and the 1945 Constitution of the Republic of Indonesia functions to develop the capabilities and forms of dignified national character and civilization in the context of the intellectual life of the nation. Thus, students can have strengths in the form of spiritual strength, religion, intelligence, independence, self-confidence and noble character and skills that will be needed for themselves, society, nation and state. In essence, education aims to improve the capabilities possessed, increase human resources (HR), this is because the increase in human resources is related to the formation of a complete human being. The success of achieving educational goals is very dependent on the learning process carried out. The quality of the learning process needs to be improved to improve the quality of education. Learning which is the core of the educational process must be designed in such a way that educational goals can be achieved properly.

Mathematics is one of the basic sciences that must be studied and mastered both in applied aspects and in reasoning aspects because it has an important role in efforts to hone science and technology. Mathematics subjects have an important role in the development of education. Batubara (2018: 1) states that "Mathematics is important both as a tool, as a science developer (for scientists) as an attitude-former and as a mindset guide for education". Given the importance of mathematics in everyday life, therefore mathematics needs to be taught at all levels of education, from elementary to university. According to Abdurrahman (2003: 253) mathematics needs to be taught to students because: (1) it is always used in terms of life; (2) all fields of study require appropriate mathematical skills; (3) is a means of communication that is strong, concise and clear; (4) can be used to present information in a variety of ways; (5) improve the ability to think logically, accuracy and spatial awareness; and (6) giving satisfaction to the effort to solve challenging problems. Countries that ignore mathematics education as a top priority will be left

behind from progress in all fields, especially science and technology.

In the whole process of education in schools, teaching and learning activities are the most basic activities. The success or failure of achieving the goals of mathematics education depends a lot on how the learning process is experienced by students as students. Improving the quality of education is very much needed, especially improving students' achievement and learning outcomes in mathematics at school. Many say that the quality of education in Indonesia, especially in mathematics, is still low. The data supporting this opinion are described as follows: (1) PISA (Program for International Student Assessment) and TIMMS (Trends in International Mathematics and Science Study). The results of the 2015 PISA mapping show that the average math achievement score of Indonesian students is still below the international average score, the PISA score for mathematics is 490 while the score obtained by Indonesia is only 386, so that of the 70 countries participating in PISA Indonesia is in the order of ranked 62. Furthermore, based on the results of a mathematical achievement analysis study conducted by TIMSS in 2015 showed more than 95% of Indonesian students were only able to reach the intermediate level, this condition puts Indonesia in position 45 out of 50 participating countries (OECD, 2017).

Technological developments that exist today are able to support the learning process based on an approach which can be realized by designing adaptive and promising learning media in the future as a new learning paradigm and also able to provide space with innovative tools to meet the needs of students where previously impossible to do, the existence of computers that have expanded to the elementary school level has not been widely used to improve learning achievement, especially in learning. The results of the 2015 TIMSS report from the Research and Development Agency's Education Assessment Center found that "Only 22.02% of schools in Indonesia have computers, and only 6% of students in Indonesia use computers in learning, while internationally as many as 37%".

Arsyad (2013: 28) suggests the benefits of learning media in the student learning process, namely: (1) learning will attract more students' attention so that it can foster learning motivation; (2) learning materials will have a clearer meaning so that they can be better understood by students and enable them to master and achieve learning objectives; (3) the teaching methods will vary, not merely verbal communication through the utterance of words by the teacher, so that they are not bored and the teacher does not run out of energy, especially if the teacher teaches every lesson; (4) students can do more learning activities because they only listen to the teacher's description, but also carry out other activities such as observing, doing, demonstrating, acting, etc.

According to Ningsih (2010: 5) the application of learning media will provide several good opportunities for students to cultivate positive values, namely: (1) providing opportunities for students to be actively involved in the learning process; (2) provide opportunities for students to reconstruct their knowledge better; (3) encourage students to develop their own learning experiences according to their interests; (4) encouraging students to be more responsible and willing to take risks; (5) provide opportunities and freedom to express opinions and ideas freely to their friends. Thus, one of the appropriate media to anticipate this needs to be supported by appropriate learning media, namely interactive multimedia. Interactive Multimedia makes the learning process more interesting and can increase students' enthusiasm for learning mathematics. Self-developed interactive multimedia will be easier for educators to use in learning. For schools, interactive multimedia can help schools in realizing quality learning. The application of interactive multimedia can condition learning activities to be more well planned, independent, complete and with clear results. Interactive multimedia that has been tested for its feasibility and advantages will be able to add learning resources that can be used by students in learning.

