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## VIRTUAL MUSEUMS BOOST MOTIVATION AND CULTURAL COMPREHENSION IN PRIMARY STUDENTS

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### Abstract

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This study aimed to examine the effectiveness of a PowerPoint-based virtual museum medium in enhancing fourth-grade elementary school students' motivation and understanding of social studies material on cultural diversity. Using a quasi-experimental design with a Non-equivalent Control Group Pretest-Posttest approach, the study involved 38 students divided into an experimental group (using the virtual museum) and a control group (using conventional textbooks). The research instruments included a motivation questionnaire based on the ARCS model and a material comprehension test based on Bloom's taxonomy. Data were analyzed using the Paired Sample t-test and Independent Sample t-test. The results showed that the use of the virtual museum significantly increased students' motivation ( $p = 0.000$ ) and material comprehension ( $p = 0.000$ ). The average motivation score for the experimental group (90.47) was significantly higher than that of the control group (72.89). Similarly, the experimental group's comprehension score (80.26) was much higher than the control group's (42.89). These findings prove that the virtual museum is superior to conventional textbooks in creating an immersive, interactive, and student-centered learning experience, aligning with Vygotsky's social constructivism theory and the principles of the Merdeka Curriculum. This medium successfully overcomes the limitations of conventional media and the inaccessibility of physical museums, ultimately fostering students' interest and active engagement.

**Keywords:** Virtual Museum; Learning Motivation; Material Comprehension; Social Studies Education; Primary School Students

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### INTRODUCTION

Social Studies (IPS) is one of the core subjects in the elementary school curriculum, playing a crucial role in shaping students' holistic development. Through Social Studies learning, students not only develop cognitive aspects but also affective and psychomotor skills, while acquiring essential life skills (Sapriya, 2009). More than just the transfer of knowledge, Social Studies aims to shape individuals with integrated and socially relevant competencies in attitudes, knowledge, and skills (Novianti et al., 2023). By functioning as a bridge connecting theory with life's realities, Social Studies prepares students to become active, critical, and responsible citizens in facing socio-cultural dynamics.

The material on Indonesian cultural diversity is a core topic in fourth-grade Social Studies. This material includes an introduction to traditional houses, dances, traditional

clothing, and musical instruments, which aligns with Basic Competency (KD) 3.2. This KD requires students to identify social, cultural, economic, ethnic, and religious diversity in a province and link it to geographical characteristics (Kemendikbud, 2021). More than just an introduction, this learning aims to instill values of tolerance and national identity from an early age (Handayani & Abdulkarim, 2024).

The role of the teacher as a facilitator is essential to achieving this goal. Teachers must use various relevant learning resources, communicate effectively, and create an enjoyable learning environment. Without student motivation, student engagement and understanding will decline. Therefore, selecting appropriate learning media is crucial, as the wrong media can hinder the understanding of concepts, especially for Social Studies material, which is often abstract (Mayer, 2020; Rosidah, 2016). A study by le Roux et al., (2021) showed that well-designed and well-used digital technology increases students' intrinsic motivation and enhances their understanding of complex concepts. Consequently, the use of technology-based creative media is a strategic necessity for optimizing Social Studies learning.

Observation results at SDN 67 OKU in February 2024 indicated that Social Studies learning in grade IV still used a conventional, teacher-centered approach with textbooks as the primary medium. This condition caused students to lack conceptual understanding, be unmotivated, and disengaged. Several other studies support this finding. Souisa (2022) also found that traditional methods were used to teach Social Studies at SD INPRES 06 Sorong. Furthermore, in their research at SDN 18 Lahat, Okpiani et al., (2022) found that monotonous learning caused 60% of students to fail to achieve the Minimum Completion Criteria (KKM).

A study by Zain & Pratiwi (2021) at SD Karanganyar found that one of the main factors causing students difficulty in understanding complex Social Studies material was the lack of learning resources. The findings indicated that fifth-grade students found the learning less contextual and abstract because they relied too heavily on textbooks and did not use interactive media. This discovery reflects the critical importance of creating new learning resources that can surpass the limitations of conventional textbooks and affirms that the transformation of learning media is essential for creating meaningful learning experiences.

According to research conducted by Esterina et al. (2022) at SDN 70 Singkawang, there was a clear difference between students with high motivation and those with low motivation in their classroom behavior in grade IV. Students with high motivation exhibited traits such as diligence, perseverance, and enthusiasm when completing tasks. They were also active in asking questions and seeking information from various sources, which ultimately had a positive impact on their learning outcomes. In contrast, students with low motivation tended to be passive, hesitant to ask questions or express opinions, and often did not complete classwork or homework. Their understanding and learning outcomes were negatively affected by their passive behavior.

