

The Influence of the Realistic Mathematic Education Model Assisted by Learning Videos on Students' Learning Activities and Outcomes in Elementary School

Wildatul Husna^{1*}, Zuwirna¹, Alwen Bentri¹, Darmansyah¹

¹ Teknologi Pendidikan, Universitas Negeri Padang, Padang, Indonesia.

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Corresponding Author:

Wildatul Husna

wildatulhusna01@gmail.com

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Abstract: This study aims to investigate the effect of the video-assisted Realistic Mathematics Education (RME) model on the learning activities and outcomes of elementary school students. The research employed a quasi-experimental design involving fourth-grade students from two different schools. Data were collected using a questionnaire to measure student learning activities and a test to assess mathematics learning outcomes. The data were then analyzed using appropriate quantitative statistical procedures to evaluate differences and relationships between the variables studied. The findings show that the implementation of the RME model supported by video learning had a significant effect on both learning activities and student achievement in mathematics. Students who participated in video-assisted RME learning demonstrated higher levels of engagement during classroom activities compared to their peers in the control group. In addition, their mathematics test scores were consistently better, indicating an improvement in conceptual understanding and problem-solving abilities. The analysis also revealed a strong and positive relationship between students' active involvement in learning and their academic performance. These results highlight the potential of combining the RME approach with digital media to foster more interactive and effective learning experiences. The study concludes that the integration of video resources within the RME model can serve as an innovative strategy to enhance student activity and achievement in elementary mathematics education.

Keywords: Learning activities; Learning outcomes; Learning Videos; RME

Introduction

Mathematics is a basic subject that equips students with logical, analytical, and problem-solving skills needed in education and daily life (Putri et al., 2022; Wali et al., 2025; Sugiharti & Ningsih, 2021; Sukendra & Sumandya, 2020). It also serves as a foundation for understanding other disciplines and building important life skills (Fauzan et al., 2024; Safari & Nurhida, 2024). However, despite its importance, students' mathematics achievement in Indonesia remains relatively low. The results of the PISA survey show that the mathematical

literacy of Indonesian students is below the international average, showing difficulties in understanding and applying concepts in real contexts (Jannah & Hayati, 2024; Mumfaza & Setyaningsih, 2024). Observations in primary schools further reveal that many students are passive during math lessons, with limited participation in discussions and problem-solving activities. Similar findings were reported by Schwerdt et al. (2011) and Mugo et al. (2024) which notes that conventional teaching methods tend to make students passive and lead to unsatisfactory learning outcomes.

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Addressing this problem requires innovative teaching approaches that can increase student engagement and achievement. One promising model is Realistic Mathematics Education (RME), which emphasizes connecting mathematical concepts with real-life experiences, making abstract ideas easier to understand (Fajri et al., 2025; Laurens et al., 2017). Previous research has shown that RMEs support active participation and strengthen conceptual understanding (Nuraina et al., 2021; Putra et al., 2024). However, challenges remain in maintaining students' interest and motivation, especially when dealing with abstract material.

To strengthen the effectiveness of RME, the integration of technology-based media such as educational videos is particularly relevant. Videos can present abstract concepts through visualization, animation, and simulation, making them easier to understand while fostering students' interest (Ismiyanti et al., 2023; Laksmi et al., 2021; Nuari et al., 2024). The study also highlights that the use of interactive media increases student engagement and supports the development of positive learning habits (Adawiyah et al., 2024; Liliana et al., 2020; Pandita & Kiran, 2023). Thus, combining RME with video-assisted learning is expected to not only improve cognitive comprehension but also increase student activity, confidence, and interaction in the classroom.

Therefore, this study examines the effect of the application of the video-assisted RME model on learning activities and outcomes of elementary school students. The novelty of this research lies in the integration of established instructional models (RMEs) with multimedia learning support to address persistent problems of low engagement and math achievement at the elementary level. Thus, this study contributes empirical evidence on how contextual learning combined with digital media can serve as an innovative strategy to improve the quality of mathematics education in Indonesia.

Method

This research is classified as quantitative research with a quasi-experimental approach. The design applied is the Unequal Control Group Design, as the experimental and control groups are pre-existing classes from different schools, not random groups. The design is presented in Table 1.

The population of this study is all elementary school students who are members of Cluster IV of Ampek Angkek District. From this population, researchers sampled two schools with purposive sampling techniques. The sample consisted of grade IV students of SDN 06 Batu Taba as the experimental class

and grade IV students of SDN 14 Pincuran VII as the control class. This selection is based on the similarity of the characteristics of the classroom and the curriculum used so that it is worthy of comparison in quasi-experimental research.

Table 1. Research Design

Class	Treatment	Post Test
Experiment	RME Model with video assistance	O1
Control	Conventional learning	O2

The instruments used in this study include learning activity questionnaires and learning outcome tests. Learning activity questionnaires are used to measure the level of student involvement in the learning process, while learning outcome tests are prepared based on indicators and basic competencies of grade IV mathematics subjects. Before use, the instrument was tested for validity using product-moment correlation and reliability using Cronbach's Alpha with the help of the SPSS program. The test results show that the instrument is suitable for use as a data collection tool.

The research data was collected through two stages. First, a learning activity questionnaire is given to students after the learning takes place to find out their activity level. Second, a learning outcome test is given at the end of the treatment (posttest) to measure the achievement of mathematics learning outcomes. The experimental class was given treatment in the form of learning with the video-assisted Realistic Mathematics Education (RME) model, while the control class followed learning with conventional methods.