The 2013 curriculum requires teachers to create a learning process where students are the center of the learning process. One of the models that can be used is the Discovery Learning model. Discovery learning leads students to think logically and systematically in solving a problem (Kemdikbud, 2015). Discovery learning-based interactive multimedia program provides opportunities for students to solve problems according to the level of difficulty, when students have succeeded in solving problems with low difficulty levels, they can continue to solve problems with higher difficulty levels (Wijaya, 2014).

Several studies that have been conducted regarding discovery learning-based multimedia learning, including research by Dalgarno, Gregor and Sue (2014) on The impact of students' exploration strategies on discovery learning using computer-based simulations stated that "discovery learning-based learning models that are integrated with the use of software as a computer-based learning media can provide guidance to students and have more potential learning benefits, so that it has a positive effect on the achievement of student learning outcomes". Furthermore, research by Febriana, Sajidan and Prayitno (2015) on the Development of Group Discovery Learning (GDL)-Based Interactive on Protist Material Class X SMA Negeri Karangpandan stated that "Interactive multimedia based on Group Discovery Learning (GDL) is effective on learning outcomes in terms of knowledge and attitudes, but not effective on the psychomotor aspect." Mardiana and Qohar's research (2017) on the Development of Guided Discovery-Based Interactive Media 'Transgeo' in Translational Materials for Class XI Students also states "that media is able to

support student learning activities and motivate students in learning".

Based on the explanation of these problems, researchers need to make efforts to develop interactive learning multimedia based on Discovery Learning on the subject of geometric transformation for class IX students of MTs Negeri 3 Langkat. The use of interactive learning multimedia based on Discovery Learning is one of the efforts to improve the quality of the learning process which in turn is able to improve the quality of students' mathematics learning outcomes.

2. THEORETICAL REVIEW

2.1. The Nature of Learning and Learning

According to Slameto (2010: 2) "Learning is a business process carried out by a person to obtain a new behavior change as a whole, as a result of his own experience in interaction with his environment". He also said that learning is a process to gain motivation in knowledge, skills, basics, and behavior. Learning is the mastery of skills or knowledge gained from instruction. However, Bruner (1960) said that "Learning is not to change one's behavior but to change the school curriculum in such a way that students can learn more and more easily". Because it would be nice if schools could provide opportunities for students to progress quickly according to their abilities in certain subjects. Learning is an activity that cannot be separated from human life.

Someone who has learned will experience changes in behavior both in terms of knowledge, skills, and attitudes. Rusman (2014: 134) argues that "Learning is a process of changing individual behavior as a result of his experience in interacting with the environment". In line with this, according to Dimyati and Mudjiono (2013: 7) "Learning is a complex student action and behavior".

Based on the opinion of experts, it can be concluded that learning can be interpreted as a process of changing behavior from not knowing to knowing, from not understanding to understanding, and can be beneficial for the environment and the individual itself. Learning is an activity carried out by individuals that result in changes in behavior in the form of knowledge (cognitive aspects), attitudes (affective aspects), skills (psychomotor aspects) in the individual due to the interaction between individuals and individuals or individuals with their environment. Learning can also be interpreted as an activity that results in changes in behavior based on the results of experience through interaction with the environment.

In essence, learning is a conscious effort from a teacher to teach students (directing student interaction with other learning resources) in order to achieve the expected goals (Irvan, 2016: 28). Learning is a process of student interaction with education and learning resources in a learning environment. Learning is assistance provided by educators so that the process of acquiring knowledge and knowledge, mastering skills and character, and forming attitudes and beliefs can occur in students. In other words, learning is a process to help students learn well. The learning process is experienced throughout a person's life and applies anywhere and anytime.

2.2. Interactive Multimedia

Interactive multimedia is a multimedia that is equipped with a controller that can be operated by the user, so that the user can choose what he wants for the next process (Sucipto, 2010). Examples of interactive multimedia are interactive learning, game applications, etc. Multimedia-based interactive learning media are used to convey messages (knowledge, skills and attitudes) and can stimulate students' choices, feelings, concerns and willingness so that the learning process occurs intentionally, with purpose and in control.

