

# Improving the Quality of the Mathematics Teaching and Learning Process Using Learning Media

\*Asdiana Sapitri R<sup>1</sup>, Asdar<sup>2</sup>, Hamda<sup>3</sup>

<sup>1</sup>*Mathematics Education Postgraduate Program, Universitas Negeri Makassar, Indonesia*

<sup>2</sup>*Department of Mathematics, Universitas Negeri Makassar, Makassar, Indonesia*

<sup>3</sup>*Department of Mathematics, Universitas Negeri Makassar, Makassar, Indonesia*

\*Corresponding author. Email: [asdianasafitri91@gmail.com](mailto:asdianasafitri91@gmail.com)

## ABSTRACT

This research is classroom action research that aims to improve the quality of the mathematic teaching and learning process using learning media. This research was conducted in class X MA DDI Ponre sub-district, Bone regency. The subject of this study was students consisting of 20 people. This research instrument used was observation sheets and student learning outcomes tests. Data collection was carried out by an observer that was the mathematics teacher, while data analysis was carried out using descriptive statistics. The result showed that during the teaching and learning process in the implementation of actions I and II, there was an increase in the average percentage of students who carried out the activity. The percentage of enthusiastic students increased from 81,65 % to 91,65%, while the percentage of active students in answering and asking questions increased from 13,35% to 23,35% and from 3,35% to 10,00%, respectively. However, the average student attendance percentage was the same in cycle I and cycle II of 100%. In addition, there was an improvement in students' learning outcomes from 64,5 in cycle I to 76,25 in cycle II. Furthermore, in the first cycle, 13 Students, or 65%, were in the incomplete category, and 7 or 35% were in the completed category. After the second cycle, there were 9 students, or 45%, in the incomplete category, and 11 Students, or 55 %, were in a complete category.

**Keywords:** Teaching and learning process, Learning media, Mathematical

## 1. INTRODUCTION

The implementation of national education is a mandate from the preamble of the 1945 Constitution. Education is a path to mastery of science and technology that must be developed from time to time so that Indonesian human resources can be more competitive in global competition and not be left behind by other nations in the world.

The target of education lies in the process of teaching and learning activities that involve educators and students. The success of education is highly dependent on elements of the education system, that is, teachers. Teachers directly influence foster and develop students to be intelligent human beings assisted with skilled and good morals. A professional teacher must have the ability to convey or teach their knowledge (Transfer of Knowledge) to their students

effectively and efficiently [1]. In addition, to mastering their field of expertise, teachers are also expected to master specific teaching knowledge such as how to understand the personality of students, how to convey knowledge objectively, and how to interact with students correctly and appropriately so that they will be able to manage each the teaching and learning process in the classroom. As a result, an easy and quality of learning can be created well. Operational quality of learning can be defined as the intensity of systemic and synergistic linkages between teachers, students, learning climate, and learning media in producing optimal learning processes and outcomes following curricular demands [2].

One of the problems of education in Indonesia is the low quality of education, especially in rural areas. This happens because of the lack of adequate teaching and learning facilities, and teachers still use

conventional learning models wrapped in the lecture method. The conventional learning model is a traditional learning model, one of which is the lecture method. The lecture method is a method that can be said to be traditional because this method has always been used as an oral communication tool between teachers and students in the teaching and learning process [3]. Teachers are also required to make solid plans, include good teaching approaches and methods, and be effective in delivering lessons by using learning media. Hamalik argues that to help effectiveness in the learning process, in delivering messages, and in the lesson's content, teachers can use learning media [4].

The use of instructional media in the teaching and learning process, especially mathematics learning, does not mean that it does not require a teacher. With instructional media, the teacher gains a better ability in presenting the subject matter. Media is an introduction to messages from the sender to the recipient of the message or in other words, media is a vehicle for channeling learning information or channeling messages [5]. While the word learning contains a more proactive meaning in carrying out learning activities because educators or instructors are active, but students are active subjects in learning [6]. In this case, the learning in question is the active interaction between teachers and students in the learning process using learning tools or media in the classroom. According to [5], learning media is a means of communication in the form of print as well as viewing and listening, including hardware technology. Learning media is expected to improve the quality of the teaching and learning process better.

