The Effectiveness of Application of Nail Board Media to Student Learning Outcomes in Mathematics Learning Flat Building Materials in Class IV at MIS Jenggot 01

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Abstract

This research was motivated by the results of observations by researchers with fourth grade teachers at MIS Jenggot 01, it was obtained information that there were still many problems in the implementation of Mathematics learning in the Bangun Datar material, including teachers not using innovative learning models and not utilizing learning media so that students were passive and less enthusiastic about participating in learning. These problems have an impact on learning outcomes that do not achieve complete learning.The formulation of the problem in writing this thesis is Is the nailed board media effective in improving student learning outcomes in the fourth grade mathematics subject at MIS Jenggot 01? Field research (Field research) with a quantitative method approach is related to statistical methods. The data collection technique uses the test and documentation method. The activities in data analysis are the early stage test and the final stage test where there is a normality and homogeneity test and a balance test using the t-test. The results of this study indicate that there is an increase in learning outcomes, this can be seen from the difference in the average value of the experimental class and the control class where the average of the experimental class is 81.87 while the control class has an average of 64.38. The nailed board media is effective on the learning outcomes of fourth graders on the matter of Bangun Datar at MIS Jenggot 01 Pekalongan City. This can be seen from the significance value which is less than 0.05 (0.000<0.05).

Keywords: *Nailed Board Media, Student Learning Outcomes.*

A. Introduction

The term Mathematics according to Latin (manthanein or mathema) which means learning or things to be learned, all of which are related to reasoning. Mathematics is one of the oldest knowledge and is considered as the mother or tool and the basic language of many sciences. Mathematics is formed from the study of numbers and spaces which is an independent discipline and is not a branch of natural science. Understanding of Mathematics according to Roy Hollands, "mathematics is a complex but very well-organized system that has many branches." Mathematics at a low level includes arithmetic, geometry and algebra (part of mathematics and the extension of arithmetic, which is widely used

in various other disciplines, such as physics, chemistry, biology, engineering, computers, industry, economics, medicine and agriculture).[1]

According to Maswins, there is no unanimous agreement among mathematicians about the nature of mathematics itself. The objective of studying mathematics is not concrete but abstract. In general, lay people are only familiar with one branch of elementary mathematics called arithmetic or arithmetic can be defined as the science of various numbers that can be directly obtained.[2] According to experts in mathematics education, mathematics is a science that discusses patterns or order (pattern) and level (order). Once again this shows that mathematics teachers must facilitate their students to learn to think through existing patterns.[3]

Mathematics is a branch of science that has an important role in the development of science and technology, both as a tool in the applications of other fields of science and in the development of mathematics itself. Mastery of mathematics material by students becomes a necessity that cannot be negotiated in the management of reasoning and decision making in the increasingly competitive era of competition at this time. Mathematics is not a science that is only for its own sake, but a science that is useful for most of the other sciences. In other words, mathematics has a very essential role for other sciences, the main ones being science and technology.[4]

Cockroft (Shadiq) acknowledged the important role of mathematics, namely "It would be very difficult-perhaps impossible-to live a normal life in very many parts of the world in the twentieth century without making use of mathematics of some kind". or it would be impossible for a person to live in this part of the earth in the 20th century without the slightest use of mathematics. Therefore, to achieve student mastery of mathematics, it must be done by building an active, creative and innovative learning system that can activate students in the learning process.[5]

Many people do not like math, including children who are still in elementary school. They think that mathematics is difficult to learn, and most teachers are unpleasant, boring, scary, haunted, killer, and so on. This assumption causes them to be even more afraid to learn mathematics. This attitude of course resulted in their mathematics learning achievement getting worse.[6]

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[1] Roy Hollands, *Math Dictionary*, (Jakarta: Erlanga, 1995), p. 81.

[2] Intan Vandini, The Role of Confidence in Students' Mathematics Learning Achievement, *Jurnal Formatif Vol.5 No.3*,2015, p. 215.