The model in multimedia learning is divided into five, namely:

a. The tutorial model is that the delivery of the material is done in a tutorial manner;

b. Drill and Practice model is to train students so that they have proficiency in a skill or strengthen mastery of a concept;

c. Simulation model that provides experience of real world problems associated with a risk;

d. Experimental models are activities that are experimental in nature, and

e. The game model is a learning media with a game model (Fatoni, Yahya and Walidain, 2016: 359).

The purpose of using multimedia in education and training is to involve students in multi-sensory experiences to enhance learning activities. The use of interactive multimedia in increasing understanding of the concept of geometric transformation is done by involving students in using the multimedia so that students are encouraged to ask various kinds of questions and find knowledge. Interactive multimedia is very supportive in an effort to improve understanding of concepts about the properties of students' spatial structures because the media emphasizes the interaction process, namely by involving students in its use so that students' motivation in learning increases so that learning outcomes also increase.

According to Ramli (2013: 63) "Multimedia provides a huge opportunity for student control compared to other media". Students not only have control over the depth, reference and selection of materials, but also interactions that allow students to establish communication with the program. User control allows students to work according to their strategy, but providing complete user control, as in hypertext, leaves floundering students with little direction and motivation. Some of the problem solving that may be best, is by giving control to students, but it is still within the limits

of education where they can access interactive instructions and exercises.

2.3. Discovery Learning Model

In the learning process, many learning models are chosen according to the material presented by the teacher, one of the efforts to improve students' mathematical critical thinking skills is learning by using the Discovery Learning learning model. Discovery learning is also a method that can encourage students to draw conclusions based on their activities and observations. Through discovery learning, students find their own identity and learn concepts in a language they understand. Thus, teachers who apply discovery learning can place students on opportunities for more independent learning. The goal is to influence each other's way of thinking, the teacher provokes students' thinking with focused questions so as to enable students to understand and construct certain concepts, build rules and learn to find something to solve problems. Based on the learning stages mentioned above, it is clear that the Discovery Learning model can improve students' mathematical thinking skills.

According to Sabri (2014: 26) outlines that there are several discovery learning procedures that must be carried out in teaching and learning activities in the classroom as follows:

1) Stimulation: The teacher poses a problem or asks students to read or listen to a description containing the problem.
2) Problem Statement: Students are given the opportunity to identify the problem to be solved. The selected problems must then be formulated in the form of questions or hypotheses, namely temporary answers to the questions posed.
3) Data collection: To answer questions or prove whether this hypothesis is true or not, students are given the opportunity to collect relevant information, read literature, observe objects, conduct interviews with resource persons, conduct their own trials, and so on.
4) Data processing: All information from readings, interviews, observations is clarified and tabulated, even if it needs to be calculated in a certain way, and interpreted at a certain level of confidence.
5) Verification: Based on the results of processing and estimation or existing information, questions or hypotheses that have been formulated should be checked first, whether they can be answered or not, proven or not.
6) Generalization: The next stage, based on the results of the verification, students learn to draw certain conclusions or generalizations.

The purpose of the Discovery Learning model is to provide a learning experience for students according to their physical and mental conditions in obtaining good learning outcomes. The advantages of the Discovery Learning model are that it attracts students' attention because they carry out activities or direct experiences, is more realistic and has meaning because it is directly related to real examples, learning is more intense because it can solve problems, it is easier to absorb material, and students are directly involved in learning. The shortcomings of the Discovery Learning model are that the time used in learning is longer, it is still easy so that the ability to think rationally is still limited, subjectivity can cause difficulties in understanding problems, and are forced to carry out learning activities that are not as usual (conventional) (Febriana, Sajidan and Prayitno, 2015). : 98).

2.4. Student Learning Outcomes

Learning outcomes according to Sudjana (2010: 22) are "the abilities that students have after they receive their learning experiences". Gagne revealed that there are five categories of learning outcomes, namely: verbal information, intellectual skills, cognitive strategies, attitudes and skills. Meanwhile, Bloom revealed three teaching objectives which are a person's abilities that must be achieved and are learning outcomes, namely: cognitive, affective and psychomotor. Learning outcomes are things that can be viewed from two sides, namely the student side and the teacher's side. From the student's perspective, learning outcomes are a better level of mental development compared to before learning. The level of mental development is manifested in the types of cognitive, affective, and psychomotor domains. Meanwhile, from the teacher's point of view, learning outcomes are when the learning materials are completed. Results can also be interpreted as if someone has learned there will be a change in behavior in that person, for example from not knowing to knowing, and from not understanding to understanding.

