

Interactive Learning Media on Mathematics Problem Solving Elementary School Students

Eka Hayati^{1*}, Zulfi Amri²

¹Master Program of Mathematics Education, Universitas Muhammadiyah Sumatera Utara, Indonesia

²Lecturer at Master of Mathematics Education, Universitas Muhammadiyah Sumatera Utara, Indonesia

* Corresponding Author. E-mail: ekahayati@gmail.com

Article Info	ABSTRACT
<p>Article History Received : 24 Mei 2022 Accepted : 23 Juni 2022 Published : 30 Juni 2022</p> <hr/> <p>Keywords: <i>Interactive learning media, problem solving, people with disabilities</i></p>	<p>The method used in this research is the experimental method. The effect of interactive learning media on mathematical problem solving for students with disabilities. The results of the validator's assessment indicate that the interactive learning media is in the very good category with an average score of 4.23 from the maximum range of 5. The practicality test of interactive learning media is indicated by a positive response from teachers and students. The results of the effectiveness test showed that interactive learning media was effective in improving problem solving abilities. This is indicated by the average problem solving ability of students who use interactive learning media to achieve individual and classical mastery. In addition, the average problem solving ability of students who use interactive learning media is better than those who do not use interactive learning media.</p>

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INTRODUCTION

Mathematics lessons are one of the subjects that are less attractive to students; this is evidenced by student learning outcomes which are generally below the minimum completeness criteria (KKM). One of the causes of mathematics being less attractive to students is because of the many formulas that must be memorized. The teacher factor is also the cause of students' lack of interest in mathematics, namely in delivery of material with what and how a teacher conveys the material to students.

Based on Permendiknas number 70 of 2009 which contains the organizers of inclusive education for students who have disabilities and have the potential for intelligence. Inclusive education is a regular education service that is combined with special education in one school system and gets the same treatment. Al Washliyah 30 Private Elementary School is one of the organizers of inclusive schools, where in the school there are several children who are in the disabled group.

Inclusive education is general education in which there are children with special needs (ABK) and other normal children who learn together in the learning process. The phenomenon of inclusive education refers to the needs of all children in getting an education, without any differences in the physical and psychological aspects of children (Wardani, et al. 2020). In implementing inclusive education, it means that schools must accommodate all children regardless of their physical, intellectual, socio-emotional, linguistic or other conditions (Olsen, 2003). Education is an effort to create an atmosphere of learning and learning, so that students actively develop their potential and skills in response to various problems in social life. (Sugiarti, N. 2022., Hidayat, M. 2020., Sesriani, Y. 2022., Husna, F. 2022)

Inclusive education requires that all children with special needs must receive services at school and in the classroom like normal children usually together in the learning process. Regular schools with an inclusive education orientation are most effective for overcoming discrimination, building an inclusive society, creating friendly communities, and achieving education for all (Smith, 2015). Schools need to pay attention to being able to modify and adapt them so that inclusive education is relevant to the local context, includes and educates all students in a friendly and flexible manner so that students can participate in the learning process.

Inclusive education provides educational services to all children, including children with special needs who will be educated together with other normal children to optimize all the potential and skills they have with full sincerity and so that they can better adapt to the surrounding social environment. The importance of inclusive education is that children with special needs can also socialize with other children. As has been implemented, children with special needs who enter the inclusive resource room are scheduled so that during the learning process they can be more organized, and during breaks they return to the regular class to play with friends in their class, to train them to be social with other people. Children with special needs often look different both physically and mentally and socially emotionally. They have special characteristics that result in adjustments in various fields, so that they still get the same rights as other children and even these adjustments must be able to optimize their development like other children (Muzdalifah, 2017). The adjustment in question is the adjustment of the environment that can accommodate the needs of all children, the adjustment of abilities, skills and knowledge of educators. Activities in the inclusive resource space emphasize more on self-development, meaning that learning carried out in the inclusive resource space is more on the motor system such as learning to cut, assemble beams, and so on (Mudjito, 2012).

So the child will be trained directly for practice so that he can concentrate and understand what he is doing (Mudjito, 2014). Learning for children with special needs at the Al Washliyah 30 Private Elementary School will from time to time be carried out in the inclusion resource room accompanied by a special assistant teacher which is carried out on a scheduled basis. The learning module is adjusted to the category of each child with special needs so that students better understand the materials provided and are adapted to the learning media. Interactive learning media is a technique or method used in the presentation of learning materials so that they are able to provide effectiveness for students in learning. The purpose of using interactive learning media is as a learning suggestion for students and learning companions other than textbooks. Geometry is one of the lessons that are equipped with many formulas; geometry is also one of the graduate competency standards for elementary students. In addition, geometry cannot be separated from our daily lives because geometry can also be used by students to solve problems in their daily lives.

