

Can the Demonstration Method via YouTube Improve the Mathematics Learning Outcomes of Grade V Students?

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Abstract

The lack of skills of educators in using varied teaching methods causes low learning outcomes and a lack of active student involvement in understanding spatial and volume material in Mathematics lessons. This research aims to investigate the effect of using the demonstration method via YouTube on the Mathematics learning outcomes of class V students regarding geometric shapes and volumes. This research uses the classroom action research (PTK) method. It is hoped that the use of YouTube as an interesting and easily accessible learning media source can help students understand Mathematics concepts. The participants in this research were 25 class V students. Based on the results of quantitative data analysis, it was found that students' grades increased in each cycle. In the pre-cycle, 68% of students completed. Meanwhile, in cycle 1, 72% of students completed. Then in cycle 2 students completed 100%. From the results of these data, it can be concluded that there has been an increase in students' Mathematics learning outcomes in space and volume material using the demonstration method via YouTube Video Media.

Keywords: Demonstration, YouTube, Learning outcomes, Mathematics

Introduction

From elementary school to higher education, the government's quarantine policy required students to study at home in early 2020 to reduce contact that could potentially spread the COVID-19 virus. This can make learning more difficult for students, especially in elementary school learning. This is because elementary school students learn while playing, which is done face-to-face, but during the pandemic, learning is done online or via the internet (Zaini, 2019). With limited interaction between students and educators, it causes a decline in student learning outcomes (Oktaviani et al., 2022).

The learning method is a part that influences student learning outcomes. Using various influential methods to attract attention during the learning process is adjusted to the needs of students (Rozania et al., 2019). This is supported by research that proves that various learning approaches can improve student responses and have an impact on better learning achievement results (Hackathorn et al., 2011). In an effort to improve the quality of student learning, especially in the field of Mathematics, it cannot be separated from the influence of learning quality factors, one of which is the teaching method of educators at school. One of the teaching methods is the demonstration method. With the demonstration

method, teaching becomes easier to understand and more concrete, so that the teaching process becomes more interesting. The demonstration method stimulates students to actively observe, adapt theory and real life, and encourage them to try new things (Sukerti, 2021). Demonstrations can be very effective in engaging students, generating interest in a topic, and improving student learning. A key component of an effective demonstration is the active involvement of students throughout the teaching and learning process (Morgan et al., 2007).

There are various problem factors faced in learning Mathematics such as students, educators or adequate facilities for learning activities. In accordance with observations in class V, it was found that the use of conventional methods, namely the lecture method. It was dominant in learning process activities. This method is a learning model that is centered on educators or can be said to be teacher centered, has not used other learning resources apart from educators and books. This triggers students to be less enthusiastic and become passive when understanding Mathematics material. This impact resulted in a decline in learning outcomes for grade V Mathematics during the pandemic, especially in the material on spatial and volume structures. This is in line with Mulyasa (2013) who stated that the dominant lecture method in education often makes students passive and less interested in interacting with learning materials, which leads to low student understanding of mathematical concepts.

From another aspect, there are many sources of student learning through learning videos available on YouTube, which students can use to learn. The condition of the utilization of facilities and infrastructure has not been maximized by educators, which makes Mathematics lessons more difficult, so that students do not understand the information transfer process. As a result, students have low quality Mathematics learning. This is supported by research conducted by Nugroho et al., (2017) which prove lack of adequate technological support, the process of transferring information and understanding mathematical concepts becomes more difficult for students. During the COVID-19 pandemic, schools used various social media services to deliver lessons more comprehensively without having to deliver lessons personally to students. The existence of learning media has great potential to improve the quality of the teaching and learning process (Inayah, 2023). Social media is usually used to communicate, exchange messages, search for information and as a learning medium. This is supported by Kaplan et al., (2010) who stated that social media is used for various purposes, including communication,