One of the media that is often applied in mathematics's teaching and learning process is visual media, such as Microsoft Powerpoint displayed using an LCD projector. Visual media is defined as media that can rely on the sense of sight by displaying or presenting subject matter on the monitor screen. According to Levie and Lentz (in [4]), there are four functions of learning media, especially visual media, namely (a) the function of attention by attracting and directing students' attention to concentrate on the content of the lesson displayed; (b) the affective function since it can be seen from the level of enjoyment of students when studying illustrated texts; (c) cognitive function as research findings which reveal that visual symbols facilitate the goal of understanding;

and (d) compensatory function as the research results that visual media can provide context for understanding texts.

Furthermore, [7] states that Microsoft PowerPoint is a tool to introduce or explain something summarized and packaged into several interesting slides. The goal is that people can more easily understand the explanations through visualizations summarized in text slides, pictures/graphics, sound, video, and others.

Madrasah Aliyah DDI Ponre, Ponre Subdistrict, Bone Regency is one madrasa located far from urban areas. The utilization of technology for the teaching and learning process is still rarely done. This can be seen from the preliminary observations, which show that the learning process was teacher-centered. This is not in line with Permendikbud No. 81A concerning the Implementation of the 2013 Curriculum that the learning process should be student-centered. Moving on from these observations, the researcher assumes that the quality of learning can be improved if the teacher can provide more attention and opportunities for students to develop their potential through the gradual improvement of learning approaches or methods.

Based on these thoughts, this research was conducted to improve the quality of the teaching and learning process using learning media. The learning media used is an LCD projector to display learning materials through the Microsoft PowerPoint 2010 program.

## **2. RESEARCH METHODS**

This research is classroom action research using a 2 cycle, where each cycle consists of 4 stages, namely, planning, implementation (action), observation, and reflection [18]. This study was carried out in class X IPA (Natural Science) Madrasah Aliyah DDI Ponre consisted of 20 students. Data collection techniques used were test techniques and non-test techniques. Data analysis used descriptive statistical analysis of quantitative data and qualitative data. Descriptive statistics were applied to describe or provide an overview of the characteristics of the object under study consisting of the average score, standard deviation, frequency table of the minimum and maximum scores obtained by students at the end of the cycle.

3. RESULT AND DISCUSSION

3.1 Descriptive Analysis of Test Results Before Using Learning Media

The results of this test obtained daily test results before using learning media. The results of descriptive analysis of student acquisition scores after the use of learning media can be seen in the following table:

Table 1. Statistics of learning outcomes scores before using learning media

Statistics	Value
Subject	20
Ideal Score	100
Highest Score	90
Lowest Score	30
Score Range	60
Average Score	57.75
Standard Deviation	28.81

Table 1 shows that the average student's mathematics learning outcomes before being given action were 57,75 from the ideal score of 100,0, the highest score was 90. The lowest score was 30 with a standard deviation of 28,81 and a score range of 60, which means learning outcomes Mathematics achieved by students of Madrasah Aliyah DDI Ponre, Ponre Subdistrict, Bone Regency, from the lowest score of 30 to 90. If the scores of student learning outcomes before using learning media are grouped into different categories, then the frequency distribution is shown in the following table:

Table 2. Distribution of frequency and percentage of student learning outcomes scores before using learning media

Score	Category	Frequency	Percentage (%)
0 – 54	Very low	7	35
55 – 64	Low	2	10
65 – 79	Currently	8	40

80 – 89	High	1	5
90 – 100	Very high	2	10
<b>Total</b>		20	100%

Based on table 2, it can be stated that of the 20 students of class X Madrasa Aliyah DDI Ponre Ponre District, Bone Regency, there are about 7 students or 35% whose learning outcomes are in the very low category, 2 students or 10% in the low category, 8 students or 40 % in the medium category, and 1 student or 5% in the high category, and 2 people or 10% in the very high category.