Learning outcomes are said to be meaningful if the learning outcomes can shape student behavior, are useful for studying other aspects, can be used as a tool to obtain information and other knowledge, have the willingness and ability to learn on their own and can be used to develop students' creativity. Based on the opinions that have been presented, it can be concluded that learning outcomes are the result of a teaching and learning process that provides information about the extent to which he has mastered the subject matter, not a mastery of training results, but changes in behavior.

3. RESEARCH METHODS

This research was conducted at MTs Negeri 3 Langkat which is one of the junior high schools in Langkat Regency in the 2020/2021 academic year on transformation material. The reason for choosing the MTs Negeri 3 Langkat school. The subjects in this study were grade IX-7 students at MTs Negeri 3 Langkat on the grounds that the school distributed all grade IX students randomly, so it was assumed that the students' abilities in each class were homogeneous. In this study, students were involved as subjects to obtain data on the

effectiveness of the learning devices developed, including test scores for learning mathematics outcomes as a result of student work, practicality questionnaires, and student responses after using interactive multimedia based on discovery learning that had been developed. While the object in this research is interactive multimedia based on discoveri learning transformation material that was developed.

The research procedure used in developing this interactive learning multimedia is the Borg and Gall (2003) development model and combined with the Dick and Carey (2015) learning development model. The steps for developing interactive multimedia based on discovery learning are as follows: (1) Conducting preliminary research; (2) Multimedia design creation; (3) Collection of materials to be researched; (4) Creating and producing interactive multimedia; (5) Reviewing or testing interactive multimedia. This research is divided into several stages. The first stage is the development of interactive multimedia products based on Discovery Learning. The development of interactive multimedia includes interactive multimedia design, validation of subject matter content, and validation of learning media experts. The second stage in this research is to try out interactive multimedia products based on Discovery Learning transformation materials in class IX of MTs Negeri 3 Langkat in the 2020/2021 school year.

The stages of developing interactive multimedia developed are detailed as follows:

(1) Phase I : Conducting Preliminary Research

Conducting this preliminary research is the initial stage where the collection of various information that will be related to the product to be developed is carried out, and is useful in overcoming problems encountered in learning activities later. After all the learning strategies have been prepared, the researcher then develops the learning materials into an interactive multimedia.

(2) Phase II : Creating Multimedia Design

The stage of creating a multimedia design aims to design interactive multimedia. The steps that must be taken at this stage are: (a) Making an interactive multimedia script based on Discovery Learning which includes an explanation of the principles, procedures, and learning materials that will be studied by students, making a learning scenario which includes the order of the material to be delivered, making Worksheets and formative test questions and feedback that refer to learning materials that are visualized with the use of interactive multimedia based on Discovery Learning. (b) Making interactive multimedia storyboards based on Discovery Learning which includes making sketches or screen images in the form of pages and frames, then choosing colors, types of writing, storylines and also selecting appropriate animations. (c) The creation of an interactive multimedia flowchart view based on Discovery Learning is aimed at identifying, detailing, and systematically compiling the concepts that will be studied by students in the geometry transformation material into a concept map.

(3) Phase III: Material Collection

The collection of interactive multimedia materials includes: making videos, images (images), animations and texts. After that the finished materials are collected into one file. The point of collecting materials is to make it easier for researchers to create and compile the content of interactive multimedia that will be used in research.

(4) Stage IV: Creating and Producing Interactive Multimedia

The stage of creating and producing interactive multimedia is carried out after the materials for interactive multimedia have been collected. At this stage the researcher begins to produce multimedia according to the storyboard design that has been prepared previously, where the contents of this multimedia consist of: (a) instructions for using interactive multimedia; (b) a brief description of the researcher; (c) basic competencies and objectives of learning geometric transformations; (d) description of geometric transformation material; (e) a summary of the material to make it easier for students to learn independently; (f) practice questions related to geometry transformation material. After this interactive multimedia has been produced, the next step for researchers is to review the interactive multimedia in order to get product results that are really practical and effective when used by students.