[3] Nisrina, H., Agustin, D.S.R. and Mahmudah, U., 2021. Etnomatematika: Analisis Problem Solving Pada Mata Kuliah Program Linier Berbasis Kearifan Lokal. *JMPM: Jurnal Matematika dan Pendidikan Matematika*, *6*(1), pp.72-80.

[4] Indriyani, I., Rizqi, U. and Mahmudah, U., 2020. Bagaimana Kreativitas dan Keaktivan Mahasiswa Mempengaruhi Pemahaman Materi Abstrak Matematika Melalui E-Learning. *Al Khawarizmi: Jurnal Pendidikan dan Pembelajaran Matematika*, *4*(2), pp.112-131.

[5] Muhammad Daut Siagian, Mathematical Connection Ability in Mathematics Learning, *MES (Journal of Mathematics Education and Science) Vol. 2 No.1*, FKIP UISU,2016, p. 59-60.

[6] Kismiati, R.N., Muslih, M., Pramesti, S.L.D. and Mahmudah, U., 2021. Penerapan Metode Drill Pada Mata Pelajaran Matematika Pada Anak Berkebutuhan Khusus Gangguan Penglihatan (Tunanetra) di SLB Negeri 1 Pemalang. *IBTIDA-Jurnal Kajian Pendidikan Dasar*, *1*(2), pp.50-59.

Learning will be more meaningful if students are directly involved in the learning process.[7] In learning mathematics students must be able to find their own answers to the problems they find by using the solutions they have learned. In this learning process, the teacher only acts as a guide, not as a teller.[8] In the learning process it is very efficient to use media as a tool or intermediary to support students' attention and interest in learning, therefore as a teacher or educator, especially in elementary schools, learning media is needed. The word "media" comes from the Latin "medium" which means "intermediary" or "introduction". Furthermore, the media is a means of channeling messages or learning information that the source of the message wants to convey to the target or recipient of the message. The use of teaching media can help achieve learning success. The Danim emphasized that research results have proven the effectiveness of using tools or media in the teaching and learning process in the classroom, especially in terms of increasing student achievement. The limited media used in class is thought to be one of the causes of the weak quality of student learning.[9]

Thus, the use of media in teaching in the classroom is a necessity that cannot be ignored. This is understandable considering that the learning process experienced by students is focused on various activities to add knowledge and insight for the provision of life in the present and the future. One of the efforts that must be taken is how to create a learning situation that allows the learning experience process to occur in students by mobilizing all learning resources and effective and efficient learning methods.[10]

In this case, teaching media is an effective supporter in helping the learning process occur. In the learning process, teaching media is a container and channel of messages from the source of the message, in this case the teacher, to the recipient of the message, in this case the students. In broader terms, Yusuf Hadi Miarso defines teaching media as anything that can be used to stimulate students' thoughts, feelings, attention, and willingness so as to encourage the learning process in students.[11]

Viewed from the basic philosophy, learning is essentially a communication process that aims to convey messages/information so that it can stimulate the thoughts, feelings, and interests and attention of students. In the learning process, the development of teaching materials can be done in various ways, one of which is the development of teaching materials by optimizing the media.[12] Learning mathematics itself can be taught using various media, such as

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[7] Fatimah, Siti, and Umi Mahmudah. "How E-Learning Affects Students' Mental Health During Covid-19 Pandemic: An Empirical Study." *DWIJA CENDEKIA: Jurnal Riset Pedagogik* 4, no. 1 (2020): 114-124.

[8] Jero Budi D & Agusmanto J.B.H, *Mathematics Textbook for Junior High School 1st Printing*, (Yogyakarta : DEEPUBLISH, 2018), p. 1.

[9] Sudarwan Danim, *Educational Communication Media*, (Jakarta : Bumi Aksara, 1995), p. 1.

[10] A. Tabrani R & Daryani, *Successful Study Guide*, (Jakarta : Nine Karya, 1993), p. 3.

[11] Rusdi Susilana & Cepi Riyana, *Learning Media the nature of development, utilization, and assessment*, (Bandung : Wacana Prima, 2007), p. 4.

