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USE OF EXPERIMENTAL METHODS WITH BUILDING SPACE MEDIA TO IMPROVE THE UNDERSTANDING OF THE CONCEPT OF BUILDING SPACE SURFACE AREA

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Abstract

Utilization of Media building models to Improve Mathematics learning outcomes in Ggrade VI elementary schools. This study describes the extent to which the use of geometrical media can improve students' mathematics learning outcomes in the basic competence "Calculating the surface area of geometric shapes" for Grade VI students of SD Negeri Blederan. The form of this research is Classroom Action Research (CAR) through geometric media with experimental methods. The number of students in class IV-B of SD Negeri Blederan is 15 students (11 male students and 4 female students). The source of the data from this study came from teaching and learning events in Mathematics with the basic competency "Calculating the surface area of a geometric shape" in the classroom, teachers and documents in the form of a list of Grade VI students' grades for the 2021/2022 academic year. Data collection techniques were carried out through observation, testing and assignment of questions. Research procedures include problem identification, problem analysis, preparation of action plans, implementation of observational actions and preparation of reports. The research process was carried out in 2 cycles, each cycle was carried out in 2 meetings which included action, action planning, action implementation, observation, analysis and reflection. Based on data on students' test scores, there has been an increase in the average score starting from before the remedial action of learning (pre-cycle), Cycle I and Cycle II. The average score before the learning corrective action was implemented was 59.3, after the learning corrective action in Cycle I the average value became 71.3 and 86.7 in Cycle II with KKM 70. This means that learning by experimental method and utilizing building media models in mathematics provides great benefits to the learning outcomes of class VI.

Keywords: Experimental Methods, Mathematics Learning Outcomes, Media building models

Abstrak

Pemanfaatan media bangun ruang untuk meningkatkan hasil belajar Matematika kelas VI sekolah dasar. Penelitian ini menggambarkan sejauh mana penggunaan media bangun ruang dapat meningkatkan hasil belajar Matematika siswa pada kompetensi dasar “Menghitung luas permukaan bangun ruang” untuk siswa Kelas VI SD Negeri Blederan. Bentuk penelitian ini adalah Penelitian Tindakan Kelas (PTK) melalui media bangun ruang dengan metode eksperimen. Jumlah siswa kelas IV-B SD Negeri Blederan yaitu 15 siswa (11 siswa laki-laki dan 4 siswa perempuan). Sumber data dari penelitian ini berasal dari peristiwa belajar mengajar Matematika dengan kompetensi dasar “Menghitung luas permukaan bangun ruang” di dalam kelas, guru dan dokumen yang berupa daftar nilai siswa Kelas VI tahun pelajaran 2021/2022. Teknik pengumpulan data dilakukan melalui pengamatan, tes dan pemberian tugas mengerjakan soal. Prosedur penelitian meliputi identifikasi masalah, analisis masalah, pernyusunan rencana tindakan, implementasi tindakan pengamatan dan penyusunan laporan. Proses penelitian dilaksanakan 2 siklus, masing-masing siklus dilaksanakan dalam 2 pertemuan yang meliputi tindakan, perencanaan tindakan, pelaksanaan tindakan, observasi, analisis dan refleksi. Berdasarkan data nilai ulangan siswa telah terjadi peningkatan rata-rata nilai mulai dari sebelum tindakan perbaikan pembelajaran (pra siklus), Siklus I dan Siklus II. Rata-rata nilai sebelum tindakan perbaikan

pembelajaran dilaksanakan adalah 59,3, setelah tindakan perbaikan pembelajaran pada Siklus I rata-rata nilai menjadi 71,3 dan 86,7 pada Siklus II dengan KKM 70.

Kata Kunci: Metode Eksperimen, Hasil Belajar Matematika, Media Bangun Ruang

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INTRODUCTION

Various efforts to renew the curriculum, improve the teaching system, and improve the quality of teachers' abilities are some of the efforts to improve the quality of learning. There are many things that can be taken to achieve these goals, one of which is how to create a good learning atmosphere, knowing the habits and pleasures of students in learning so that teachers can choose learning strategies that are appropriate to the situations and conditions in the classroom.

The common problem that occurs in learning in elementary schools is the low achievement of students' mathematics learning. This has been proven by the average daily test per subject Mathematics always produces low results, especially on the subject of geometric shapes. Grade VI students at SD Negeri Blederan, Mojotengah District, Wonosobo district only obtained an average score of 59.3 with a KKM of 70. Most students felt that geometric material was difficult material to learn, even though geometric material only discussed calculating the volume of geometric shapes and calculating the sum of the areas of all the sides of a geometric shape or often known as the surface area of a geometric shape.

