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Comparing the Effectiveness of Learning Video Media and the Imitation Model in Enhancing Mathematical Learning Outcomes and Student Motivation

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Abstrak

Media pembelajaran memegang peran yang sangat penting dalam mencapai tujuan pendidikan, karena dapat membantu guru menyampaikan materi pelajaran dengan lebih efektif kepada siswa. Penelitian ini bertujuan untuk mengetahui perbedaan motivasi dan hasil belajar matematis siswa yang menggunakan media video pembelajaran dan model tiruan di SDN 3 Karangpawitan. Metode yang digunakan dalam penelitian ini adalah eksperimen dengan desain Quasi Eksperimental, tepatnya dengan model static group comparison design. Hasil penelitian menunjukkan bahwa terdapat perbedaan signifikan dalam motivasi belajar antara siswa yang menggunakan media video pembelajaran dan model tiruan. Siswa yang menggunakan media video pembelajaran menunjukkan motivasi belajar sebesar 80%, yang tergolong dalam kategori "baik", sedangkan motivasi siswa yang menggunakan model tiruan hanya mencapai 46,4%, yang tergolong dalam kategori "kurang". Selain itu, hasil belajar matematis siswa yang menggunakan video pembelajaran mengalami peningkatan (gain) sebesar 0,717 yang termasuk dalam kategori tinggi, sementara siswa yang menggunakan model tiruan hanya mengalami peningkatan sebesar 0,248, yang tergolong dalam kategori rendah. Dengan demikian, penelitian ini menyimpulkan bahwa media video pembelajaran lebih efektif dalam meningkatkan motivasi dan hasil belajar matematis siswa dibandingkan dengan model tiruan.
Kata Kunci: Hasil Belajar; Media Video Pembelajaran; Model Tiruan; Motivasi

Abstract

Learning media plays a crucial role in achieving educational goals, as it can help teachers deliver subject matter more effectively to students. This study aims to determine the differences in motivation and mathematical learning outcomes between students using instructional videos and simulation models at SDN 3 Karangpawitan. The method used in this study was a quasi-experimental experiment, specifically a static group comparison design. The results showed a significant difference in learning motivation between students using instructional videos and simulation models. Students using instructional videos demonstrated learning motivation of 80%, which is categorized as "good," while students using simulation models only achieved 46.4%, which is categorized as "poor." Furthermore, students using instructional videos experienced a gain of 0.717, which is categorized as high, while students using simulation models only experienced an increase of 0.248, which is categorized as low. Therefore, this study concludes that instructional videos are more effective in improving students' motivation and mathematical learning outcomes compared to simulation models.
Keywords: Learning Outcomes; Learning Video Media; Imitation Model; Motivation

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I. INTRODUCTION

Education is a fundamental pillar in the development of a nation. Quality human resources are rooted in an effective education system, which is capable of producing individuals who not only possess academic knowledge but also critical thinking, creativity, and innovation skills. In the context of primary education, engaging and meaningful learning is a key factor in enhancing student motivation and learning outcomes. However, many challenges remain in achieving this goal, one of which is the low interest and motivation of students towards certain subjects, including mathematics.

Mathematics is one of the subjects that many students often find difficult (Sari & Nur, 2023). Various efforts have been made to improve students' understanding of mathematical material, one of which is through the use of engaging and innovative learning media. Learning media plays an important role in supporting the teaching and learning process. According to Sa'adah and Budi (2022), the use of appropriate learning media can increase student motivation and learning outcomes, particularly in subjects that are perceived as difficult, such as mathematics.

One media considered effective in learning is video learning media (Sari et al., 2022; Rifanti, Septia, & Handayani, 2023). Video media can present information visually and auditorily, which helps students understand the material in a more engaging and interactive manner. According to Yunani (2021), videos as learning media can convey abstract concepts in a more concrete and easily understandable way for students. Video learning can also facilitate students' understanding of difficult material in a more attractive and enjoyable way, which in turn can increase their motivation to learn.

Video learning offers a more engaging learning experience through a combination of audio, visual, and animation elements (Yulianto, Yulianto, & Hidayanto, 2022; Khairani et al., 2023). The cognitive multimedia theory proposed by Mayer (as cited in Güney, 2019) states that humans find it easier to comprehend information when presented in the form of images and sounds rather than just text or verbal lectures. The use of video in science learning can help students connect abstract concepts with real-life phenomena they observe in their daily lives (Elyana, Wulandari, & Mulyani, 2022; Mardiani, Sumartini, & Nuraisah, 2024).