[12] Sapto Haryoko, The Effectiveness of Using Audio – Visual Media as an Alternative for Optimizing Learning Models, *Jurnal Edukasi @Elektro Vol. 5 No. 1*, 2009, p. 2.

the nailed board media that the author will use here. A nailed board is one type of media that can be used as a teaching aid to teach flat-building material. This media is in the form of a board that is driven by nails on its surface.

These nails are only half plugged in, half of the nails are left protruding onto the surface of the board in small square shapes. As explained by Ruseffendi, that nailed board is made of boards with nails driven in such a way that they can be used to demonstrate flat geometric shapes and their dimensions.[13]

Based on the results of the researcher's interview with the principal and class IV teacher at MIS Jenggot 01, Pak Choirun as the school principal has provided media facilities to all class teachers at MIS Jenggot 01 but there are class teachers who do not use these facilities. To be clearer, the researcher asked directly regarding the use of media facilities to Mr. Hendi as a class IV b teacher, he had not fully used the media. He only uses the blackboard as a medium during the process of teaching and learning activities.[14]

That way in class IV B they still use conventional learning, the responses from class teachers regarding media are very pleasant because they can help students to better understand the material to be taught. He admits that it is difficult for him to use the media because he has to prepare beforehand while he has little time to study mathematics. Seeing this, the researcher wants to apply nail board media to learning mathematics so that the teaching and learning process is more fun and exciting.[15]

The use of the nail board itself can use a rubber band as a tool to form the desired flat shape. The author himself is interested in researching about the nail board itself because it has advantages and disadvantages and is unique in its use. There are several advantages of this media, one of which is that the materials needed are affordable and economical to manufacture, while the drawback is that the nails will rust over time.

B. Research Method

The type of research used in this study is a quasi-experimental design (pseudo-experimental design). The choice of this design was due to the fact that the researcher was not able to strictly control the inclusion of external variables that affected the implementation of the experiment. Furthermore, the quasi-experimental research design is divided into two forms, one of which is the non-equivalent control group design which was chosen as the design in this study. Sugiyono revealed that "the design of the non-equivalent control group design is almost the same as the pretest-posttest control group design in the true

[13] Yohanes Lagadoni K, Thesis: The Use of Nail Board Media to Improve Student Learning Outcomes in Mathematics Learning Flat Shape Material for Grade 3 Students of SDN Sawit Sewon Bantul Yogyakarta, dalam https://core.ac.uk/download/pdf/83146502.pdf, (accessed July 6 2019 20:00 WIB)

[14] Choirun Nakhdlivin, *Principal MIS Jenggot 01*, Personal Interview, Beard, 7 October 2019.

[15] Hendi Susanto, *Classroom teacher IV B MIS Jenggot 01*, Personal Interview, Beard, 7 October 2019.

experimental design", except that in this design the control group is selected randomly.[16]

In this research approach, the author uses a quantitative research approach to answer the existing problems. Quantitative approach is a process in obtaining summary data by using certain methods or formulas.[17] This approach is used because the researcher explores to collect and analyze data in the form of numbers about the application of nailed board media to improve learning outcomes in learning mathematics with flat shapes in class IV at MIS Jenggot 01.

Arikunto states that the research variable is the object of research, or what is the focus of a research.[18] As for this research, there are two variables, namely the independent variable (X) and the dependent variable (Y).

a) Independent Variable (Independent Variable)

An independent variable is a variable that affects or causes the change or emergence of the dependent variable.[19] The independent variables in this study are divided into 2 categories, namely: X_1 = Nailed Board Media, with indicator: Using real world context, Involve student activity, Making students the subject of learning, Interactive learning process. X_2 = Conventional learning with indicators: The teacher's role as a learning manager, Learning orientation on learning materials, Learning is done through listening, question and answer, and reading; Students as learning objects who act as recipients,

b) Dependent Variable (Dependent Variable)