(5) Stage V: Product Review and Trial

The purpose of the product review and trial phase is to produce good interactive multimedia.

Interactive multimedia that has been declared worthy as a learning resource, then tested the effectiveness of interactive multimedia products. After making improvements, the researchers conducted a trial of interactive multimedia developed in class IX of MTs Negeri 3 Langkat which has computer facilities at school. The researcher acts as a teacher who explains the geometry transformation material using Adobe Flash C6 software. The teacher starts learning activities according to the lesson plans that have been prepared.

The practicality of discovery learning-based interactive multimedia developed in this study, will be said to be practical if the average score obtained from the questionnaire responses obtained from mathematics subject teachers who receive teaching using interactive multimedia developed is at least 76% or in the practical category. The effectiveness test is from the learning outcomes test in the field evaluation. Learning outcomes test to determine the increase in student learning outcomes. Evaluation of learning through learning outcomes tests is said to be successful if the individual mastery has reached the KKM (Minimum Completeness Criteria) which is 74.

This interactive multimedia developed can be used in mathematics learning of geometry transformation material for MTs Class IX students if the learning media meets the indicators of success, namely interactive multimedia has adequate validity, practicality and effectiveness. Interactive multimedia is said to be valid if it is considered valid by the validators and multimedia is considered valid statistically. Then interactive multimedia is said to be practical if the multimedia created can be used with little or no revision and the results of the interactive multimedia practicality questionnaire are developed in the practical category. Furthermore, interactive multimedia is said to be effective if multimedia is able to achieve classical learning completeness (at least 85%), and empirical evidence that has been obtained from normalized gain index data is then supported by the time used in efficient learning and student responses are minimally good.

4. RESULTS AND DISCUSSION

4.1. Trial Results I

After the media and learning tools developed have met the criteria for validity, then the media and learning tools are tested at the research site, namely class IX students at MTs Negeri Langkat with a total of 25 students. The first trial was carried out 3 times in accordance with the lesson plan (RPP) that had been designed. At the time of the trial, the researcher acted as a teacher who taught. At each meeting, 2 (two) observers were presented to observe the implementation of learning tools in the classroom. Learning is designed by conditioning students to sit in groups consisting of 3 or 4 people in one group. The first trial was conducted to measure the practicality and effectiveness of interactive multimedia developed with the discovery learning model which aims to improve student learning outcomes.

a) Description of Practicality Based on Teacher's Assessment

Practicality in terms of teacher assessment consists of two aspects, namely the usefulness of the media and the use of applications. Based on the teacher's response questionnaire, a total average score of 2.71 was obtained. Furthermore, this value is referred to the predetermined practicality criteria. By referring to these criteria, it can be concluded that the developed multimedia meets the practicality with the Practical category (2.5 < Va 3.5). From the results of the questionnaire that was given to the teacher, it was found that the level of usefulness of the media was quite low and almost categorized as less practical. This is because the sample questions and material provided are few and the media display is less attractive.

b) Practical Description Based on Student Response

Student response data was taken to see the extent of interest, feelings of pleasure, and ease of students in understanding the interactive multimedia developed. The results of the questionnaire data analysis of student responses to the developed multimedia were analyzed in the practicality questionnaire in the first trial, it was found that many students stated that the learning media developed to improve student learning outcomes was 76% (practical category).

Based on the implementation of the learning tools, all of the practicality indicators in this study met the following criteria: (1) the mathematics teacher said that the learning media used were easy to use; (2) students said that the learning media used were easy to use. Based on the achievement of the indicators of the practicality of the learning devices, the learning tools developed can be said to be practical. However, this still needs to be re-examined and revised so that the overall implementation of the tools at each meeting is good.

c) Description of the Effectiveness of Discovery Learning-Based Interactive Multimedia

Learning media is said to be effective in terms of: (1) the achievement of classical student learning mastery if 85% of students who take the mathematical learning outcomes test have scored 75; (2) the time used in learning is efficient or does not exceed ordinary learning. The following will present a discussion of each indicator in measuring the effectiveness of Discovery Learning-Based Interactive Multimedia in field trials.

1) Classical Student Learning Completeness Field Trial I

In this study, the level of student mastery in terms of student learning outcomes by using the mathematical learning outcomes test that has been developed. The description of students' mathematical learning outcomes in the first trial is shown in Table 4.1. following.