Result and Discussion

Prerequisite Test

Before hypothesis testing, the data from the research were analyzed using the normality test (Kolmogorov-Smirnov) and the homogeneity test (Levene's test). A summary of the test results is presented in Tables 2 and 3.

Table 2. Normality Test

Variables	Class	Sig.(p)	Description
Learning activity (Pretest)	Experimental	0.210	Normal
Learning activities (Pretest)	Control	0.347	Normal
Learning Outcomes (Posttest)	Experimental	0.365	Normal
Learning Outcomes (Posttest)	Control	0.421	Normal

Table 3. Homogeneity Test Results

Variables	Sig.(p)	Description
Learninv activities	0.527	Homogen
Learning outcomes	0.614	Homogen

Based on the table above, all data are normally distributed ($p > 0.05$) and homogeneous, so they are eligible for the t-test.

Learning Activities

Student learning activities in the experimental class (RME + video) were higher than in the control (conventional) class.

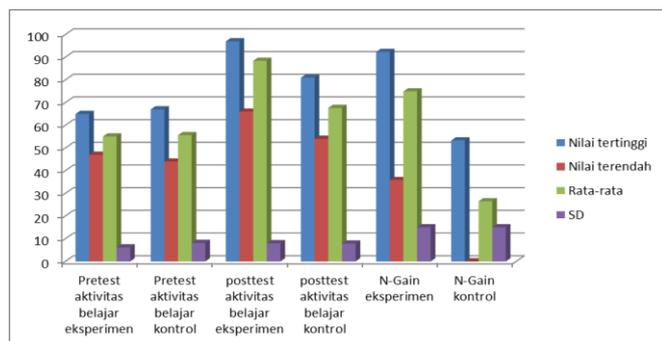


Figure 1. Comparison of student learning activities

The t-test showed a significant difference between the two groups, $t(32) = 3.89$, $p < 0.001$, which means that the use of the video-assisted RME model was able to improve students' learning activities.

Learning Outcomes

The posttest results showed an increase in learning outcomes in the experimental class.

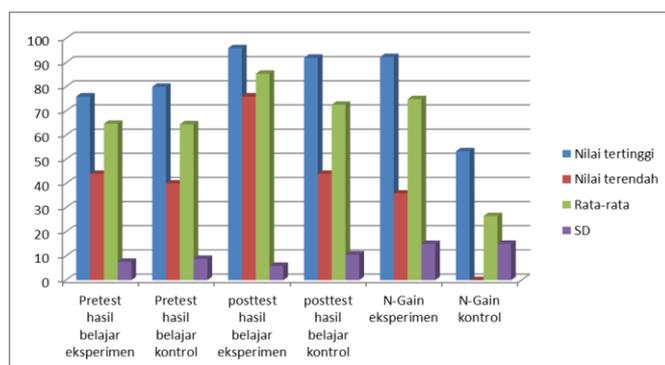


Figure 2. Comparison of student learning outcomes

The results of the t-test showed a significant difference, $t(32) = 4.25$, $p < 0.001$. Thus, the hypothesis that video-assisted RME is more effective than conventional learning is accepted.

The Relationship between Activities and Learning Outcomes

Pearson's correlation analysis showed a positive relationship between learning activities and learning outcomes with a value of $r = 0.725$, $p < 0.01$. The value of the determination coefficient (r^2) was 0.526, which means that learning activities explain 52.6% of the variation in student learning outcomes

The results of this study show that the application of video-assisted Realistic Mathematics Education (RME) is able to significantly improve student learning activities and learning outcomes compared to conventional learning. These findings are in line with research (Agustina et al., 2025; Lady et al., 2018; Lubis, 2025), which suggests that the RME approach can increase student engagement in mathematics learning.

The improvement in learning outcomes in the experimental class also strengthened the findings that RME helps students understand mathematical concepts through a context that is realistic and close to their experiences (Apriyanti et al., 2023; Rangkuti et al., 2024). In addition, the integration of video media has been shown to facilitate the understanding of abstract concepts (Hodaifah et al., 2025), supporting multimedia learning theory (Staneviciene & Žekienė, 2025; Novanti et al., 2025) which emphasizes the dual role of text and visuals in improving student understanding. The positive correlation between learning activities and learning outcomes in this study shows that the higher the student involvement in learning, the better the achievement of academic results. This is consistent with the view that learning activities are an important indicator of Hikmah et al. (2022) Miftah et al. (2024).

Practically, this study provides the implication that teachers need to consider the use of the RME approach enriched with video media as an alternative to mathematics learning strategies. Not only does it improve learning outcomes, but it also builds active student engagement.

Conclusion

This study demonstrates that the application of the Realistic Mathematics Education (RME) model supported by video media leads to notable improvements in elementary students' mathematics learning. The approach not only increased student engagement such as active participation and attentiveness but also enhanced learning outcomes to a moderate-to-high degree compared to conventional instruction. Moreover, the analysis revealed a moderately strong positive association between student activity and learning outcomes, suggesting that active involvement contributes meaningfully to academic achievement. These findings imply that integrating RME with video support can be a practical strategy for strengthening both motivation and performance in mathematics learning at the elementary level.

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Conceptualization, W. and Z.; methodology, W.; software, W.; validation, W, Z.; formal analysis, W.; investigation, W.; resources, W.; data curation, W.; writing—original draft preparation, W.; writing—review and editing, W, Z, A, D.; visualization, W. Z.; supervision, W.Z.; project administration, W.;. All authors have read and agreed to the published version of the manuscript.

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Conflicts of Interest

No conflict interest.

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