Another learning medium that can be used as a teaching aid is the teaching aid itself. A teaching aid refers to any material used to demonstrate lesson content, making abstract concepts more tangible and comprehensible for students. Arsyad (2017) defines teaching aids as items that are abstract, then concretized with tools so that they can be easily understood and perceived by students. One type of media is the imitation model, a three-dimensional learning medium. A three-dimensional medium is a teaching aid that has length, width, and height and can be observed from any angle (Sujana et al., 2011). Three-dimensional media is a form of art that has volume and occupies space (Habsyih, 2023). Based on expert opinions, it can be concluded that three-dimensional media are tactile and can be viewed from any

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perspective, showing the entire shape (length, width, and height or volume).

In addition to video media, the imitation model can also be used to improve mathematics learning outcomes. The imitation model, or "modeling," is an approach that emphasizes the learning process through imitation or the creation of conceptual representations. According to Arifin (2023), the use of the imitation model in learning can help students develop a deeper mathematical understanding through the simulation and modeling of real-life situations. By modeling mathematical situations or concepts in a real context, students can relate the material they are learning to everyday life, which can ultimately increase their motivation to learn.

The imitation model is a physical representation of the concept being taught. The use of this model in mathematics learning allows students to understand concepts through hands-on experiences. This aligns with Kolb's (1984) experiential learning theory, which asserts that concrete experiences can enhance understanding and engagement in the learning process. Several studies have shown that the appropriate use of learning media can increase motivation, interest in learning, and academic achievement (Arsyad, 2017).

This research aims to analyze the effectiveness of video learning media and the imitation model in improving students' mathematical learning outcomes and motivation. The hypothesis of this study is that the use of interactive multimedia learning videos is more effective in improving students' motivation and learning outcomes compared to the simulation model. Through this approach, it is hoped that new insights can be gained regarding the application of video media and the imitation model in mathematics learning, as well as their impact on student motivation and learning outcomes.

II. METHOD

This study employs a quantitative method with an experimental approach. The research design used is a Quasi-Experimental Design with a Static Group Comparison Design model (Darmawan & Wahyudin, 2018). The research sample was randomly selected using the random sampling technique, with 5 students chosen from a group of 28 students as the experimental group, while 5 students were selected from a group of 27 students to form the control group. The learning was conducted using the microlearning method (APS–TPI, 2020) over a period of 21 days.

The population in this study consists of students from SDN 3 Karangpawitan. The research sample consisted of two classes: Class 6A, which used video learning with 5 students selected from 28 students, and Class 6B, which employed the imitation model with 5 students chosen from 27 students. Class selection was done through random sampling.

The interactive multimedia video and the simulation model were both designed based on the same lesson content, ensuring content equivalence. The video included animations, narration, and embedded interactive prompts, while the simulation model involved physical manipulatives and step-by-step demonstrations. Both

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materials underwent expert validation by two instructional design specialists and two subject-matter experts to ensure content accuracy, pedagogical suitability, and technical quality.

The data used in this study are quantitative, consisting of pretest and posttest results to measure student motivation and mathematical learning outcomes in the 6th grade of SDN 3 Karangpawitan, Garut District. The data sources include primary data collected through observations and tests administered directly to the 6th-grade students of SDN 3 Karangpawitan, and secondary data obtained from journals, books, documents, and other relevant references. The measurement scales used in this study are ordinal scale, which ranks data from highest to lowest or vice versa, and interval scale, which indicates equal distances between data points.

III. Result and Discussion

A. Students' Learning Motivation Using Instructional Video and Physical Model

This study compares students' learning motivation between those who used instructional videos and those who used physical models. Based on observations, in the class that used instructional videos, 16 student activity aspects were categorized as "good," while 4 aspects were "fair." Overall, learning through interactive videos showed positive results with 80% student engagement, classified as "good."

Meanwhile, in the class that used physical models, only 8 activity aspects fell under the "fair" category, while the remaining 12 were categorized as "poor." The student engagement percentage in this class was lower than that of the video learning group, falling into the "low" category. These results indicate that instructional videos are more effective in enhancing student learning motivation than physical models.

Table 1.
Comparison of Students' Learning Motivation by Teaching Method

Motivational Aspects	Learning Videos	Imitation Models
Activity Aspect (Good)	16	0
Activity Aspect (Fair)	4	8
Activity Aspect (Poor)	0	12
Engagement Category	Good	Low

B. Students' Learning Outcomes Using Instructional Video and Physical Model

Students' learning outcomes were analyzed based on pretest and posttest scores, and the gain was calculated. In the class that used instructional videos, the average pretest score of 40.00 increased to 80.00 on the posttest, with a standard deviation of 15.811. The gain score of 0.19702 falls into the "high" category.

In contrast, in the class that used the physical model, the average pretest score of 28.00 increased to 44.00 on the posttest, with a standard deviation of 23.022. The gain score of 0.13161 is categorized as "low."