Problem solving is one aspect of higher order thinking skills because in problem solving skills are needed to use various information from various aspects including the application of concepts, finding a pattern, making conclusions, and others can be developed better through problem solving (Suherman, 2003). The development of science and technology can encourage efforts to improve the quality of education through the use of technology in the teaching and learning process. The problem that is often faced in the teaching and learning process is that learning is still centered on the teacher because teachers are monotonous using conventional methods so that students become bored especially when faced with learning fields that contain many formulas. Teachers should be able to use effective and efficient media in delivering subject matter to students. In addition to being able to use media, teachers also need to be creative in developing their abilities in making learning media if the media does not yet exist (Hastuti and Budianti, 2014). The use of multimedia has been proven to help the mathematics learning process in terms of achieving the teaching objectives to be achieved. This is shown from the research results of Macaulay (2003) where the mathematics scores of students who use multimedia higher than the mathematics scores of students who did not use multimedia. This study aims to determine the effect of using interactive learning media on student problem solving in the

disabled group in the form of interactive CDs, especially in geometry lessons, namely the area of flat areas including triangles, squares and rectangles.

RESEARCH METHOD

In this study, the method used is the experimental method. Researchers use this method, because researchers have difficulty in determining the experimental class and control class randomly. Quasi-experimental design (Sugiyono, 2009), "is used because in reality it is difficult to get a control group used for research." In a study, it is often not possible to use some students from several schools to conduct experiments. Because students in a class are already conditioned for learning, so it is not possible to take experimental research by taking random samples for researchers. In practice, the researchers tested the treatment of mathematics learning using interactive multimedia with the help of computer media in the experimental class. While the control group used a conventional approach to learning mathematics. In this case, the researcher tries to compare the results of learning mathematics using interactive multimedia with conventional or ordinary learning models. The research design used in this study is the Nonequivalent Control Group Design.

The research sample is inclusive school administrators, namely students of Al Washliyah Private Elementary School 30, Medan-Labuhan sub-district. The population of this research is the sixth grade students of Al Washliyah Private Elementary School 30, Medan Labuhan sub-district. The research subjects were students with disabilities in class VI a SD Swasta al Washliyah 30, Medan Labuhan District. Research time in November-December 2019. YP. Al Washliyah's research site is 30, Medan Labuhan sub-district.

There are two types of instruments used in this study, namely test and non-test instruments. The test instrument used was a written test in the form of pretest, posttest and oral test results. While the non-test instruments are observation sheets and student questionnaires. The test instrument is used to see the measure of student success in learning. The pretest was carried out at the beginning of the treatment, aiming to see the initial abilities of students in the control group and the experimental group. While the post test is carried out after treatment, so that differences are obtained before and after treatment. Observation sheets are used to observe or assess ongoing learning, so that the effectiveness of learning can be known, as well as student activities. While the questionnaire was used to obtain an overview of students' attitudes towards the use of interactive multimedia in learning mathematics. The form of the questionnaire that was prepared referred to the Likert scale guidelines. Based on the test results of the test instrument questions, after being tested for validity, it is obtained

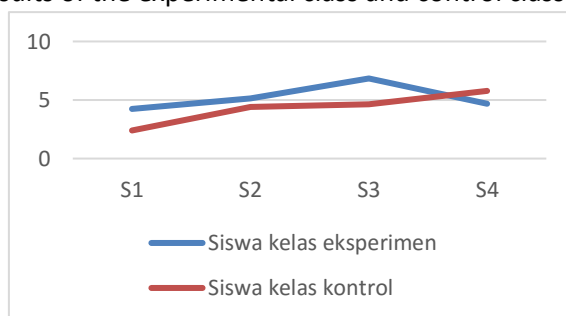
The result of the validity of the device is 0.43. According to Sugiyono (2009:178) states that "if the correlation of each factor is positive and the magnitude is 0.3 and above, then the factor has a strong construct." Therefore, it can be concluded that the instrument has good instrument validity. Furthermore, based on the calculation of the reliability of the test instrument, it was obtained that the reliability was 0.54. This means that the reliability is classified as moderate. The data analysis technique is intended to determine the effect of using interactive multimedia in mathematics learning on student learning outcomes through the difference in improving student learning outcomes between mathematics learning using interactive multimedia (in the experimental class) and conventional learning (in the control class). The data obtained from the research results were then analyzed by normality test using the Lilliefors test, homogeneity test using the F test and the mean difference test to answer the hypothesis using the t test. In this study, the data processed were data obtained from the experimental class and the control class on the pretest and posttest. Pretest data processing in the experimental class and control class was used to see the initial ability of the two groups. Meanwhile, post-test data processing was used to see the improvement in student learning outcomes in the experimental class and the control class.

