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# Effectiveness of Big Clock Media in Teaching Analog Clock to Grade 1 Elementary School Students

**Mughnil Muhtaj[1]*, David Alviansyah[2], Faiqatun Nailah[2], Tri Murtiyani[3], Wirayoga Abdillah Kurnianto[1], Yudi Kurniawan[1]**
Universitas Negeri Yogyakarta, Indonesia[1]
STKIP PGRI Sumenep, Indonesia[2]
SMP Nahdatul Ulama, Indonesia[3]
*Correspondence E-mail: mughnilmuhtaj.2023@student.uny.ac.id

***Keywords:***
*Big Clock Learning Media, Analog Clock Reading, Math Learning, Primary School Education.*

***Abstract***
*This study aims to measure the effectiveness of using big clock media in improving grade 1 elementary students' understanding of the concept of reading analog clocks. The research method used is a quantitative method with a pretest-posttest design to compare the results of students' initial and final tests after learning using large clock media. This research was conducted at SDN Pabian 4, with five students as samples. The results showed an increase in students' understanding of analog clock reading material, as indicated by the increase in the average score from the initial test of 36% to 84% in the final test. This finding emphasizes the importance of using concrete media in learning mathematics, especially for abstract materials. This research is expected to encourage further innovation in the development of creative and applicable educational media, as well as provide insight for educators in optimizing the teaching and learning process.*

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## Introduction

Primary education plays an important role in building the foundation of life skills, including an understanding of the concept of time. The ability to read analog clocks is one of the essential skills that primary school students should master, especially in grade 1, as it is closely related to time management and the development of mathematical literacy [1]. However, research shows that students often face difficulties in understanding the concept of analog clocks, especially when it comes to relating time to the position of the hands [2].

In the context of learning, innovative learning media such as Big Clock Media is one solution to help students overcome this challenge. Big Clock Media is designed to provide a visual and interactive learning experience that facilitates the understanding of the concept of time. The use of large, interactive visual aids not only attracts students' attention but also increases their engagement in the learning process [3]. Although various learning media have been developed to help students understand the concept of time, most studies have focused on the use of digital-based media or interactive applications [4]. Digital-based media has its own appeal, but its use is often limited by access to technology, especially in areas with inadequate educational infrastructure. While physical manipulative learning media



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such as Big Clock Media are relatively simple, affordable and can be used in a variety of educational contexts, there is limited research on their effectiveness [5].

In addition, most existing studies tend to focus on evaluating learning outcomes quantitatively without exploring aspects of student engagement during the learning process [6]. Student engagement, especially at an early age, is an important factor that influences the overall effectiveness of learning. Research that integrates the analysis of manipulative media effectiveness with the dimension of student engagement in analog clock learning is still rare, especially in the context of basic education in Indonesia.

Furthermore, primary school curricula often do not provide specific guidelines regarding the use of manipulatives in analog clock learning. This creates a gap between the needs of students in understanding the abstract concept of time and the approach used by teachers in the classroom [7]. Therefore, this study seeks to answer the question of the effectiveness and relevance of Big Clock Media as a learning tool that supports the understanding of the concept of time in grade 1 students.

Although many studies have highlighted the importance of learning media in primary education, there is limited research on the effectiveness of Big Clock Media specifically in teaching analog clock concepts to Grade 1 students. Therefore, this study aims to evaluate the effectiveness of Big Clock Media in improving students' understanding of the analog clock concept. This research is expected to contribute significantly to the development of more effective learning strategies in basic education, especially related to the concept of time.

## Research Methods

This study used quantitative methods to assess the effectiveness of large clock media in teaching analog clocks to grade 1 students. This method emphasizes the collection and analysis of number-based data to evaluate the improvement of students' understanding [8]. The main instruments used are the initial and final tests, which aim to measure students' abilities before and after learning using the big clock media. The result of this test will be compared to find out how much influence the media has on the students' understanding.

This research also involved observations and interviews. Observations were made to see the real conditions at SDN Pabian 4, including the way teachers teach, students' interest in learning, and the limitations of existing facilities. Interviews were conducted with classroom teachers and the principal to explore the problems faced, such as students' low understanding of analog clocks and the lack of adequate learning media. Information from these observations and interviews was used to understand the context and find the right solution, namely through the use of large clock media.