Table 4.1. Description of Student Learning Outcomes Ability Score on Trial I

Description	Pretest of Mathematical Learning Outcomes Ability	Posttest of Mathematical Learning Outcomes Ability
Highest Score	87	87
Lowest Score	44	58
Average	62,2	74,1

Based on Table 4.1. shows that the average ability of student learning outcomes on the pretest results is 62.2 and posttests is 74.1. If categorized based on the level of student mastery, the level of mastery of students' mathematical learning outcomes in the pretest and posttest results of the first trial can be seen in Table 4.2. following.

Table 4.2. Mastery Level of Students' Mathematical Learning Outcomes

No	Interval	Pretest		Posttest		Category
		Students	Percent	Students	Percent	
1	0 ≤ SKBKM < 45	1	4%	0	0%	Very Less
2	45 ≤ SKBKM < 65	15	60%	3	12%	Less
3	65 ≤ SKBKM < 75	7	28%	10	40%	Enough
4	75 ≤ SKBKM < 90	2	8%	12	48%	Good
5	90 ≤ SKBKM ≤ 100	0	0%	0	0%	Very Good
Total		25	100%	25	100%	

From Table 4.2. It was found that in the pretest who obtained the very poor category as many as 1 student (4%), who obtained the less category as many as 15 students (60%), who obtained the sufficient category as many as 7 students (28%), who obtained the good category as many as 2 students (8 %), and there are no students (0%) in the very good category. However, in the posttest, the results showed that there were no students who got the very poor category (0%), who got the less category as many as 3 students (12%), who got the sufficient category as many as 10 students (40%), who got the good category as many as 12 students (48%) and no students (0%) got very good category (40%). Based on Table 4.2. it was found that the level of students' mathematical learning outcomes from the pretest test I the most dominating was in the less and sufficient categories, while the posttest results in the pretest I the most dominating were in the good category followed by the sufficient, less, and sufficient categories. Furthermore, the results of classical mastery of students' mathematical learning outcomes in the first trial can be seen in Table 4.3.

Table 4.3. Classical Mastery Level of Students' Mathematical Learning Outcomes Kemampuan

Category	Pretest	Percentage of classical completeness	Posttest	Percentage of classical completeness
	Students		Students	
Complete	2	8%	13	52%
Not Complete	23	92%	12	48%
Total	25	100%	25	100%

Based on the data in Table 4.3. it can be seen that the classical mastery of students' mathematical learning outcomes in the pretest trial I was 8% while in the posttest trial I was 52%. In accordance with the criteria for mastery of classical student learning outcomes, namely at least 75% of students who take the test of mathematical learning outcomes ability are able to achieve a score of 75. Thus, the posttest results of students' mathematical learning outcomes do not meet classical mastery because they get 52% completeness percentage. So it can be concluded that in the field trial the application of the developed learning tools did not meet the criteria for achieving classical completeness.

4.2. Trial Results II

After conducting the first trial, further improvements were made to produce learning tools that meet good practicality and effectiveness. Trial II was conducted three times in accordance with the lesson plan (RPP) that had been developed. Trial II was conducted to measure the practicality and effectiveness of interactive multimedia developed with the Discovery Learning model which aims to improve student learning outcomes.

a) Description of Practicality Based on Teacher's Assessment

In the second trial, the results of the practicality assessment of learning media based on the teacher's assessment obtained a total average score of 3.1. Furthermore, this value is referred to the practicality criteria that have been set accordingly. By referring to these criteria, it can be concluded that in the second trial the learning media developed also met the practicality with the Practical category (2.5 < Va 3.5).

In the second trial, the results of the questionnaire that had been given to the teacher, there was an increase in the practicality value from the first trial to the second trial. Although it only increased by 0.39 from trial I, this increase was more or less influenced by improvements in multimedia based on suggestions and analysis of the practicality of media in trial I. Thus, the practicality aspect for teacher responses related to the ease of using learning media was fulfilled.

b) Practical Description Based on Student Response

In the second trial, the results of the media practicality assessment based on the results of the practicality questionnaire analysis showed that many students stated that the developed learning media could improve student learning outcomes by 84.8% (practical category). Thus, the practical aspect for student responses related to the use of learning media is fulfilled.