The use of museums and other supporting media is considered vital for enhancing student motivation and understanding because cultural material is highly complex in elementary Social Studies. Social Studies material is complex as it integrates many fields of science, such as geography, politics, economics, history, and sociology. The goal of this integration is for students to understand problems holistically, especially social and cultural issues (Rifai et al., 2023). However, as of 2024, the distribution of museums in Indonesia remains uneven, with 292 museums largely concentrated on Java Island. Numerous constraints related to unequal access include distance, time, and cost. Virtual museums, an innovative learning medium that allows unlimited access through digital media, present a solution. According to Aiello et al. 2019), virtual museums not only

address geographical and financial challenges but also offer interactive, technology-based 3D content proven to enhance students' understanding of cultural concepts and increase their learning engagement.

Virtual museums emerge as an innovative solution, particularly for supporting online learning, by enabling easy and equitable access to various exhibition collections. According to Glaser, (2022), a virtual museum is defined as a repository or collection of museum objects displayed exclusively on the internet. During the COVID-19 pandemic, the popularity of these platforms surged rapidly. International organizations like the International Council of Museums (ICOM), under the auspices of UNESCO, encourage the use of digital technology to display museum collections online and incorporate them into global cultural strategy. Virtual museums developed using PowerPoint offer an immersive digital representation of Indonesia's cultural wealth, such as traditional clothing, traditional architecture, dance arts, and musical instruments, thereby creating an experience resembling a visit to a physical museum. A designed interface with intuitive navigation for example, clicking on a door or object to obtain detailed information allows students to explore independently (Zhang et al., 2025). Not only does it present collections equipped with educational explanations, but the platform also integrates gamification elements to facilitate a better understanding of abstract Social Studies concepts. Research by Firmansyah & Amalia (2021) confirms that integrating gamification elements in a virtual museum environment not only encourages deeper learning but also effectively reduces learners' cognitive load.

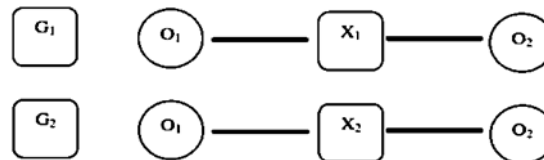
The presence of virtual museums is a transformative solution in addressing the challenges of limited access to conventional museums, while also shifting the learning paradigm to be more dynamic and student-centered. Through engaging visual presentations and interactive mechanisms that encourage exploration, this medium has proven significant in increasing learning motivation and conceptual understanding. A study by Hu et al. (2021) adds that the digitization of cultural content not only makes learning more accessible but also plays a vital role in strengthening cultural identity and fostering multicultural awareness among students. With these characteristics, PowerPoint-based virtual museums align with the demands of developing 21st-century competencies that emphasize digital literacy and critical thinking skills Antonaci et al. (2013).

Theoretically, this research is grounded in the constructivism paradigm (Vygotsky, 1978), which emphasizes that social interaction and authentic learning experiences are essential for knowledge construction (Vhalery et al., 2025). As the Merdeka Curriculum focuses on active student engagement, the existence of virtual museums allows students to interact directly with cultural content in a contextual learning environment (Kemendikbud, 2022). This study aims to evaluate how the use of a PowerPoint-based virtual museum affects fourth-grade elementary students' desire to learn and their understanding of cultural diversity material. The study also examines how significant this virtual museum is compared to conventional approaches. This research is expected to broaden the understanding of technology-enhanced learning in elementary education. Furthermore, its results can serve as empirical guidance for educators to implement effective digital learning practices.

## **METHODS**

This study employed a Quasi-Experimental Design with a Non-equivalent Control Group Pretest-Posttest Design. This design was selected to measure the effect of the

PowerPoint-based virtual museum media on the learning motivation and understanding of Indonesian cultural diversity material among fourth-grade elementary school students. The research was conducted at SDN 67 OKU (as the experimental group) and SDN 66 OKU (as the control group) in Ogan Komering Ulu Regency from May to August 2024. The research sample consisted of 38 students divided into two groups: 19 students in the experimental group (learning using the virtual museum) and 19 students in the control group (learning using conventional textbooks).