Data obtained from the initial and final tests were analyzed quantitatively to determine changes in students' average scores. Meanwhile, data from observations and interviews were used to complement the research results by providing an explanation of the obstacles faced at SDN Pabian 4 and why the big clock media was chosen as a solution. This research focuses on the use of large clocks as an alternative to overcome students' low understanding of the concept of time, which is often considered abstract and difficult to understand. By combining test results

and information from observations and interviews, this study is expected to provide a clear picture of the impact of big clock media in analog clock learning as well as the relevance of its application in elementary schools.

**Results and Discussion**

The use of learning media plays an important role in primary school education, especially in helping students understand abstract concepts more easily. Learning media, such as real objects that can be touched and seen directly, help students visualize the subject matter, making the learning process more effective and efficient. Learning Media can increase students' interest and attention in learning, and facilitate understanding of the concepts taught. At SDN Pabian 4, based on observations and interviews, it was found that learning analog clocks faced several obstacles. Students have difficulty in understanding the concept of time that is presented abstractly, and the lack of appropriate learning media exacerbates this problem.

Teachers also admit that conventional teaching methods have not been able to significantly improve students' understanding. This condition indicates the need for innovation in the methods and learning media used. As a solution to this problem, the use of large clock media is introduced in the learning process. This media allows students to see and directly manipulate large analog clock representations, so that they can understand the concept of time more concretely. With the large clock media, it is expected that students can more easily understand how to read analog clocks, increase interest in learning, and overcome the difficulties previously faced in learning time.

The implementation of concrete learning media such as large clocks is in line with the findings which state that the use of teaching aids can make the learning process more lively, interesting, fun, and interactive, so as to stimulate and foster students' interest in learning [9]. Thus, it is expected that the application of large clock media at SDN Pabian 4 can improve students' understanding of the concept of analog clocks and provide a more meaningful learning experience.

The big clock media is a learning tool specifically designed to help students understand the concept of time, especially how to read an analog clock. This media is in the form of a circle with a size of 60 cm x 60 cm, equipped with large clear numbers, large hands, and prominent minute dots. This design is deliberately made so that students can clearly see each element of the clock, making it easier for them to understand the relationship between the hands, minutes, and numbers on an analog clock. The uniqueness of this media lies in its large size and simple yet effective visualization. With this size, the large clock media can be used directly in front of the class so that all students can see it clearly. In addition, the presence of elements such as enlarged numbers and hands provides a more concrete learning experience, which is very important in elementary school-age students' learning.

Figure 1. Big Clock

The application of large clock media in primary school learning can be an interesting way to help students understand the concept of analog clocks. The first step is for the teacher to prepare the material to be taught, such as an explanation of the direction of the hands, the number of minutes in an hour, and the function of the short and long hands. In the learning activity, students can sit in a circle around a large clock. The teacher then divides the students into small groups of two. Each group will be assigned to practice how to move the short and long hands according to the teacher's instructions. The teacher starts by providing a basic understanding of analog clocks using large media. This way, students can see directly and more easily understand the explanation given. After basic understanding, the teacher provides exercises, such as determining a certain time, for example 12:30. Students together direct the hands of the clock to the appropriate position. Conversely, the teacher can also point the hands to a specific time and ask students to read the time aloud.

To increase student engagement, teachers can repeat this exercise several times and combine it with simple games. This approach makes the learning atmosphere more fun and motivates students to try to answer the exercise correctly. For example, as implemented at SDN Pabian 4, students were very enthusiastic when trying to correctly orient the hands of a large clock. Large and attractive media helps students understand the concept of analog clocks more easily. In addition, teachers can give rewards to students who get the answer right. This can motivate other students to be more enthusiastic and try harder in answering the questions given.

Figure 2. Application of big clock media in the classroom

The selection of large clock media as a learning tool is based on the need to overcome students' difficulties in understanding the abstract concept of time. By using concrete media such as large clocks, students can interact directly with learning objects, so that the concepts taught become more real and easy to understand. This is in line with Piaget's cognitive development theory, which states that children in the concrete operational stage (elementary school age) learn more effectively through manipulation of real objects. In addition, previous research shows that the use of concrete media can improve student learning outcomes in learning mathematics, including in understanding the concept of time (Tauqifa, 2023), concrete media helps students understand material that is generally abstract, by providing direct experience that improves understanding of concepts (Ali et al., 2023), the use of concrete media helps students understand material that is generally abstract, by providing direct experience that improves understanding of concepts (Ali et al., 2023), the use of concrete media can improve student learning outcomes in learning mathematics, 2023), the use of concrete media in learning mathematics has been shown to increase student interest and learning outcomes, especially in understanding the concept of time (Erlina, T., Purwati, P. D., & Afwan, 2024), Thus, the use of large clock media is expected to be an effective solution in improving student understanding of analog clock learning at SDN Pabian 4.