From the description above, the overall practicality indicators in this study meet the following criteria: (1) subject teachers say that the learning tools used are easy to use; (2) students said that the learning tools used were easy to use. Based on the achievement of the indicators of the practicality of the learning devices, the interactive multimedia developed with the discovery learning model can be said to be practical.

c) Description of the Effectiveness of Discovery Learning-Based Interactive Multimedia

Learning media is said to be effective in terms of: (1) the achievement of classical student learning mastery if 85% of students who take the mathematical learning

outcomes test have scored 75; (2) the time used in learning is efficient or does not exceed ordinary learning. The following will present a discussion of each indicator in measuring the effectiveness of Discovery Learning-Based Interactive Multimedia in field trials.

1) Classical Student Learning Completeness Field Trial II

In this study, the level of student mastery in terms of the ability of learning outcomes by using the ability test of mathematical learning outcomes. The description of the results in trial II is shown in Table 4.4.

Table 4.4. Description of the Results of Student Learning Outcomes Trial II

Description	Pretest of Mathematical Learning Outcomes Ability	Posttest of Mathematical Learning Outcomes Ability
Highest Score	100	100
Lowest Score	58	57
Average	79,9	86,9

Based on Table 4.4. shows that the average ability of students' mathematical learning outcomes on the results of the pretests is 79.9 and posttests is 86.9. If it is categorized based on the level of student mastery, then the level of mastery of students' mathematical learning outcomes in the results of the pretest and posttest trial II can be seen in Table 4.5.

Table 4.5. Mastery Level of Students' Mathematical Learning Outcomes

No	Interval	Pretest		Posttest		Category
		Students	Percent	Students	Percent	
1	0 ≤ SKBKM < 45	0	0%	0	0%	Very Less
2	45 ≤ SKBKM < 65	2	8%	2	8%	Less
3	65 ≤ SKBKM < 75	1	4%	1	4%	Enough
4	75 ≤ SKBKM < 90	18	72%	12	48%	Good
5	90 ≤ SKBKM ≤ 100	4	16%	10	40%	Very Good
Total		25	100%	25	100%	

From Table 4.5. It was found that in the pretest there were no students who got the very poor category (0%), who got the less category as many as 2 students (8%), who got the sufficient category as many as 1 student (4%), who got the good category as many as 18 students (72 %), and as many as 4 students (16%) obtained the very good category. In the posttest, the results showed that there were no students who got the very poor category (0%), who got the less category as many as 2 students (8%), who got the sufficient category as many as 1 student (4%), who got the good category as many as 12 students (48 %) and as many as 10 students (40%) obtained the very good category. Based on Table 4.5. it was found that the level of students' mathematical learning outcomes from the pretest test results II which dominated the good and very good categories, while the posttest results from the second trial the most dominating were in the good category followed by the very good category. Furthermore, the results of classical mastery of students' mathematical learning outcomes in the second trial can be seen in Table 4.6.

Table 4.6. Classical Completeness Level of Student Learning Outcomes in Trial II

Category	Pretest	Percentage of classical completeness	Posttest	Percentage of classical completeness
	Students		Students	
Complete	22	88%	22	88%
Not Complete	33	12%	3	12%
Total	25	100%	25	100%

Based on the data in Table 4.6. it can be seen that the classical completeness of the results in the pretest trial II was 88% while the posttest trial II was also 88%. In accordance with the criteria for mastery of student learning outcomes classically, namely at least 85% of students who take the ability test for mathematical learning outcomes are able to achieve a score of 75. Thus, the posttest results of students' mathematical creative thinking skills have met classical mastery because they obtained a percentage of completeness 88%. So it can be concluded that in the second trial the application of the developed learning tools has met the criteria for achieving mastery classically.

5. CONCLUSIONS

Based on the results and discussion in the study, it can be concluded as follows: 1) The interactive multimedia developed in the research is suitable to be used as a medium for learning mathematics for class IX. This is obtained from the results of research that interactive multimedia can increase students' interest in learning independently in understanding mathematics subject matter so that it has a good impact on improving student learning outcomes. 2) The interactive multimedia used in the study proved to be effective in improving students' mathematics learning outcomes in grade IX. This can be seen from the first trial there was an increase in the value with low criteria (g 0.3) and in the second trial there was an increase in the value with moderate criteria (0.3 < g 0.7). Then student learning outcomes using interactive multimedia are higher than student learning outcomes before using interactive multimedia as seen from classical completeness and learning time.

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