RESULTS AND DISCUSSION

1. Learning Outcome Data

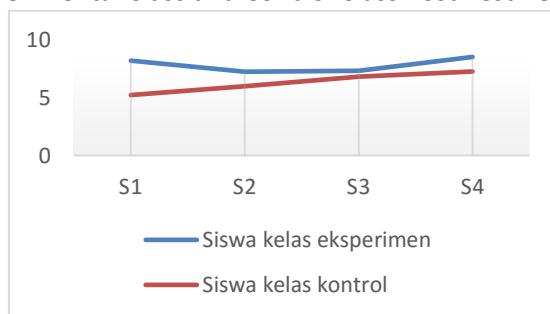
In accordance with the problems that the authors discuss in this study, the data needed in data processing is learning outcomes data. The pretest was carried out in the experimental class and the control class alternately. From these data, it can be seen that the ability of the experimental class and the control class is not much different. The average value of the experimental class was 5,22 while the control class average was 4,78. For more details, see the results of the pretest in the experimental class and control class, can be seen in the following line chart.

The results of the experimental class and control class pretest.



Furthermore, after carrying out the treatment or treatment in the experimental class and control class, it was carried out 6 times. Then students are given a post test to see the extent to which changes or improvements in learning outcomes. So, based on the data obtained, the post test results in the experimental class have an average value of 7.83 while the control class has an average value of 6.33. For more details, see the development of the post test results of the experimental class and control class can be seen in the line diagram below.

Experimental Class and Control Class Post Test Results



The data from the pretest and posttest results above were processed using a statistical approach. From the processing, the data obtained in the form of the calculation of the average score and the standard deviation of the results of the pretest and post-test, both of which can be seen below.

Study Group	Average value	Standard Deviation	variance
Experiment Class			
Pre-Test	5.22	2.28	5.24
Final Test	7,833	1.2485	1.558
Control Class			
Pre-Test	4.78	1.8	3.2418
Final Test	6,333	1.8786	3.5294

2. Analysis Prerequisite Test

a. Pretest Results

After the pretest data was collected, it was analyzed using the normality test, homogeneity test, and the mean difference test to test the hypothesis. From the results of the calculation of the normality test using the Lilliefors test, the value of Count for the control class is 0.1382 with $\alpha = 0.01$ and L_{table} is 0.239. So with the results of this test it can be concluded that $L_{count} < L_{table}$ which means the results of the pretest control class are normally distributed. While for the experimental class the price of Count is 0.1169 with $\alpha = 0.01$ and L_{table} is 0.239. Because $L_{count} < L_{table}$ it can be concluded that the results of the pretest in the experimental class are normally distributed.

After knowing the data is normally distributed, it is followed by homogeneity test using the F test. Based on the calculations, the experimental class variance is 5.24 and the control class variance is 3.24 with degrees of freedom (db) 17, obtained $F_{count} = 1.617$ with $F_{table} = 3,24$. Thus, $F_{count} < F_{table}$ i.e. $1,617 < 3,24$. Therefore, it can be concluded that the results of the second pretest have homogeneous variances.

Furthermore, for hypothesis testing, followed by t-test. From the calculation results, it is obtained that the t_{count} value is 0.64 with $x_1 = 5.22$, $x_2 = 4.78$ also the combined standard deviation (dsg) = 2.059, while the list t price is 2.73 with $\alpha = 0.01$ and db = 34. It turns out that $-t_{table} < t_{count} < t_{table}$ i.e. $-2.73 < 0.64 < 2.73$. Thus, t_{count} is between $-t_{table}$ and t_{table} , it can be concluded that the average of the two classes does not show a significant difference and that means that the initial abilities of the control class and the experimental class are relatively the same.