This study analyzes changes in students' understanding of learning to read analog clocks after using large clock media. The results of this study were obtained from the initial and final tests conducted on five grade 1 students of SDN Pabian 4 as samples. The test consisted of five questions related to reading analog clocks. The initial and final test scores were converted into scores with a scale of 100, so that the results were easier to understand. The following table presents a comparison of students' average scores before and after using big clock media in learning.

Table 1. Big clock media usage test results table

| Name | Preliminary test | Final test | Difference |
|---|---|---|---|
| Falah | 40 | 80 | 40 |
| Husain | 20 | 60 | 40 |
| Aliah | 40 | 100 | 60 |
| Hanun | 20 | 100 | 80 |
| Dayat | 40 | 80 | 40 |

The average score of students in the initial test was 36, which reflects the difficulty of students in understanding analog clock readings before using the big clock media. After learning using this media, the average score increased to 84. This shows a significant increase in students' understanding of the material taught. This comparison shows that all students experienced an increase in understanding, with an average score difference of 48 points. The results of this study clearly demonstrate the effectiveness of using large clock media in improving students' understanding of analog clock learning. The increase in mean score from 36 in the initial test to 84 in the final test reflects the success of this media in helping students understand the concept of time that was previously difficult to understand.

The effectiveness of this large clock media is supported by its characteristics that are designed according to students' needs. It provides real visualization and allows students to manipulate clock elements directly, making it easier for them to understand the relationship between hands, numbers and time readings. For

example, the large numbers and clear hands make it easier for students to distinguish between minutes and hours, an often confusing aspect of learning analog clocks [10], [11]. The learning process becomes more interactive, engaging and relevant to students' real-life experiences, in line with constructivism learning theory which emphasizes the importance of active and experiential learning [12], [13]. Thus, the results of this study provide strong evidence that the use of big clock media is an effective solution to overcome the obstacles to learning analog clocks at SDN Pabian 4. It is hoped that the application of similar media can be adopted more widely to improve the quality of learning in other elementary schools.

## Conclusion

Based on the research conducted, it can be concluded that the use of big clock media has significant effectiveness in improving grade 1 elementary students' understanding of how to read analog clocks. This is shown through the increase in average scores from the initial test to the final test, as well as students' positive responses during the learning process. The big clock media, with a simple yet concrete design, proved to be able to facilitate students in understanding the concept of time which is often abstract for children at that age. This research also makes a real contribution to learning in elementary schools, especially in overcoming the challenges of learning mathematics on the concept of time. By using concrete media such as large clocks, teachers have more effective tools to explain complex material. This research also highlights the importance of developing creative and interactive learning media, especially in schools with limited facilities. In the future, innovations in learning are expected to continue to develop by utilizing available technology or modifying learning media to better suit student needs. In addition, support from the school and government is also very important to provide adequate learning facilities. Thus, the learning process can be more interesting, effective and inclusive for all students, not only in mathematics, but also in various other subjects. This research is expected to inspire teachers, researchers and educational media developers to continue creating and implementing innovative learning approaches. Concrete media such as this big clock is just one of the many ways to help students understand abstract material, and there is still much room for future exploration and improvement.

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## Author Contributions

Mughnil Muhtaj: conceptualization; formal analysis; data curation; methodology and review. David Alviansyah: data curation; methodology; writing-reviewing and editing. Faiqatun Nailah: formal analysis; and methodology. Tri Murtiyani: formal analysis; writing-reviewing and editing. Wirayoga Abdillah Kurnianto: formal analysis; writing-reviewing and editing. Yudi Kurniawan: data analysis; writing-reviewing.

**Availability of data and materials**

The authors have made all the data available.

**Competing interests**

No conflicting interests are disclosed by the writers.

**Additional information**

No additional information from the authors.

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