



The Effect of Using P3M Media on Understanding the Concept of Multiplication and Division of Fifth Grade Students

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Abstrak

Menanamkan konsep perkalian dan pembagian pada siswa dipengaruhi oleh media pembelajaran. Namun saat ini masih banyak guru yang belum menggunakan media pembelajaran dengan baik. Penelitian yang dilakukan bertujuan untuk menganalisis bagaimana pengaruh media P3M terhadap pemahaman konsep perkalian dan pembagian siswa. Metode yang digunakan dalam penelitian ini adalah metode Quasi Eksperimental dengan jenis yang digunakan adalah Posttest Only Control Group Design. Sampel dalam penelitian ini adalah 15 siswa sebagai kelas kontrol dan 15 siswa sebagai kelas eksperimen dari siswa kelas V. Penelitian ini menggunakan dua uji untuk menganalisis data yaitu uji normalitas (Shapiro-Wilk) dan uji hipotesis (Mann-Whitne). Karena data tidak memenuhi uji normalitas maka digunakan uji Mann-Whitney dan diperoleh hasil nilai signifikansi $0,001 < 0,05$ atau H_a diterima. Dapat dikatakan terdapat perbedaan penerapan media P3M pada konsep perkalian dan pembagian pada kelas kontrol dan kelas eksperimen. Jadi dikatakan terdapat pengaruh penggunaan media P3M terhadap pemahaman konsep perkalian dan pembagian siswa. Tidak lain adalah pembelajaran dengan menggunakan media pembelajaran P3M dalam memahami konsep perkalian dan pembagian pada siswa menjadi lebih efektif dibandingkan pembelajaran tanpa penerapan media.

Kata Kunci: Media P3M, Perkalian, Pembagian

Abstract

Instilling concept of multiplication and division to students is influenced by learning media. But currently there are still many teachers who do not use good learning media. The research conducted aims to analyze how influential the Papan Perkalian Pembagian Matematika (P3M) media is on students' understanding of the concept of multiplication and division. The method used in this study is a Quasi- Experimental method with the type used is Post-test Only Control Group Design. The sample in this study was 15 students as the control class and 15 students as the experimental class from fifth grade students. This study used two tests to analyze the data, namely the normality test (Shapiro-Wilk) and the hypothesis test (Mann-Whitne). Because the data did not meet the normality test, the Mann-Whitney test was used and the results obtained were a significance value of $0.001 < 0.05$ or H_a was accepted. It can be said that there are differences in the application of P3M media to the concept of multiplication and division in the control class and the experimental class. So it is said that there is an effect of using P3M media on understanding the concept of multiplication and division of students. Nothing but learning using P3M learning media in understanding the concept of multiplication and division in students becomes more effective than learning without the application of media.

Keywords: P3M Media, Multiplication, Division

History:

Received : July 05, 2023

Revised : July 10, 2023

Accepted : September 28, 2023

Published : October 25, 2023

Publisher: Undiksha Press

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1. INTRODUCTION

Instilling in students an understanding of the concepts of multiplication and division is very important. This is because multiplication and division in everyday life have indispensable functions. Just as multiplication is used to determine the price of more than one item and division is used to determine the number of objects that can be given to several people with the same amount (Jayadi, 2022; Owusu-Mensah & Baffour, 2015). Instilling concept of multiplication and division to students is influenced by learning media. Learning media that are interesting for students will make it easier for students to understand the material taught by the teacher. The use of learning media helps students in the learning process, through the right learning media, the expected learning objectives will be easily achieved (Akbar et al., 2020; Arif & Muthoharoh, 2021; Mardhotillah et al., 2023).

But currently there are still many teachers who do not use good learning media, even there are still many teachers who use conventional methods in learning activities, namely the lecture method so that students feel bored quickly and inhibit the student learning process because students do not have motivation in learning (Febtriko et al., 2019; Hidayat & Lia, 2020). Low student learning motivation is caused by negative perceptions of students who consider mathematics difficult greatly affect the learning process and result in low student learning outcomes (Kholil & Safianti, 2019; Maesaroh, 2013; Sari et al., 2020). Conventional methods that are widely used by teachers in the learning process result in students feeling bored in the process of delivering material so that students do not understand the concept of the material given by the teacher (Asih & Ramdhani, 2019; Kurniawati, 2022). Therefore, it is necessary to adjust the way that helps in delivering material, especially in mathematics learning.