**Figure 1.**  
Non-equivalent Control Group Design Model  
*Source: Researcher*

**Description:**

G1 = Experimental subjects

G2 = Control subjects

O1 = Pre-test

O2 = Post-test

X1 = Treatment with virtual museum media

X2 = Treatment with conventional textbooks

Research data were collected through two primary instruments that were validated for their reliability and validity. The first instrument was a learning motivation questionnaire, developed based on the ARCS model (Attention, Relevance, Confidence, Satisfaction) by Keller (1987). This questionnaire employed a 1-5 Likert scale to measure students' levels of attention, perceived relevance, confidence, and satisfaction. The second instrument was a material comprehension test in a multiple-choice format, which was constructed in alignment with Bloom's taxonomy at the C1 to C4 levels (Remembering, Understanding, Applying, and Analyzing) to assess students' cognitive abilities. Prior to deployment, both instruments underwent rigorous testing; validity was confirmed using Pearson Product Moment correlation, and reliability was established through Cronbach's Alpha, which yielded a coefficient exceeding 0.70, confirming that both tools were valid and reliable for data collection.

The quantitative data analysis was conducted using SPSS software version 22 in a multi-stage process. The initial stage involved preliminary analyses to check the assumptions for parametric tests, which included a normality test using the Shapiro-Wilk test to confirm normal data distribution and a homogeneity test using Levene's Test to verify the equality of variances between the experimental and control groups. Subsequently, hypothesis testing was performed. A Paired Sample t-test was utilized to analyze the significant improvement in motivation and comprehension scores within each group from pretest to posttest. Furthermore, an Independent Sample t-test was employed to compare the posttest results between the experimental and control groups to determine if the differences were statistically significant. For all tests, the null hypothesis ( $H_0$ ) was rejected if the significance value (p-value) was less than 0.05, indicating a statistically significant effect of the virtual museum media on the dependent variables.

## **RESULTS & DISCUSSION**

### ***Results***

This study aimed to determine the effect of using virtual museum media on students' learning motivation and material comprehension compared to the use of conventional textbooks. Data analysis was conducted using paired sample t-tests and independent sample t-tests with SPSS version 22. Overall, the results showed that both learning motivation and students' material comprehension increased significantly after the treatment, but the increase in the experimental group using the virtual museum was far greater than in the control group using conventional textbooks.

#### **The Effect of the Virtual Museum on Learning Motivation**

The paired t-test results indicated that the group of students using the virtual museum experienced a significant increase in learning motivation. The pre-test motivation score of 64.21 increased to 90.47 in the post-test, with a significance value of 0.000 ( $p < 0.05$ ). This demonstrates that the online museum can significantly encourage students to learn. The virtual museum serves as an engaging, interactive, and enjoyable learning medium that fosters student engagement and increases their interest in learning. Its ability to provide a compelling learning experience through visual displays, digital object exploration, and integrated gamification elements challenges students to participate actively in the learning process.

#### **The Effect of Conventional Textbooks on Learning Motivation**

The results show that learning using conventional textbooks still significantly improved student motivation; the average score increased from 67.53 to 72.89 ( $p=0.000$ ). It is suggested that the organized, step-by-step structure of textbooks, which guides students systematically, is an important factor in this increase. However, textbooks provided less motivational boost compared to more engaging media like the virtual museum, due to their static nature and lack of interactivity. Consequently, their effectiveness heavily depends on students' pre-existing personal interest.

#### **Comparison of Learning Motivation between Experimental and Control Groups**

Based on the analysis results, the virtual museum proved significantly superior to conventional textbooks in enhancing student learning motivation. This finding is supported by the independent t-test results, which showed a significant difference in the mean motivation scores between the experimental group (90.47) and the control group (72.89). The superiority of the virtual museum lies in its ability to create an immersive learning experience by integrating three key elements: appealing visualization, interactivity, and gamification mechanisms.

#### **The Effect of the Virtual Museum on Material Comprehension**

Besides affecting motivation, the virtual museum also influenced students' material comprehension. With a significance of 0.000 ( $p < 0.05$ ), the average comprehension pre-test score of 36.05 increased to 80.26 in the post-test. This improvement indicates that the virtual museum not only boosts student interest but also enhances their cognitive ability to understand the learning material. The success is influenced by the virtual museum's capability to present abstract concepts more concretely through visual representations and digital simulations, allowing students to more easily connect theory with the real world.

### **The Effect of Conventional Textbooks on Material Comprehension**

The use of conventional textbooks did improve students' comprehension, but not as effectively as the virtual museum. The students' average comprehension score increased from 30.79 to 42.89, confirming that textbooks still play a vital role as a learning foundation, thanks to their ability to present information systematically and in an organized manner, thus building a solid cognitive base. However, limitations in visual aspects and interactivity resulted in suboptimal comprehension gains.