Based on the average score of mathematics learning outcomes obtained by students, namely 57.75, it can be concluded that the learning outcomes scores obtained by students are still in the low category. The following is the percentage of learning completeness for students of class X IPA Madrasah Aliyah DDI Ponre before applying learning media.

Table 3. Description of Students' Mathematics Learning Outcomes Completeness Before Using Learning Media

Score	Category	Frequency	Percentage (%)
0 – 74	Incomplete	15	75
75 – 100	Complete	5	25

Based on table 3, the percentage of students whose mathematics learning outcomes are in the incomplete category is 75%, while students who are in a complete category are only about 25%.

3.2 Analysis of the results of the teaching and learning process observations using learning media in Cycle I and Cycle II.

The results of observations of student activities during the teaching and learning process on the topic of three-variable linear equation system with the implementation of learning media can be seen in the table below:

**Table 4.** Results of observation of teaching and learning process using learning media in cycle I and cycle II

Student behavior	Average score		Percentage	
	Cycle I	Cycle II	Cycle I	Cycle II
Students who are enthusiastic about participating in the lesson	16,33	18,33	81,65	91,65
Students who are actively answering the teacher's questions	2,67	4,67	13,35	23,35
Students who ask questions in class at the beginning of teaching and learning activities	0,67	2	3,35	10
Students who do activities outside the subject matter	4,67	2	23,35	10
Students who do not do practice questions	0,67	-	3,35	-
Students who ask questions	1,67	3	8,35	15
Number of students who attend	20	20	100	100

Based on table 4, the results of observations during the teaching and learning process in the implementation of actions I and II showed an increase in the average percentage of student activities, including: (1) the percentage of enthusiastic students increased from 81.65% to 91, 65%; (2) the percentage of students who actively answered the teacher's questions increased from 13.35% to 23.35%; (3) the percentage of students who asked questions in class at the beginning of teaching and learning activities increased from 3.35% to 10.00%; (4) the percentage of

students who did activities outside the subject matter decreased from 23.34% to 10.00%; (5) the percentage of students who did not do the practice questions also decreased from 3.33% to 0%; (6) the percentage of students who asked questions on core activities increased from 8.35% to 15,00%; and (7) the average percentage of student attendance was the same both in cycle I and in Cycle II of 100%. Therefore, it can be said that the use of learning media that is Microsoft PowerPoint 2010 program displayed using an LCD projector can increase the quality of the teaching and learning process in class X Madrasah Aliyah DDI Ponre Ponre District, Bone Regency in Mathematics subjects with the topic of a three-variable linear equation system.

### 3.3 Descriptive Analysis of Cycle I and Cycle II Test Results

The results of descriptive analysis of student learning outcomes after the application of learning media can be seen in the following table:

**Table 5.** Statistics of student learning outcomes scores in cycle I and cycle II

Statistic	Value	
	Cycle I	Cycle II
Subject	20	20
Ideal Score	100	100
Highest Score	90	95
Lowest Score	40	60
Score Range	50	35
Average Score	64,5	76,25
Standard Deviation	15,55	11,34

Table 5 shows that student learning outcomes in learning Mathematics using learning media in class X IPA Madrasah Aliyah DDI Ponre have increased from cycle I and cycle II. The average score of student learning outcomes in the first cycle was 64,5 from increasing to 76,25 in the second cycle from the ideal score of 100.00.