sharing information, and also for educational purposes. There are several types of social media such as WhatsApp, YouTube, Instagram, Facebook, Twitter, and others (Antoni, 2018). This is in line with research that proves that students get higher results after integrating Facebook, Twitter, and YouTube into online classes in Mathematics lessons. In this digital era, social media and online video sharing platforms, such as YouTube, have become very popular tools in the field of education as teaching media (Alhija, 2021). At the elementary level, the use of YouTube as a teaching medium has also entered the realm of learning at various levels of schools, including elementary schools (Latip, 2020). This is supported by research by Setiyadi et al., (2022) which shows that YouTube is the most preferred social media among various social media platforms, and is considered very interesting by students to use as a teaching tool in online learning. The impact of using YouTube in the teaching and learning process is not only felt at the elementary school level but also at the higher education level, namely students (Roy, 2023). The use of technology in learning has become something that cannot be avoided in efforts to improve the quality of Mathematics learning. One popular learning source is the YouTube platform. According to data released by YouTube in 2020, 2 billion registered users visit the site each month, and 1 billion hours of video content are seen there every day. According to certain research, YouTube's popularity and ease of use as a video learning tool have advantages and prospective advantages in education and lifelong learning (Kuyucu, 2021). This YouTube video allows every user to create videos and freely create their own creations so that they can be used as a medium for learning mathematics (Susanti & Amelia, 2021) On the other hand, understanding the concept of Mathematics is a fundamental foundation in learning process activities at the elementary school level (Siregar, Khairunnisa, Muliatik Sri, Harahap, 2012). Elementary Mathematics learning is the initial stage of forming a basic understanding of the concept of Mathematics (Telaumbanua, 2020). The level of intelligence and understanding of students is greatly influenced by the teaching methods and teaching aids used. In today's digital era, especially in the fields of communication, technology, and information, technology is developing rapidly (Anisa, 2022). Therefore, it is important to understand the extent to which YouTube as an effective teaching medium can be used in various contexts of Mathematics learning, especially the material of spatial and volume figures for grade V.

YouTube provides easy access to various interactive and interesting Mathematics learning videos, and is able to increase the potential for students' interest and

understanding of Mathematics learning (Setiyana & Kusuma, 2021). Various research results on YouTube as a teaching medium YouTube can be used as an interesting distance learning medium for students in elementary schools because it provides sound and images simultaneously and is easily accessible (Tamara & Thohir, 2022). YouTube has many features that can make students interested, make the material easier for students to understand, can be used flexibly in various situations and can store videos for a long period of time (Amada & Hakim, 2022). The use of YouTube as a teaching medium has an important role in complementing knowledge, assisting in obtaining information related to assignments, and monitoring the growth of information, allowing for deeper exploration of the material being studied and providing real examples of the application of the material (Yudha & Sundari, 2021)

By considering the reasons underlying the problem, the researcher intends to conduct research to improve student learning outcomes, especially spatial and volume figures in Mathematics lessons by using the demonstration method through YouTube media. This study is to determine the stages of implementing the demonstration method using YouTube learning videos on the material of spatial and volume figures for grade V of elementary school. The objectives of the problem in the study are:

- 1) Can the Mathematics learning outcomes of grade V students be improved by implementing the demonstration method through YouTube?
- 2) How does the use of the demonstration method through YouTube affect the Mathematic learning outcomes of grade V students in the material of spatial and volume figures?

Method

This study uses classroom action research (CAR). According to Kemmis et al (2014) classroom action research or often called Classroom Action Research (CAR) usually involves the use of qualitative and interpretive methods of inquiry and data collection by educators (often with the help of academic partners) with the aim that educators make judgments about how to improve their own teaching practices. This classroom action research uses the Kemmis and Mc. Taggart model in 1988. In one research cycle, there are 4 parts: planning, acting, observing, and reflecting. However, after the reflection section, re-planning or revision is needed to carry out the previous cycle.

Figure 1. Kemmis and Mc. Taggart Model

This study involved one class that consisted of 25 on the fifth grade students as participants, consisting of 16 females and 9 males. This classroom action research focuses on one class because this research is reflective and contextual. This study focused on Mathematics lessons, especially regarding the material of spatial and volume figures. This research was carried out through two stages, namely cycle 1 and cycle 2 which consisted of 1 meeting in each cycle.

Data collection technique

The data collection of this study used observation and test techniques. The observed observations consist of 2 aspects, namely the application of Demonstration Method Variations and the use of images of objects or tools used as media. The use of observation techniques to collect data by observing research participants, namely grade V students. In addition, to see the activities of educators in implementing learning models using observation techniques. The activities and attention of students were also observed to obtain data on how students understand the material on spatial and volume figures through YouTube, and whether YouTube can influence students. Meanwhile, the evaluation test consists of a series of questions. Questions or problems are useful for evaluating how well students understand the lessons that have been given. The evaluation test was made in accordance with the Erlangga Mathematics book of the 2013 curriculum. Tests are given to students to determine their cognitive abilities. Students do this test individually after

studying a material. This test is carried out during the learning process through LKS and final learning tests in cycle I, cycle II