The dependent variable is a variable that is affected or becomes a result because of other variables (free variables). The dependent variable as (Y) in this study is the mathematics learning achievement of MIS Jenggot 01 students with a single indicator of learning outcomes.[20]

c) Research Data Collection Instruments and Techniques

As for finding and collecting research data, the research uses several methods, namely: a). Test method. A test is a series of questions or exercises or other tools used to measure knowledge, skills, and intelligence. The ability or talent possessed by an individual or group. This test is in the form of a written test to obtain data on student learning outcomes in the Mathematics subject of Bangun Datar class IV at MIS Jenggot 01, and this test is given to the control class and the experimental class to determine the difference in the results of the two classes. Instrument Test to determine the validity of the research questions. This is calculated by means of instrument trial analysis (validity and reliability); b) Documentation Method. The documentation method is looking for data about things or variables in the form of notes, transcripts, books, documentaries,

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[16] Sugiyono, Combination Research Model (Mixed Methods), (Bandung: Alfabeta, 2013), p. 118.

[17] Mahmudah, U., 2020. Metode statistika: Step by step. *Pekalongan: Penerbit NEM*.

[18] Suharsimi Arikunto, *Research Methods: a practical approach*, (Jakarta: Rineka Cipta, 2006), p. 99

[19] Darmanto, dkk, *Orientation Mix and Organizational Performance Application of Antecedent Variables, Moderation and Mediation in Scientific, cet. number 1* (Yogyakarta: CV Budi Utama, 2015), p. 80

[20] Nana Sudjana, *Teaching and Learning Outcomes Process Research*, (Bandung: PT Remaja Rosdakarya, 2001), p. 22

photographs, newspapers, magazines, inscriptions, meeting minutes, agendas, and so on. test method or to refine the test method.[21] The documentation method in this study was used to obtain data in MIS Jenggot 01 Pekalongan City, regarding relevant books, activity reports, photographs, names, and grades of experimental and control class students.

The research instrument used by the researcher in this study was in the form of a test to determine the achievement of student learning achievement through nailed board media and conventional learning. The test used to measure the achievement of mathematics learning outcomes contains questions that aim to measure the results of applying nailed board media and conventional learning to mathematics learning achievement by choosing one of the four multiple choices or answers provided on the question sheet. In this study, the researchers used the Mathematics UAS scores and tests in the form of pretest-posttest. Mathematics UAS scores are used to see if the balance between the experimental and control classes is the same or different. Then for the pretest-posttest questions, the researchers in this study made 15 multiple-choice questions that were tested.

C. Discussion

Several previous studies that are relevant to the research of researcher include: Istiqomah's research with the title Implementation of the Use of Color Beads Media in Mathematics Learning in Operation Material Counting Integers for Class IV MIS Bumirejo Pekalongan City in this study discusses the implementation of learning media in the form of color beads in Mathematics learning for Class IV MIS. Bumirejo Pekalongan City. The results of research that has been carried out in learning activities including in learning Mathematics can be said to be good and successful. This can be seen when learning takes place where students look enthusiastic in participating in learning, students are able to work on practice questions given by the teacher by getting scores above the KKM. The advantages of color beads media include affordable prices, can facilitate understanding and strengthen memory, can increase interest and motivation to learn, durable and easy to carry. The drawbacks of the color bead media are, among others, that it cannot be used for large numbers, requiring a long time allocation.

The similarity of this research with the research that will be carried out by the author is that they both use quantitative research, improve learning outcomes and apply learning media in their learning. But it is different from the use of learning media in previous studies using color beads media, while in the author's research using nailed board media. In addition, the object of research is the same in class IV.[22]

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[21] Suharsimi Arikunto, *Research Procedure A Practical Approach*, (Jakarta: Rineka Cipta, 2006), p. 231.

[22] Istiqomah, thesis: Implementation of the Use of Colored Beads Media in Mathematics Learning on the Material of Addition Counting Operations Integer Class IV MIS Bumirejo Pekalongan City,(IAIN Pekalongan, 2018).

