



Learning Innovation through Virtual Reality Media to Enhance Interest in Christian Religious Education: A Study of Grade X Students at PGRI-20 Private Senior High School, Siborong-borong

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ABSTRACT

This study aims to examine the effectiveness of using Virtual Reality (VR)-based instructional media in enhancing students' learning interest in Christian Religious Education (CRE) among Grade X students at PGRI-20 Private Senior High School, Siborongborong, during the 2024/2025 academic year. The background of this research lies in the low level of students' interest in CRE, as indicated by limited active participation, lack of enthusiasm, and monotonous as well as less innovative teaching methods. To address this issue, VR technology was employed, as it is considered capable of creating immersive, interactive, and enjoyable learning experiences. This research adopts a quantitative approach with a quasi-experimental design, specifically the nonequivalent control group design. The sample consisted of 64 students, divided into an experimental class (X-1, 32 students) and a control class (X-2, 32 students). The experimental class utilized VR media, while the control class applied conventional methods. The instrument used was a questionnaire with a Likert scale to measure five indicators of learning interest: enjoyment, curiosity, attention, engagement, and awareness. Data were analyzed using validity, reliability, normality, and t-tests. The results of the analysis revealed a significant difference between the experimental and control classes. The experimental class demonstrated a 57.9% increase in learning interest scores, which was higher after the use of VR media, while 42.1% was influenced by other teaching methods such as large group discussions, demonstrations, and question-and-answer sessions, along with instructional models. These findings confirm that VR-based instructional media is effective in improving students' interest in learning CRE. Therefore, it is recommended that this technology be more widely integrated into CRE instruction as an alternative medium that is contextual and relevant to contemporary developments.

Keywords: *Virtual Reality, Interest in Learning, Christian Religious Education, Learning Media*

INTRODUCTION

Education constitutes a fundamental pillar in shaping the character and civilization of a nation. The Law of the Republic of Indonesia No. 20 of 2003 on the National Education System emphasizes that education is a “conscious and deliberate effort to create a learning atmosphere and learning process whereby students actively develop their potential to possess spiritual strength, self-control, personality, intelligence, noble character, and the skills required by themselves, society, the nation, and the state” (Ministry of Education and Culture, 2003). This definition illustrates that education is not merely the transfer of knowledge but also an endeavor to shape the human person in a holistic manner. More broadly, education encompasses all lifelong learning processes in diverse situations and environments, whether formal, non-formal, or informal. In a narrower sense, education is understood as an organized effort within educational institutions to equip learners with relevant competencies and strong social awareness. Along with the dynamics of the times, Indonesia’s education system has undergone significant changes, particularly in approaches, methods, and learning media. One of the most transformative developments affecting education is the advancement of information and communication technology. In the digital era, technology functions not only as a learning tool but also as a catalyst for innovation in educational processes. Educational technology enables teachers and students to interact more dynamically, engagingly, and effectively through diverse interactive media. Among emerging technologies that are rapidly gaining attention in education is Virtual Reality (VR). VR is a simulation technology that creates a three-dimensional virtual environment accessible and interactable in an immersive manner. Within the learning context, VR offers highly engaging experiences, allowing students to “enter” the learning world directly and interactively, rather than remaining passive observers.

VR-based learning media possesses clear advantages in enhancing student engagement, accommodating visual and kinesthetic learning styles, and reinforcing the understanding of complex concepts. In conventional learning settings, students often function merely as passive listeners. With VR, however, they are invited to experience and explore phenomena, concepts, and events directly through near-realistic simulations. This makes the learning process more meaningful and enjoyable. The application of VR is not only effective for subjects such as science and geography but also holds strong potential in Christian Religious Education (CRE). As an integral part of education in Indonesia, CRE aims to foster students’ character and spiritual values. Nonetheless, challenges remain in CRE instruction due to its abstract and philosophical nature, which requires contextual and applicable approaches. Unfortunately, in many schools, CRE is still delivered through conventional methods such as lectures, textbooks, and minimal use of modern technology.

Virtual Reality offers new opportunities to revolutionize CRE instruction. Through VR, students may “visit” significant locations in biblical history such as Jerusalem or Bethlehem, or other sites relevant to the lives of Jesus and the apostles. They may also witness pivotal events in church history, visualize Jesus’ parables, and reflect on ethical and moral values through realistic simulations. Such experiences enhance students’ holistic understanding of the content and values of CRE. Nevertheless, one of the challenges that persists is students’ low interest in CRE. Preliminary observations, based

on interviews with a CRE teacher at PGRI-20 Private Senior High School, Siborongborong, revealed that Grade X students exhibit low participation, limited enthusiasm, and minimal initiative in exploring material beyond class hours. Monotonous teaching methods, lecture dominance, and limited use of interactive media are among the factors contributing to students' lack of interest in this subject.

Grade X students, as digital natives, tend to require visually stimulating, interactive, and engaging learning stimuli. In this context, Virtual Reality is regarded as an innovative solution to increase students' interest in CRE. However, prior to its broad implementation, preliminary research is necessary to test the effectiveness of VR technology in improving students' learning interest, particularly in the context of CRE. PGRI-20 Private Senior High School, Siborongborong, is one institution with a vision to integrate technology into learning as part of its efforts to improve educational quality. This makes the school a strategic site for research on the implementation of VR in CRE instruction. Therefore, this study aims to examine the extent to which VR-based learning media can enhance students' interest in CRE.