b. Post Test Results

Post-test data analysis was carried out after the post-test data had been collected which the teacher had previously conducted mathematics learning for research. In the control class learning takes place using conventional methods while in the experimental class learning uses interactive multimedia. Based on the results of testing the normality of the data with the Lilliefors test, it was found that the value of L_{count} for the control class was 0.1307 with $\alpha = 0.01$ and L_{table} was 0.239. So with the results of this test it can be concluded that $L_{count} < L_{table}$ which means the post results The control class test is normally distributed, while for the experimental class the value of L_{count} is 0.1703 with $\alpha = 0.01$ and L_{table} is 0.239. Because $L_{count} < L_{table}$, it can be concluded that the post test results in the experimental class are normally distributed. Because the post test data is normally distributed, it is continued with the homogeneity test using the test F. Based on the calculation of the experimental class variance of 1.5588 and the control class variance of 3.5294 with a degree of freedom (db) 17, the $F_{count} = 2.264$ with $F_{table} = 3.24$. Thus, $F_{count} < F_{table}$ i.e. $2.264 < 3.24$. Therefore, it can be concluded that the post-test results of the two variances are homogeneous. Since both variants are homogeneous, it is continued with the use of t-test with the aim of whether there is a significant difference between the two averages. class. From the calculation results, the calculated price is 2.82 with $x_1 = 7.833$, $x_2 = 6.333$ also the combined standard deviation (dsg) = 1.595, while the t_{table} price is 2.73 with $\alpha = 0.01$ and db = 34. $t_{count} = 2.82$ lies outside $-t_{table}$ and t_{table} . So it can be concluded that there is a significant difference between the control class and the experimental class. Thus the average experimental class is better than the control class average, it can be interpreted that the mathematics learning outcomes obtained using interactive multimedia are better than using conventional methods. In other words, there is a significant effect of using interactive multimedia on student learning, especially in problem solving.

c. Questionnaire Results

Based on the data that has been collected from the student attitude questionnaire, after each data is scored, it can be grouped into three categories, namely moderate, low and high. percentage 55.56%. This shows that students have a positive attitude towards learning mathematics using interactive multimedia.

3. Discussion of Research Results

Based on the results of statistical hypothesis testing, as stated above, it turns out that empirically the hypotheses proposed in this study have been proven to be accepted. It means "The use of interactive learning media in learning mathematics has a significant effect on solving math problems for students with disabilities at Al Washliyah 30 Private Elementary School on flat-shaped materials. In addition, there are other positive values obtained, namely the positive attitude of students towards learning mathematics by using interactive learning media. This is indicated by the majority of students' attitudes towards learning mathematics using interactive multimedia in the medium category with a percentage of 55.56 %.

This is in line with Dewi and Haryanto's research (2019) against the development of interactive multimedia which states that the development of interactive multimedia used in mathematics learning material addition to integers can improve student learning outcomes, namely the average score of 3.36 is obtained in a good category so that the media is suitable for use. in learning mathematics. Furthermore, research conducted by Nugraha and Muhtadi (2015) suggests that the development of multimedia learning mathematics on flat-sided geometrical materials can effectively improve student learning outcomes after using multimedia products with a pretest average of 4.96 and posttest obtained an average of 7.4 students have declared complete after obtaining results above the school KKM.

Furthermore Hery et al. (2018) shows that the development of interactive multimedia based on PMRI material on the area and circumference of a parallelogram is valid, practical and has a potential effect to improve student learning outcomes so that the multimedia that has been developed is effective as a means in the learning process.

Based on the results of product trials, interactive multimedia development research has the following advantages. First, this interactive multimedia is attractively packaged by displaying videos, audio, images, simulations and questions so that it can help increase students' motivation and interest in learning. Second, this multimedia displays interactivity on rectangular material, which can rotate and form a rectangle and on triangular material, multimedia interactivity can form various types of triangles. Third, the material on interactive multimedia is in accordance with the 2013 curriculum and mathematical content standards set by the government. Fourth, interactive multimedia can be used online and offline so that learning mathematics is not only for face-to-face but can be a source of independent learning for students. The advantages obtained are the advantages of the type of multimedia according to the research results of Amir et al., (2018) that interactive multimedia has advantages in the appearance and content of the media so that it can have a positive influence on the responses and motivation of students to learn mathematics.

In addition to having several advantages, interactive multimedia that has been developed also has the disadvantage that this interactive multimedia cannot be used on smartphones, multimedia can only be used on computers or laptops, and students must have basic skills in operating computers. The lack of products developed is in line with the results of Dewi and Haryanto's (2019) development, namely that the product can only be used if there are supporting facilities, namely computer equipment.

CONCLUSION

Based on the results of data analysis, it can be concluded that the use of interactive learning media has a significant effect on solving math problems for students with disabilities at Al Washliyah Private Elementary

School 30. In geometry lessons, namely building triangles, squares and rectangles, students have a positive attitude towards learning by using this. This can be seen from the attitude of students in the medium category with a percentage of 55.56 %.

From the research results, it can be suggested that: Mathematics learning in elementary school requires students to be able to develop reasoning and imagination power. The ability of reasoning power and imagination can help students to better understand the subject matter being taught.

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