Another factor that causes low learning outcomes in Mathematics is that students' interest in learning Mathematics is very low. This happens because when the teacher delivers learning material, it is not accompanied by learning media (props), instead it only relies on the lecture method. So that students are not interested in learning and understanding mathematics material. With the attitude of the teacher who tends to use learning methods that are monotonous without any variation, it can cause a feeling of boredom for students in interpreting the teacher's explanation. In order to overcome this problem, it is only natural that a teacher is required to use learning media and methods in learning activities with the aim of making it easier for students to understand the mathematics learning material being taught.

Examples of media and learning methods that can be used for sixth grade elementary school children are the "Build Space" media and the "Experimental" method. Most students feel that geometric material is very difficult to learn. Through the intermediary of geometric media that is applied to the experimental method where students will conduct experiments directly, so that they can form ideas or thoughts in solving a problem so that they can overcome student learning obstacles. In addition, through this media and method students can also distinguish between the sides of a flat shape and the sides of a geometric shape and students can know firsthand the shapes of the sides as well as remind students about the area of a flat shape. So that not only the understanding of geometric material is optimal, but student learning outcomes also increase. This is supported by the opinion (Rahmanelli, 2005) which states that if students

are involved and experience themselves or students participate in the learning process, student learning outcomes will be better and learning material will also be remembered longer by students. Based on the statement above, the researcher (teacher) concludes that the use of media and learning methods can support success in student learning both in understanding the material and in achieving optimal learning outcomes. And this is what encourages researchers to improve learning in Mathematics through Classroom Action Research (CAR).

In addition to concretizing the concepts contained in learning, geometric media can also make it easier for students to receive material about the surface area of geometric shapes. According to (Amis Kamar, 2002)the function of spatial media in learning mathematics is as follows: (1) With the media students will pay more attention to learning mathematics because students feel attracted and positively attracted to mathematics; (2) By presenting abstract mathematical concepts in concrete form, students with lower levels of understanding will find it easier to understand the material; (3) Media can help power point space; (4) Students will realize the relationship between learning and the objects around them; (5) Abstract concepts presented in concrete form in the form of mathematical models can be used as objects of assessment. the use of geometric media accompanied by experimental methods is a very good combination. According to (Ramayulis, 2002), in his book "Methodology of Islamic religious education" defines that the Experimental Method is a teaching method that is carried out by students to carry out experiments on certain subjects. Meanwhile, according to (Djamarah, 1995) suggests that "method Experiment is a way of presenting lessons where students do experiments by proving yourself something learned. (Sumantri, 1999) suggests that "the experimental method is as a way of teaching and learning that involves students with experiencing, testing and proving for themselves the process and results of the experiment. Implementation of the experimental method really helps students in the process learn them. With this method students are given the opportunity to experience it for themselves or do it yourself, follow the process, observe an object, analyze, prove, and draw their own conclusions about an object, situation or certain process. Thus, students are required to experience themselves, seek truth or trying to find a law or proposition and draw conclusions
from the process he went through. The method can also be interpreted as a systematic way of doing things an activity to achieve a goal. Meanwhile, according to (Mappasoro, 2007) method is "the way/way of presenting/implementing activities to achieve goals".

METHOD

The classroom action research model According to Arikunto, Suhardjono, and Supardi "Broadly speaking, there are four stages that are commonly passed, namely: (1) planning, (2) implementation, (3) observation, and (4) reflection" (2010: 16) . This classroom action research procedure follows the action research model according to (Arikunto, 2010) which consists of four stages, namely planning, implementing, observing, and reflecting. The following is a chart of the stages of action research according to Arikunto, Suhardjono, and Supardi:

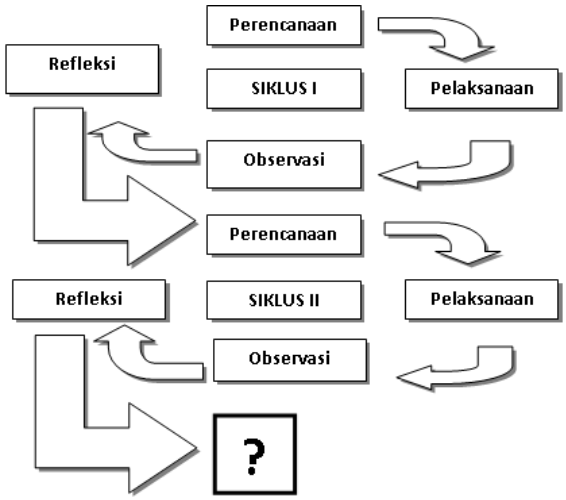

Figure 1. Class Action Research Procedures

This research uses a qualitative approach with the type of PTK research. This research will be carried out in 2 cycles, in each cycle consisting of planning, implementation, observation and reflection. The research will be carried out for four months at Blederan Public Elementary School, Mojotengah District, Wonosobo Regency in the 2021/2022 academic year in semester one. The population of this study were 15 grade VI students consisting of 11 male students and 4 female students. The research variable consists of two variables, the independent variable in this study is the experimental method and spatial media while the dependent variable is the result of learning mathematics. The technique to be used in this research is test and observation.