The use of learning media is one way or tool to help form a fun learning gym so that the learning process can run naturally and not monotonously and to facilitate the delivery of material in the learning process (Bopo et al., 2023; Kaufmann, 2018). Previous study explained through the results of his research that using Musi board media can improve students' ability in counting operations such as multiplication and division (Dada, 2022). Other study explained that the use of a combination of the probing prompting model with the recitation method was proven to significantly affect the average ability to understand mathematical concepts in students (Ramadhan & Eminita, 2022). There is research concluded that using marbles can improve the understanding of the concept of calculating multiplication in students (Hidayati et al., 2023). Other research explained that learning with the use of domino card media in multiplication and division of integers can improve the ability of learning outcomes of grade VII-A students at Mts. Alkhairaat Kalukubula (Mailili, 2018). Other one explained that mathematics smart bottle cap learning media can improve student learning outcomes (Zumrotun & Attalina, 2020). Supported by study that revealed that the use of bamboo dancing media can increase understanding of the concepts of multiplication and division of whole numbers (Wahyuningtyas, 2017). Then there is study explained that the mathematics learning outcomes of students who received learning using multiplication glass media were better than without using multiplication glass media (Rismayanis et al., 2022).

Based on the results of previous research, the same research has been conducted explaining that the use of a combination of the probing prompting model with the recitation method is proven to significantly affect the average ability to understand mathematical concepts in students (Rahmadhan & Eminita, 2022). There are differences in this study lies in the learning media, education level and teaching material. The media that researchers use is P3M media. Papan Perkalian Pembagian Matematika (P3M) media is a modified media from the traditional game "Dakon". This medium is in the form of rectangular boards made of cardboard. It has 12 block-shaped bags made of cardboard and inside there are counting sticks. The way P3M media users are the same as we play dakon is by filling blocks with counting sticks with the number of sticks following the given problem. Furthermore, the level of education that the researchers used was elementary school education and the material that the researchers used was multiplication and division (Handayani et al., 2022; Idham Sumirat, Trimurtini, 2017).

As is known, students need the concept of multiplication and division to build critical thinking skills and to do repeated addition and subtraction in everyday life. Concept understanding is an ability to understand concepts that can be adjusted and able to master the material provided (Wati & Purwanti, 2022; Yenni & Malalina, 2019). In addition, understanding concepts is a mathematics learning goal that must be owned and achieved by. Therefore, the application of learning media is needed in a lesson. The existence of media in the learning process makes students helped in learning and understanding the material provided (Ramadhan & Eminita, 2022; Wahyuningtyas, 2017). The use of media will make

learning fun and interesting. In addition, students' responsibility in completing assignments well is able to strengthen students in understanding the concept (Kuswanto et al., 2021; Mee Mee et al., 2020).

According to this description, the purpose of this study is to analyze how influential the Multiplication and Mathematical Division Board (P3M) media is on students' understanding of the concepts of multiplication and division. This research is also expected to provide information to teachers about the Multiplication and Division Board media in helping the student learning process in increasing students' understanding of the concepts of multiplication and division.

2. METHODS

The type of research used is Quasi-Experimental research with a Quantitative Approach. The design used in this study is Posttest Only Control Group Design by measuring at the last moment of the study so that with this the researcher is able to know the purpose of the study (Sugiyono, 2019). This study involved two classes, namely the experimental class and the control class. The experimental class is a class that gets treatment and the control class is a class that does not get treatment (Sumilat, 2018). In this study, the experimental class used P3M learning media, while the control class did not use P3M learning media.

The variables used in this study are the influence of using P3M media as an independent variable and understanding the concept of division multiplication as a non-free variable. This research was conducted at the Indonesian Citizen Education Center (PPWNI) Klang Malaysia. The population used in this study was grade V students with a total of 30 students. The sample in this study was 15 students for the control class and 15 students for the experimental class. In this study, data collection used an assessment instrument in the form of a test of understanding the concept of multiplication and division given after carrying out the learning process according to the material in the form of an essay (posttest). The steps taken according to the method in this study: (1) validation of the research instrument first; (2) the instrument validation test on the posttest question items aims to determine the accuracy and consistency of the instrument using the Product-Moment correlation test (Aliyah & Purwanto, 2022; Suyanto & Gio, 2017).

This study used two tests to analyze the data, namely the normality test and the hypothesis test. The normality test in this study uses the Shapiro-Wilk test with the condition. After being tested with a normality test, it turns out that from these data the results obtained are abnormally distributed or the probability value is smaller than 0.05. Therefore, to prove whether or not there is an influence of the use of P3M learning media on the understanding of the concept of multiplication and division of class V PPWNI Klang, it is necessary to test the hypothesis using the Mann-Whitne test.

3. RESULTS AND DISCUSSION

Result

To find out the results of differences in understanding the concepts of multiplication and division, the data is processed using frequency distribution. For calculation results can be seen in Table 1. Base on Table 1 from the minimum completeness criteria (KKM) at PPWI Klang Malaysia, which is 70. It can be seen from these data for the values of \bar{X} , Me, Xmax in the experimental class and the control class have the same as meeting the KKM. While \bar{X} for the experimental class is higher than the control class. Before knowing that the two data are normally distributed and homogeneous, a normality test must first be carried out and then a hypothesis test. For normality results using the Shapiro-Wilk test can be seen in Table 2.