Based on the average score of mathematics learning outcomes obtained by students in the first

cycle, which is 64,5 and in the second cycle, it is 76,25, it can be concluded that the score of learning outcomes obtained by students in the first cycle is in the medium category and the second cycle is also still in the medium category, but still seen an increase in the average score of student learning outcomes from cycle I to cycle II. If the scores of student learning outcomes in cycle I and cycle II are grouped into 5 categories, then the score frequency distribution is shown in the following table:

**Table 6.** Distribution of Frequency and Percentage of Learning Outcomes Scores in Cycle I and Cycle II

Score	Category	Frequency		Percentage (%)	
		Cycle I	Cycle II	Cycle I	Cycle II
0 – 54	Very low	6	0	30	0
55 – 64	Low	3	1	15	5
65 – 79	Currently	6	10	30	50
80 – 89	High	4	5	20	25
90 – 100	Very high	1	4	5	20
<b>Total</b>		20	20	100 %	100 %

Based on table 6, it can be seen that, in the first cycle, there were 6 students (30%) in the low category, 3 students (15%) in a low category, 6 students (30%) in the medium category, 4 students (20%) in the high category, and 1 student (5%) in the very high category. In the second cycle, there was an increase in student learning outcomes. Namely, there were no student scores in the very low category, 1 student (5%) in the low category, 10 students (50%) in the medium category, 5 students (25%) in the high category, and 4 students (20%) in the very high category.

The percentage of mathematics learning completeness of students in grade X Madrasah Aliyah DDI Ponre after the application of learning media in cycle I and cycle II can be seen in the following table:

**Table 7.** Description of students' mathematics learning outcomes completeness in cycle I and cycle II

Score	Category	Frequency on cycle		Cycle percentage (%)	
		I	II	I	II
0 – 74	Incomplete	13	9	65	45
75 – 100	Complete	7	11	35	55

Based on table 7, it can be seen that in the first cycle, 13 students (65%) were in the incomplete category, and 7 students (35%) were in a complete category. In the second cycle, there was an increase in learning outcomes, where 9 students (45%) were in the incomplete category, and 11 students (55%) were in a complete category.

**4. CONCLUSION**

Based on the results of research on learning mathematics using instructional media in class X IPA Madrasah Aliyah DDI Ponre, it can be concluded that the presentation of the material for two cycles can improve the quality of the teaching and learning process. This can be seen from the average percentage of students who carry out activities in each implementation of the teaching and learning process in each cycle, which identifies students' increasing attention, interest, and motivation towards the subject matter given by the teacher. Therefore, it is expected that teachers and schools pay attention to the completeness of educational media to improve the quality and quality of education in general, especially for class X IPA students of Madrasah Aliyah DDI Ponre, Ponre District, Bone Regency.

**ACKNOWLEDGMENTS**

Researchers would like to thank the Ministry of Religion of Bone Regency, Madrasah Aliah DDI Ponre, Ponre Subdistrict, Bone Regency, which has supported and assisted researchers in providing data and information to achieve the objectives of this research.

**REFERENCES**

- [1] Istarani, & Intan Pulungan. 2015. “Ensiklopedi Pendidikan Jilid I”. Medan: Iscom Medan
- [2] Haryati, Titik dan Noor Rochman. 2012. “Peningkatan Kualitas Pembelajaran Pendidikan Kewarganegaraan Melalui Praktik Belajar Kewarganegaraan (Project Citizen)”. *Jurnal Ilmiah CIVIS*. Vol. 2, No.2. Tahun 2012
- [3] Djamarah, S.B & A. Zain. 2010. “Strategi Belajar Mengajar”. Jakarta: Rineka Cipta
- [4] Arsyad, A. (2013). “Media Pembelajaran”. Jakarta: PT. Raja Grafindo Persada
- [5] Rusman, Deni Kurniawan & Cepi Riyana. 2013. “Pembelajaran Berbasis Teknologi Informasi dan Komunikasi”. Jakarta: Raja Garafindo Persada
- [6] Hamzah, B Uno dan Nina Lamatenggo. 2011. “Teknologi Komunikasi dan Informasi Pembelajaran”. Jakarta : PT. Bumi Aksara
- [7] Purnomo, Catur Hadi. 2011. “Panduan Belajar Otodidak Microsoft Office Power Point 2010”. Jakarta: mediakita
- [8] Arikunto, Suharsimi dkk. 2011. “Penelitian Tindakan Kelas”. Jakarta: Bumi Aksara