Table 2.
Students' Learning Outcomes Using Instructional Video

Variable	Pretest	Posttest
Mean	40,00	80,00
Minimum Score	20,00	60,00
Maximum Score	50,00	100,00
Standard Deviation	20,000	15,811
Gain Score	0,19702	-
Minimum Gain Score	0,50	-
Maximum Gain Score	1,00	-
Standard Deviation Gain	0,717	-

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Table 3.
Students' Learning Outcomes Using Physical Model

Variable	Pretest	Posttest
Mean	28,00	44,00
Minimum Score	10,00	20,00
Maximum Score	50,00	70,00
Standard Deviation	17,899	23,022
Gain Score	0,13161	-
Minimum Gain Score	0,11	-
Maximum Gain Score	0,405	-
Standard Deviation Gain	0,2483	-

Based on these findings, it can be concluded that the use of instructional videos is proven to be more effective in improving students' motivation and mathematical learning outcomes compared to the use of physical models. This indicates that multimedia-based learning methods are more engaging and help students understand the material more effectively.

Effective learning must create an interactive, inspiring, and enjoyable environment to foster students' active participation, creativity, and independence (Kemendiknas, 2007). The use of interactive multimedia, such as instructional videos, has proven to enhance students' learning motivation by allowing them to play an active role in the learning process.

The findings of this study indicate that students who used instructional videos demonstrated greater improvement in learning outcomes compared to those who used physical models. This improvement is attributed to more effective teacher-student interaction, which facilitates a deeper understanding of the material. According to Purwanto (2011:46), learning outcomes represent behavioral changes reflecting achievements in cognitive, affective, and psychomotor domains. In this study, students learning through video showed greater improvement in comprehending and applying taught concepts.

Several factors explain the greater effectiveness of instructional videos. First, dynamic visualizations in videos help clarify abstract concepts through animations and simulations. Second, multi-sensory engagement through combined audio-visual elements stimulates attention and enhances information retention. Third, the flexibility of access allows students to revisit materials at any time. Fourth, contextualization of the content in videos allows students to see the real-life application (Attalina et al., 2024; Rakhma et al., 2024; Rubiyati et al., 2022).

In contrast, although physical models offer hands-on experience, they have limitations in representing complex or dynamic concepts. Additionally, they require more time and resources, reducing instructional flexibility. Therefore, instructional videos present several advantages that contribute to more effective student learning (Audie, 2019; Rakhma et al., 2024).

Learning outcomes are influenced by internal, external, and instructional approach factors. Internal factors include students' physiological and psychological conditions. External factors involve the social and physical environment, such as interactions with teachers and peers, as well as home and school conditions. Instructional approaches refer to the strategies and methods employed by teachers to deliver content.

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Rivai and Sudjana (Kustandi & Sutjipto, 2011) emphasize that instructional media attract students' attention, enhance understanding, and allow for more varied teaching methods. Sadiman (2002) explains that learning is a communication process, where messages are conveyed from the sender to the receiver through specific media. Hamalik (Arsyad, 2017) adds that instructional media can stimulate new interest, motivation, and psychological engagement. Furthermore, Dale (in Arsyad, 2017) estimates that 75% of learning outcomes are acquired through visual perception, 13% through hearing, and 12% through other senses.

In this context, interactive multimedia—such as instructional videos—enhance students' understanding of concepts through the integration of text, images, animations, and sound. This aligns with modern multimedia-based learning approaches that leverage information technology to enrich students' learning experiences.

Overall, the study confirms that technology-based instructional approaches have a positive impact on students' motivation and academic performance. Therefore, teachers are encouraged to integrate interactive multimedia into their teaching to create a more engaging and effective learning environment.

IV. CONCLUSION

The findings indicate that learning with interactive multimedia in the form of videos is more effective in improving students' motivation and learning outcomes compared to the simulation model. Students in the video-based learning class demonstrated higher engagement, better activity aspect categories, and a higher average learning gain (0.717; high category) than those in the simulation model class (0.2483; low category). These results highlight the importance of optimizing the use of educational technology to create more engaging and interactive learning environments that positively impact student achievement. It is recommended that teachers integrate interactive multimedia videos into their instructional practices to foster student engagement, enhance conceptual understanding, and improve learning outcomes. Teachers should also consider designing learning activities that encourage active participation alongside video use to maximize the benefits of technology-based instruction.

For future research, conducting longitudinal studies or involving larger and more diverse samples is suggested to validate and strengthen the generalizability of these findings. This would provide a more comprehensive understanding of the long-term effects of interactive multimedia videos on student motivation and achievement.

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development of more effective learning models.

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