Data Analysis Techniques

Data must be analyzed to see how effective the use of a method is. This study uses quantitative descriptive methods as a data analysis technique. To calculate the data, simple statistics are needed to analyze using the following class average calculation:

$$\text{Average} = \frac{\sum x \cdot 100}{\sum n} \times 100\%$$

Description:

$\sum x$ = Total student score

$\sum n$ = Total students

Presentation of analysis values through tables and graphs. Quantitative analysis is obtained from the KKM (minimum completion criteria) value with the following range:

Table 1. Quantitative data analysis of minimum completion criteria values

| Result | Category |
|---------------|-----------------|
| < 70 | Not Completed |
| = 70 | Exceeded |
| > 70 | Completed |

Results And Discussion

Results

Before the research began, the researcher began the pre-cycle stage. This classroom action research was conducted in two cycles with a duration of two hours.

1. Pre-Cycle

Before the research began, the researcher conducted observations in class V. These observations were conducted during teaching and learning activities. The aim was to determine the level of student learning success. There are 4 stages that form this cycle, namely planning, implementation, observation, and reflection.

a. Planning

In the planning stage, the first thing to do is to make a learning implementation plan consisting of objectives, lecture methods, observation sheets, and evaluation question sheets that are relevant to the material on spatial and volume figures.

b. Implementation

In this section, learning is carried out according to the previous plan. The implementation of learning includes three activities, namely initial activities, core activities, and final activities. In the initial activity, the educator greets students and invites them to pray. The teacher also asked for news and made sure the students were ready for the lesson. Before the core activity began, the teacher introduced the students to the previous material. In the core activity, the teacher delivered a lesson on the material of geometric shapes and volumes and understood their properties through the lecture method. When the teacher was explaining, the students did not listen orderly, it was obvious that they did not pay attention to the explanation given by the teacher, so they were less focused on the lesson. The teacher gave the students the opportunity to ask questions. The students were less enthusiastic about responding to the opportunity to ask questions. So that only a few students asked questions. Next, the teacher divided the groups. Each group was given the task of making a geometric shape and its volume in groups. The teacher observed the activities of each group and observed and the difficulties of each group. After that, the teacher gave assignments in the form of evaluation questions to the students. At the end of the learning activity, students and the teacher concluded the material that had been delivered.

c. Observation

The results of observations in this pre-cycle have advantages and disadvantages. At the beginning of the opening activity, students are asked about their presence and are motivated to follow the learning process, in group work, discussing the results and giving written tests. Do not forget to invite students to pray together at the beginning and end of the lesson. From the results of observations using the lecture method, the implementation of learning by educators has not been maximized, so that the results of group work have not been achieved. Educators only provide explanations so that students are not active during the teaching and learning process in the classroom. This condition makes the evaluation result value less than 70%.

d. Reflection

Based on the findings of the pre-cycle research, the researcher analyzed the results of the observations. There are many things that have not been achieved and must be improved in the material on spatial shapes and volumes of Mathematics learning for grade V. The weaknesses found in the implementation of pre-cycle learning are: There are several things that were missed in the pre-cycle activities and are not relevant to the learning implementation plan that has been designed. The group learning strategy has not produced maximum results. The absence of the use of teaching aids and learning media causes students to be less active. Strengths and weaknesses will be a reference for improving learning in the next stage, namely cycle 1. Based on the results of observations in the field, the achievement of students' Mathematics scores, especially volume and spatial geometry materials, is still quite low. At the pre-cycle stage, the results of the formative test can be observed in the following table.

Table 2. Pre-Cycle Values

| Pre Cycle Values | | |
|--------------------------|-----------|------------|
| | Completed | Incomplete |
| Number of Students | 9 | 17 |
| Percentage | 36% | 68% |
| Average Class | 69,8 | |
| Percentage of Completion | 36% | |
| Percentage of Incomplete | 68% | |

The results of the observation of the values from the table above, the pre-cycle values of students at the pre-cycle stage produced values that exceeded the KKM of 9

people (36%), while those who obtained values below the KKM were 17 people (68%). The results of the observation of the pre-cycle table of students had an average class value of 69.8 with a percentage of completion of 36%. The results of the students' scores can be said to be incomplete on the material of spatial and volume figures.