### **Comparison of Material Comprehension between Experimental and Control Groups**

The independent t-test results showed a significant difference in material comprehension between the experimental and control groups with a t-count of  $-11.281 < t_{table} -2.028$  ( $p = 0.000$ ). The average comprehension score of students in the experimental group (80.26) was much higher than that of the control group (42.89). Theoretically, this result is consistent with the principles of Mayer's (2020) Cognitive Theory of Multimedia Learning, which states that presenting material through integrated visual and verbal modalities can reduce cognitive load and facilitate deeper information processing.

### **Discussion**

The finding that the virtual museum significantly boosts motivation aligns with the study by Ariesta et al. (2024), which states that virtual museum tours enhance learning motivation by providing new experiences unattainable through conventional learning and by presenting historical and cultural content immersively. Research by Fitria (2023) on gamification integration in online learning strengthens this finding, showing that the challenges and sense of achievement created by virtual tours successfully encouraged learner engagement and intrinsic drive. Furthermore, two key elements mediating this motivational increase are the sense of presence (feeling present in the virtual environment) and agency (the ability to take action and see the results). As indicated in the study by Meyer et al. (2019), students who actively become explorers reported increased curiosity and emotional engagement compared to those who merely receive information.

The motivational increase observed in the control group using textbooks is consistent with Clark & Mayer (2016) assertion that the structured, textual presentation of information in textbooks can motivate students with verbal and reading learning styles and reduce cognitive load. The success of textbooks is highly dependent on students' prior personal interest, highlighting their limitations as a less interactive medium. The virtual museum's superiority in enhancing motivation is consistent with the study by Sailer & Homner (2020), which found that gamification elements like points and leaderboards can increase intrinsic motivation and student engagement. Additionally, Meyer et al. (2019) confirm that conventional media are limited in creating deep learning experiences, concluding that a sense of presence and agency are key to the effectiveness of virtual media in improving cognitive and affective learning outcomes.

The significant improvement in comprehension within the experimental group aligns with a recent meta-analysis by Radianti et al. (2020), showing that immersive technologies like VR significantly improve learning outcomes compared to traditional approaches, largely due to their ability to generate embodied learning experiences and better memory through direct interaction. This result fits the basic principles of motivation and cognition in learning proposed by Schunk & DiBenedetto (2020), stating

that the processes of attention, active engagement, and motivation are fundamental for achieving deep understanding. The virtual museum supports these three elements by offering engaging visual objects, opportunities for independent exploration, and gamification challenges that spur student curiosity to learn the material further.

From a neuroscience perspective, the findings are supported by research from Krokos et al. (2019), which indicates that immersive virtual environments activate brain areas related to spatial processing and memory more strongly than two-dimensional learning methods. This activation provides a neurobiological explanation for why students can understand and remember material better after visiting the virtual museum. The limited comprehension gains from textbooks are also noted by Taranilla et al. (2022), who found that text-based media are less effective in developing spatial and contextual understanding. This confirms that textbooks need to be combined with more interactive media, like virtual museums, to achieve optimal learning outcomes.

This study is grounded in Vygotsky, (1978) social constructivism paradigm, emphasizing that knowledge is built through social interaction and authentic experiences. This approach aligns with the principles of the Merdeka Curriculum (Kemendikbud, 2022), which emphasizes active student involvement in the learning process. In this context, the PowerPoint-based virtual museum emerges as an innovative learning medium that facilitates immersive and interactive learning experiences, allowing students to explore Indonesian cultural content contextually. These findings are reinforced by contemporary perspectives on technology-enhanced learning Marín et al. (2020) and immersive learning Dede (2009), which assert that well-designed digital learning environments can strengthen learners' cognitive and affective engagement.

## CONCLUSION

Based on the research findings, it can be concluded that the PowerPoint-based virtual museum proved significantly more effective than conventional textbooks in increasing the learning motivation and material comprehension of fourth grade students on the topic of Indonesian cultural diversity. This medium successfully created an immersive and interactive learning experience through appealing visualizations, independent exploration, and gamification mechanisms, which not only sparked active student engagement but also facilitated deeper conceptual understanding by reducing cognitive load. These findings align with the constructivist paradigm and the principles of technology-enhanced learning in the Merdeka Curriculum. For future development, it is recommended to apply virtual museums to more diverse subjects and educational levels, add collaborative features, conduct long term studies, and promote their widespread adoption as an innovative and affordable digital learning practice.

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