From Table 2 show normality test results from the experimental class and the control class have similarities in the probability number obtained less than 0.05, then H0 is rejected and the data is abnormally distributed. Because the data does not meet the normality test and the researcher will see the difference between the control class and the experiment, then the next hypothesis test that will be used is the Mann-Whitney hypothesis test the results can be seen in Table 3. Judging from Table 3, the Sig values are $0.001 < 0.05$. Therefore, according to the reference for making the Mann Whitney test above, it can be concluded that Ho was rejected. Thus, it can be said that there is a difference from the application of P3M media to the concept of multiplication and division in the control class and experimental class. Because there are significant differences, there is an influence on the use of P3M media on the understanding of the concept of multiplication and division of PPWNI Klang Malaysia students.

Table 1. Understanding the Concepts of Multiplication and Class Division Experiments and Controls

No.	Statistics	Group	
		Experiment	Control
1	\bar{x}	92.33	72.74
2	Me	96.00	90.00
3	x_{max}	100	98
4	x_{min}	75	10
5	s	7.641	33.479

Table 2. Normality Test Results Using Shapiro-Wilk Test

No.	Statistics	Group	
		Experiment	Control
1	n	15	15
2	Sig	0.009	0.000
3	α	0.05	0.05
4	H_0	Rejected	Rejected

Tabel 3. Results of Homogeneity Test

		sig
Hasil Belajar Matematika	Based on mean	.604
	Based on median	.830
	Based on median and with adjusted df	.830
	Based on trimmed mean	.678

Table 4. Results of Hypothesis Test Using Mann–Whitney Test

No.	Statistics	Group	
		Experiment	Control
1	<i>n</i>	15	15
2	<i>Sig</i>	0.001	0.001
3	<i>α</i>	0.05	0.05
4	<i>H₀</i>	Rejected	Rejected

Discussions

Based on the results of the study, it was found that there was an influence on the use of P3M media in increasing students' understanding of the concept of multiplication and division. This can be seen from the results of the study which shows the significance value of the mann-whitney test results which show a value of 0.001 smaller than 0.05 ($0.001 < 0.05$). The result means that H_0 was rejected so that the use of P3M media affected the understanding of the concept of multiplication and division in Malaysian PPWNI Klang students. This can also be seen in the test results of students where the average score of the experimental class is higher than the average score of the control class students. This proves that using P3M media can affect the understanding of student multiplication and division conditions.

In accordance with research conducted by previous study that students' mathematics learning outcomes after being introduced to learning media are better before using media in learning (Rismayanis et al., 2022). This can be seen from the significant difference in the ability to understand concepts between students who learn learning media and students who have not received learning with media. With the P3M learning media in multiplication and division materials, it can be ascertained that students are able to increase their understanding of the material that has been given, students are more actively interacting and a different atmosphere during the learning process because the learning carried out is more interesting and students are able to solve problems well.

This is supported by the opinion regarding the advantages of using media in the learning process is that it allows students to be able to improve learning, interaction between students is more visible and improves students' skills in understanding teaching materials and requires students to think, remember, predict and calculate (Imam et al., 2018; Rismayanis et al., 2022). The use of appropriate and good learning media during the learning process greatly supports students' understanding of the material presented by the teacher (Rejekiningsih et al., 2021; Rosalina & Suhardi, 2020). This is evidenced by the results of research found using P3M media students better understand the concepts of multiplication and division. Meanwhile, if you do not use learning media, students tend to be passive and easily bored so that students' understanding of the concepts of multiplication and division is not understood well enough (Aminah & Kurniawati, 2018; Owusu-Mensah & Baffour, 2015).

The obstacles during the learning process using P3M media are limited media and time, making some students unable to operate learning media. In addition, there are still many students who are not confident in the results they get. Another thing is that the class is less conducive because many students wander around and disturb the theme who are trying to operate learning media. So it is recommended that further researchers can conduct follow-up research to answer these weaknesses. So based on the findings and discussion of the research, it can be said that using the media of the Multiplication and Division Board of Mathematics (P3M) affects students' understanding of the concept of multiplication and mathematical division in PPWNI Klang Malaysia.

4. CONCLUSION

Based on the results of research and discussion on the influence of the use of Multiplication Board and Mathematical Division media on the understanding of the concept of multiplication division in grade V students at the Indonesian Citizen Education Center in Klang, Malaysia, produced a conclusion that the use of P3M media proved to have a significant influence on the average understanding of the concept of multiplication and division of students. It can be interpreted that there is a difference between understanding the concept of multiplication and division using media with understanding the concept of multiplication and division without using media. It is none other than learning using P3M learning media in understanding the concepts of multiplication and division in students to be more effective than learning without the application of learning media.

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