The form of the test used is in the form of a written test covering limited fields and descriptions. The instrument used for observation observes the behavior of students and teachers during the learning process. The things observed were the attitude of cooperation in groups, the ability to work on cube root problems in various ways, the ability to present the results of discussions, and the enthusiasm to participate in PBM. The validity is obtained from the triangulation technique. The data analysis technique uses descriptive comparative for quantitative data, namely comparing the initial condition test scores, the test scores after the first cycle and the test scores after the second cycle. As for the qualitative data, it was analyzed using a qualitative descriptive analysis based on the results of observations and reflections from each cycle.

RESULTS AND DISCUSSION

Results

Research through the use of experimental methods with geometric media on learning Mathematics about calculating the surface area of geometric shapes was carried out in 2 cycles. Each cycle consists of 2 meetings, with a time allocation of 2 x 35 minutes for each meeting. The following is the average data from observations of teachers regarding the use of experimental methods with geometric media in mathematics learning in cycles I and II.

Table 1. Comparison of the Use of Experimental Methods with Building Space

	Cycle I	Cycle II
Average	3,34	3,59
%	83,53	89,88

Based on table 1 it is concluded that the use of experimental methods with geometric media in the mathematics learning process for teachers has increased at each elbow. Based on the data, it can be seen that in cycle I, the average was 3.34 with a percentage of 83.53%. In the second cycle there was an increase in the average to 3.59 with a percentage increase of 6.35% to 89.88%. Apart from being based on learning process scores, research also uses data on student learning outcomes. With the following results:

Table 2. Comparison of Student Learning Outcomes in Initial Conditions, Cycles I and II

Action	Average	%	
		Complete	Not Finished
Initial Conditions	59,3	56,67	43,33
Cycle I	71,3	75,86	20,55
Cycle II	86,7	86,21	12,54

Based on table 2 regarding the comparison of student learning outcomes, it can be seen that there was an increase in the percentage of completeness of student learning outcomes in the initial conditions of 56.67% then in cycle I there was an increase in the percentage of completeness of student learning outcomes by 19.9% to 75.86%, in the second cycle also saw an increase in the percentage of 10.55% to 86.21%.

Discussion

The use of experimental methods with geometric media is a combination of learning methods and media that can provide a new atmosphere in the learning process, especially in learning mathematics about the surface area of geometric shapes. This is in accordance with the opinion Moeslichatoen (Meiliawati, 2015) stated that in choosing a learning method one must also pay attention to the characteristics of the child that children are generally children who are always active who have a strong curiosity, like to experiment, are creative, have imagination and like to talk. The experimental method is a method which is a method that involves children directly in learning. Doing a simple experiment can attract the attention of the child so that the child is able to imagine according to the child's abilities and characteristics (Durmus, 2010). Besides that, (Haudi, 2021) learning using the experimental method in which both the teacher and the child conduct an experiment to find out the effect or result of an action.

The use of experimental methods with geometric media in Mathematics learning about geometric surface area will provide direct experience for students to do so that learning is carried out not only knowing or memorizing what is conveyed by the teacher but being able to practice it directly (Hasnida et al., 2011). In addition to concretizing the concepts contained in learning, geometric media can also make it easier for students to receive material about the surface area of geometric shapes. (Amis Kamar, 2002). The use of geometric media will greatly affect the results of learning mathematics because it is more concrete with the material presented (Saleh, 2011).

CONCLUSION

The results of learning Mathematics through the experimental method assisted by geometric media can improve the learning outcomes of class VI students of SD Negeri Blederan, Mojotengah District, Wonosobo Regency Semester 1 of the 2021/2022 Academic Year. The hypothesis is supported by data obtained from the results of class action in two cycles. The results of these measures showed an increase in the class average score from 59.3 in the pre-cycle to 71.3 in the first cycle, and increased again to 86.7 in the second cycle. Learning completeness also increased from pre-cycle 56% to 73% in cycle I, and increased again to 86% in cycle II. This success is also because students when participating in learning always have a positive attitude, namely students are more active and enthusiastic in learning learning material.

ACKNOWLEDGMENTS

Based on the conclusion there are several suggestions that the author can convey:

1. The teacher as a science facilitator is able to provide interesting activities for students.
2. Collaboration between physics teachers is needed in an effort to optimize students' abilitiesin learning physics. This collaboration is a means of sharing teaching experiences according to the learning strategies, methods and learning media used by each eacher.
3. The teacher should be able to know the level of student interest in learning physics as early as possible, this is the first step to foster and improve student learning outcomes

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