1. Cycle 1

In this cycle 1 stage, there are 4 stages including planning, implementation, observation, and reflection.

a. Planning

Planning of research instruments, learning media or learning tools and learning implementation plans are prepared at this stage. First, the researcher prepares a learning implementation plan consisting of student achievements after using the demonstration method, preparing observation sheets, preparing evaluation question sheets related to the material of spatial and volume figures that will be given to students to evaluate their understanding of the material that has been studied.

b. Implementation

In implementation stage, learning is carried out according to the previously made design. The learning process consists of three parts: initial activities, core activities, and final activities. The teacher greets students with a prayer before starting the class. The teacher also asks how they are and ensures that students are ready to start the lesson. Before the core activity begins, the teacher informs students about the previous material. Then, the teacher discusses the material on spatial shapes and calculating volume, students listen orderly. Then the teacher asks questions about the explanation given. The teacher begins to use the demonstration method to demonstrate the material on spatial shapes and volume through simple demonstration tools. After the demonstration activity is complete, an evaluation sheet is given to students to work on. In the final activity, the teacher and students draw conclusions about the material that has been delivered.

c. Observation

Supervisor 2 provides input on the researcher's shortcomings in providing learning materials in the classroom at the observation stage. Supervisor 2 carries out observations and writes down the results of observations during the activity through tools on the observation sheet related to the teacher's performance. The purpose of this observation is to collect data related to the implementation of classroom research actions. The researcher used the demonstration method to carry out learning activities with the help of supervisor 2

to supervise the progress of teaching and learning activities. Supervisor 2 and the researcher talked about the results of the improved learning activities in cycle 1, and then wrote the results of observations about the performance of educators on the observation sheet.

d. Reflection

After cycle 1 was completed, a reflection was carried out on the process that had been achieved in the previous cycle. The data collected from cycle 1 will be used to continue to cycle 2 at the next meeting. At the reflection stage, several weaknesses were found by educators in implementing learning activities in cycle 1. There were several activities that were still missed in the learning implementation plan. There was still a lack of explanation about the method used, namely the demonstration method made students still less focused and educators did not provide enough motivation for them to learn. Lack of guidance in trying activities so that they had difficulties during discussion activities. Educators were less able to help provide conclusions from the learning process carried out at the end of learning as a form of review so that students had better absorption of the material on spatial and volume figures. The following table shows the results of the cycle 1 formative test learning.

Table 3. Cycle 1 Values

| Cycle Value 1 | | |
|--------------------------|-----------|------------|
| | Completed | Incomplete |
| Number of Students | 18 | 7 |
| Percentage | 72% | 28% |
| Average Class | 70,2 | |
| Percentage of Completion | 72% | |
| Percentage of Incomplete | 28% | |

From the results of activities in cycle 1, it was found that some students still obtained low results because students did not understand the material presented so they were not able to achieve the KKM score of 70. The advantages in cycle 1 found in reflection activities were the learning process in using concrete objects, learning resources and learning methods. There has been active interaction between students and educators. Educators have been able to create and plan learning implementation plans according to indicators and materials with the applicable curriculum. Educators always study the material that will be taught beforehand so that educators master the material well.

Educators have carried out remedial learning in cycle 1. These advantages can correct deficiencies in improving learning in the next step, namely cycle 2

2. Cycle 2

Cycle 2 consists of 4 stages including the planning, implementation, observation, and reflection stages. At the end of the cycle, students are also given written assignments to measure their abilities

a. Planning

The results of the cycle 1 reflection data show the need for improvements in the implementation of cycle 2 learning. The first plan is to plan to improve Mathematics learning by using a new technique, namely the demonstration method with YouTube media as an alternative to improve the performance of educators to be more creative and make students more active. The second plan is to prepare supporting facilities and infrastructure in the classroom, prepare a plan for implementing improved learning, create observation sheets for educators and students, prepare evaluation sheets, and design things needed for reflection and follow-up activities. After making a plan, the researcher is ready to carry out cycle 2 activities

b. Implementation

In this stage, planning directs the implementation of learning. In the learning stage, there are 3 activities, namely initial activities, core activities, and final activities. In the initial activity, the educator greets students and invites them to pray. In addition, the educator asks for news and conditions the students. Before the core activity begins, the educator repeats the previous material. Shape and volume are discussed in the core activity. In addition, the educator repeats the power of three. The educator demonstrates a geometric shape with the help of YouTube media. Students observe the demonstration carefully and carefully. Students are asked to do exercises with the help of YouTube media and educators ask again what has been conveyed with the YouTube media about spatial figures. Then students provide conclusions. Educators provide evaluation questions, to see how well each student understands the material they have learned.

c. Reflection

The results show that cycle 2 learning was successful and according to plan. At the reflection stage of cycle 2, the second cycle produced very good grades and improvements. One of the advantages of this second cycle is the active interaction between educators and students. Educators have been able to create and plan learning implementation plans

according to indicators and materials according to the applicable curriculum. Educators master the material well. In the second cycle, educators have made improvements to learning with satisfactory results. The results of the values in the cycle can be seen in the following table.