Research from Ani Sari Safitri with the title Use of Picture Media in the Learning Process of Science Subjects in Grades V and VI at SDN Cepagan 02, Warungasem District, Batang Regency. Cepagan 02 Warungasem District, Batang Regency. The results of the first study, the use of picture media in the science learning process in Grades V and VI at SDN Cepagan 02, Warungasem District, Batang Regency by using picture media in the learning process is enough to help students to more easily understand the subject matter taught by educators, so that students do not quickly forget the subject matter being taught, can streamline time in the learning process, so the use of image media in learning is very helpful, because the use of image media in learning is to convey subject matter well, and also efficiently. So that the learning objectives can be achieved properly and carried out smoothly. Second, there are inhibiting factors and supporting factors in the use of this media. The inhibiting factors are the absence of projector and LCD screens and the limited number of printed books in the library, while the supporting factors are the presence of image media used in the science learning process in grades V and VI, and the existence of student printed books and student worksheets (LKS).

The similarity of this research with the research that will be carried out by the author is that they both use quantitative research, improve learning outcomes and apply learning media. But it is different from the use of learning media in previous studies using image media, while in this study the authors used nailed board media. In addition, it is different in the object of research in previous studies, the objects are students in class V and VI, while in this study the authors are in class IV.[23]

Research from Rindhy Antika with the title Efforts to Increase Understanding of Flat Shape Area Concepts through Nailed Board Media in Mathematics Learning Class III SD Negeri I Tanggulangin, Jatisrono District, Wonogiri Regency in this study discusses learning media in the form of a nailed board. From the results of this study, the class action in the first cycle showed an increase in understanding of the concept of the area of a flat figure marked by an increase in the results of each cycle for the area of Mathematics. Initially the average value in the first cycle was 64.5 with the percentage of students who scored 60 as many as 21 students (67.70%). In accordance with the performance indicators that have been set, namely students who reach the KKM (score 60) more than 80%, this research has not been successful and needs to be continued in cycle II. At the end of the second cycle the average score reached 74.5 with the percentage of students who scored 60 as many as 26 students (84%). From the results of the second cycle, it can be said to be successful because it is in accordance with the performance indicators that have been set and has increased from 67.70% to 84%. From the results above, it can be said that the research is in accordance with the performance indicators of using nailed board media to improve understanding of the concept of flat shape in Mathematics for third grade

[23] Ani Sari Safitri, Thesis : Use of Picture Media in the Learning Process of Science Subjects in Grades V and VI at SDN Cepagan 02, Warungasem District, Batang Regency, (IAIN Pekalongan, 2018).

students of SD Negeri I Tanggulangin. While the increase in student activity can be seen from the value of student activity, namely the first cycle of 81% and the second cycle to 95%. In addition to the student's value and activity, the increase can also be seen from the teacher's activity, namely the first cycle 81% and in the second cycle it becomes 93%. The use of nailed board media can find solutions to improve the understanding of the concept of flat shape in mathematics learning for third grade students of SDN I Tanggulangin.

The equation of this research with the research that will be carried out by the author is that they both use quantitative research, improve learning outcomes and apply nailed board media. In addition, it is different in the object of research in previous research, the object is class III students, while in this study the object of this research is class IV.[24]

D. Conclusion

Based on the results of the research and discussion of the influence of parenting styles on the learning motivation of fourth graders at MIS Jenggot 01, the authors conclude that: a) The application of nailed board media is very effective, especially in learning mathematics. Where before the application of the media, especially the experimental class, the score was quite low, but after the application of the nailed board media the value of mathematics subjects increased as explained above that in the experimental class an average value of 81.87 was obtained. While in the control class there are differences because the application of nailed board media is not enforced as the results of the data analysis above obtained an average value of 64.38; b) There is a difference in the application of spiked board media in learning mathematics on flat shapes in class IV at MIS Jenggot 01 with a calculated tcount = 4.583 and based on the t distribution table it is known at a significance level of 0.05 with db = 68 ttable = 1.99547. If $|t_o| \geq tt$ then Ho is rejected, Ha is accepted. It means that it can be concluded that there is a significant difference between variable I and variable II. And if $|t_o| \geq tt$ then Ho is accepted, Ha is rejected. It means that it can be concluded that there is no significant difference between variable I.

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