Table 4. Cycle 2 Values

| Cycle Value 2 | | |
|--------------------------|-----------|------------|
| | Completed | Incomplete |
| Number of Students | 25 | 0 |
| Percentage | 100% | 0% |
| Average Class | 87 | |
| Percentage of Completion | 100% | |
| Percentage of Incomplete | 0% | |

Based on the results of cycle 2 learning observed from the table above, it can be concluded that 25 (100%) students got scores exceeding the KKM and 0 (0%) students did not complete. The average class score was 87 with a completion percentage of 100% at cycle 2. The Mathematics learning results showed an increase from the pre-cycle stage to cycle 2. The increase in student learning outcomes can be seen in the graph below

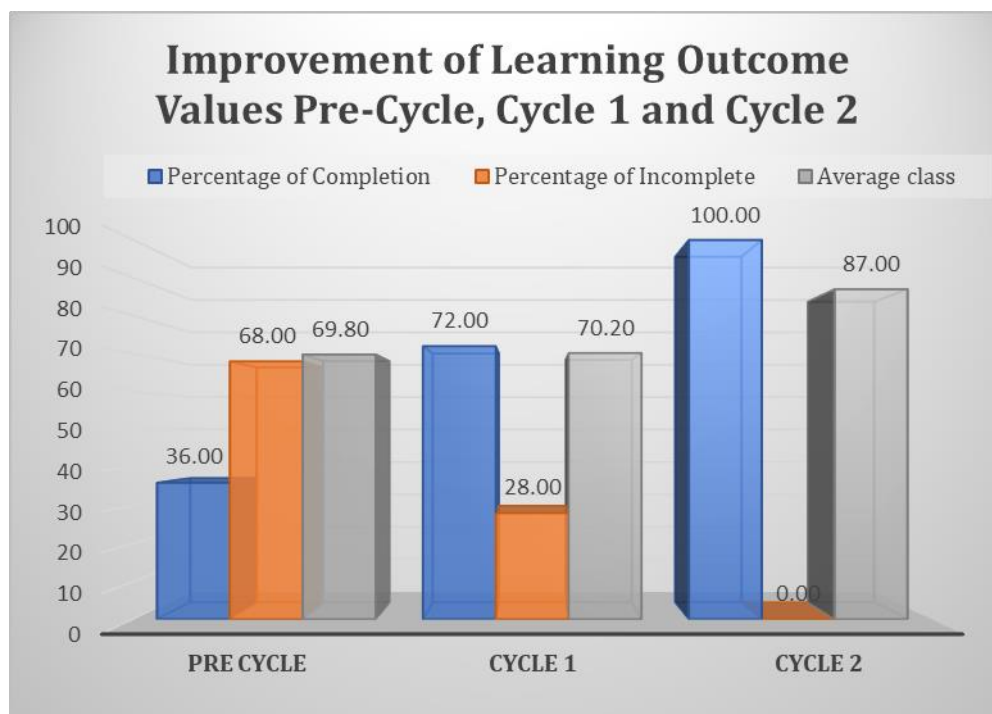


Figure 1. Student Learning Outcomes

Each meeting in the two cycles of classroom action research showed significant improvement. In the pre-cycle stage, the learning outcomes of students using the lecture

method obtained a class average score of 69.8 with a completion percentage of 68%. Meanwhile, when viewed in cycle 1, the learning outcomes of students on the material of spatial and volume figures using teaching aids obtained a class average score of 70.2 with a completion percentage of 72%. Meanwhile, in cycle 2, the learning outcomes of students on the material of spatial and volume figures using YouTube media obtained a class average score of 87 with a completion percentage of 100%.

Discussion

Based on observation data, it is proven that most students do not show enthusiasm in the early stages of the pre-cycle. In this early stage, educators usually speak and students listen. Educators do not utilize tools or media that can help active learning, so that students do not understand the material, are inactive, and not enthusiastic. Students are not involved in the learning process, even when they only ask questions. Students do not focus on the theme presented, so that the learning process is less active. This factor causes the results of student scores not to meet expectations. Before the study began, the researcher tested the initial abilities of students in the material of spatial and volume figures through an initial test, or pretest. The initial test was given to students and they were asked to complete it.

There are 2 cycles with one meeting per cycle in classroom action research, The results of the cycle I action show that many students do not pay attention to the educator when they explain the material. In addition, most students do not understand the concept of volume and spatial figures because the activities are carried out online. In addition, educators give students the opportunity to ask questions via WhatsApp and Zoom. However, only a few do so for several reasons. Educators have not shown the relationship between the demonstration method used through YouTube media with the material on spatial figures and volume in learning activities, the lack of student roles in learning, and have not fully adjusted activities with the previously determined learning implementation plan. There are several shortcomings that also need to be considered, such as the similarity between the learning implementation plan and the learning activities that have been designed have not been fully and optimally carried out. This causes some students to be late and not work on the questions.

The results of observations at the cycle 1 stage proved that there were still many shortcomings, so further action was needed at the cycle 2 stage. The results of observations at the second cycle showed that educators began to draw students' attention to the subject matter, although some students did not fully understand the material well. During the

second cycle, students showed signs that they were more concentrated when educators delivered learning materials. The data results showed that educators had begun to be focused and appropriate in carrying out learning activities with the learning implementation plan that had been designed. However, there are some aspects that still need to be evaluated. In addition, students showed more drive and enthusiasm for learning. In addition, students were more concentrated when completing test questions that were shared via Zoom and WhatsApp. This allows educators to implement learning in a more planned manner with the learning implementation plan.

Learning outcomes from cycle 1 to cycle 2 increased. This shows that students can learn more about volume and spatial geometry in Mathematics lessons using the YouTube demonstration method. In the pre-cycle phase, students got an average score of 69.8 with a completion percentage of 36%. In the first stage of the cycle, students got an average score of 70.2 with a completion percentage of 72%. The results of the first cycle were much better than the pre-cycle stage, because they got an average score of 0.4 with a completion percentage of 36%. However, this has not been categorized comprehensively based on achievement. Furthermore, the results of student scores increased, with an average class score of 87 and a completion percentage of 100% in cycle 2.

If observed, the results of student scores in cycle 2 increased compared to the results of the scores in cycle 1, namely with the average class score increasing by 87% from cycle 1 to cycle 2 with an overall percentage of 100%. This indicates that not only the results of student academic scores are better, but also the results of observations of educator activities are better. From the results of observations of student activities and educator activities, it is proven that the demonstration method via YouTube can optimize Mathematics learning outcomes in the material of spatial and volume figures.

The results of this study are similar to the research of Ardiansyah and Nugraha (2022) which shows that through YouTube, students' ability to understand Mathematics concepts can be maximized, besides that the use of YouTube can stimulate the effectiveness, interest and motivation of educators. From the results of research conducted by Nadela and Asyhar (2022) regarding the large influence between motivation and students' Mathematics learning outcomes with the use of YouTube. In addition to having a positive effect, YouTube can also have a negative impact if used excessively and not used as a learning resource. This is in line with previous research by Suwarno (2017) which proved that YouTube as a learning resource has a negative effect on students. For example,

when students find the title of the video they want in Mathematics lessons on YouTube, this can distract them from the lesson material. However, the title and the content of the video do not match, which causes students to not be able to understand the material properly. In addition, research by Septiani and Abadi (2022) found that the use of social media has a positive contribution to learning Mathematics. This happens when social media such as YouTube is used as a learning medium, for example to create learning videos and other teaching materials. On the other hand, when social media such as YouTube is used for insignificant purposes or because of excessive use, it causes students to be lazy to learn, which causes them to be uninterested in learning Mathematics. As a result, they have lower learning outcomes in Mathematics.

Conclusion and Suggestion

The results of this study prove that the Mathematic learning outcomes of fifth grade students can be improved by using the demonstration method via YouTube for the material of spatial and volume figures. However, this study is limited to the material of spatial and volume figures and was only conducted at one grade level. Due to its limitations, this study can be used as an inspiration to consider conducting similar research at different times, places, and conditions. The researcher also suggests that educators can increase student learning activities, educators, and student learning outcomes by applying the demonstration method via YouTube to other materials or grade levels. According to this study, educator activities, student activities and student learning outcomes can be increased by using the demonstration method via the YouTube platform.

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