Based on the aforementioned background, several key issues can be identified as the primary focus of this study: (1) the low learning interest of Grade X students in CRE at PGRI-20 Private Senior High School, Siborongborong, evidenced by passive classroom behavior, lack of initiative in asking questions or engaging in discussions, and limited independent exploration of CRE material beyond class hours; (2) the abstract and philosophical nature of CRE material, which often makes it difficult for students to conceptualize and relate to daily life, exacerbated by the lack of supporting visual and interactive media, rendering the learning process less contextual and monotonous; (3) the limited use of innovative and engaging learning media, as many CRE teachers still rely heavily on lectures and textbooks, while digital-native students are more accustomed to interactive technologies—this gap potentially diminishes student interest and hampers comprehension of CRE values; and (4) the lack of in-depth prior research on the effectiveness of VR technology in CRE learning, particularly within the local context of PGRI-20 Private Senior High School, Siborongborong, underscores the relevance and urgency of this study.

The independent variable (X) in this study is the implementation of VR-based learning media, namely the extent to which VR technology is applied in CRE instruction. The dependent variable (Y) is students' interest in CRE, encompassing aspects of motivation, active participation, and attitudes toward learning. The research subjects are limited to Grade X students at PGRI-20 Private Senior High School, Siborongborong, during the 2024/2025 academic year, considering that Grade X represents the entry-level group in senior high school, still in the process of adapting to more complex learning. The study focuses exclusively on CRE and does not extend to other subjects. The scope of VR usage in this research includes simple VR applications relevant to CRE learning materials, such as simulations of historical sites, visual narratives of biblical events, and illustrations of Christian moral values. With these delimitations, the study is expected to proceed in a focused and in-depth manner, evaluating the effectiveness of VR in enhancing students' interest in CRE. The findings are anticipated to provide practical contributions for teachers, schools, and educational policymakers in designing innovative learning strategies that are both relevant and responsive to the needs of 21st-century learners.

METHODS

This study employed a quantitative approach with an experimental research design. A quantitative approach was selected because the data collected were numerical in nature and analyzed using statistical methods. The primary objective of this approach was to test the hypothesis regarding the effectiveness of Virtual Reality (VR)-based learning media in enhancing students' interest in Christian Religious Education (CRE).

The type of experimental design applied was a Quasi-Experimental Design. This design was chosen because it allowed the implementation of experiments on two groups—an experimental group and a control group—without full randomization of participants. Although this design cannot entirely control all external variables that may affect the results, it remains relevant and enables structured measurement of the effect of the independent variable on the dependent variable.

The research was conducted at PGRI-20 Private Senior High School, Siborongborong. The location was chosen based on preliminary observations, which indicated that students' interest in learning, particularly in CRE, remained relatively low. In addition, VR-based media had not previously been implemented at the school, making it possible to test its effectiveness in a fresh context unaffected by prior interventions. The study was scheduled to take place from September 2024 to March 2025, covering stages of planning, treatment implementation, pre- and post-data collection, and data analysis.

The study population consisted of all Grade X students at PGRI-20 Private Senior High School, Siborongborong, totaling 200 students across six classes. Grade X was selected as the population for psychopedagogical considerations, as students at this level are undergoing a transitional stage from junior to senior high school. This transition is typically marked by changes in motivation and learning interest, making innovative interventions such as VR essential for fostering students' engagement at an early stage. The sample was purposively selected from two classes with relatively balanced academic abilities and student characteristics. Class X-1 served as the experimental group, receiving instruction through VR media, while Class X-2 functioned as the control group, receiving conventional instruction. Technical factors such as class schedules were also considered in the selection process. The total sample comprised 64 students, with 32 in each group. The implementation procedures were as follows: 1) Administration of a pre-test to measure initial learning interest. 2) Pre-test data analysis using a t-test to ensure group equivalence. 3) Application of VR media to the experimental group and conventional methods to the control group. 4) Administration of a post-test. 5) Comparative analysis of post-test results using a t-test to determine treatment effects. 6) Calculation of gain scores to measure improvement in learning interest. *Virtual Reality (VR)-Based Media*: Defined as a three-dimensional simulation technology that enables direct interaction and immersive learning experiences. The VR media was structured in three phases: (1) preparation, including goal formulation, procedure development, and equipment setup; (2) implementation, involving its direct use in classroom instruction; and (3) evaluation, comprising assessment and result analysis. *Students' Learning Interest*: Defined as the attention, awareness, and curiosity demonstrated by students during CRE lessons. The indicators include:

1. Sense of enjoyment
2. Interest in the material

3. Attention to the learning process
4. Active engagement in learning
5. Awareness of the importance of the material

These indicators were adapted from the theories of Slameto and Rusydi, which state that learning interest can be identified through students' affective, cognitive, and behavioral responses toward the learning process. The primary data collection technique was a closed-ended questionnaire using a four-point Likert scale. The questionnaire was administered to measure students' level of interest in learning both before and after the treatment. Data obtained from the questionnaire were analyzed statistically to identify significant differences between the experimental and control groups.

RESULT AND DISCUSSION

This study aims to examine whether the use of Virtual Reality (VR) media has a significant effect on students' learning interest in the subject of Christian Religious Education and Character Education among Grade X students of PGRI-20 Private Senior High School in the 2024/2025 academic year. The hypotheses tested were as follows:

H₀: $\beta = 0$ (There is no significant effect of Virtual Reality media on students' learning interest in Christian Religious Education and Character Education at PGRI-20 Private Senior High School in the 2024/2025 academic year).

H_a: $\beta \neq 0$ (There is a significant effect of Virtual Reality media on students' learning interest in Christian Religious Education and Character Education at PGRI-20 Private Senior High School in the 2024/2025 academic year).

The hypothesis testing was conducted at a significance level (α) of 0.05. The collected data were processed through editing, coding, tabulation, and analysis to ensure systematic categorization and accurate conclusions.

Based on the results of the analysis, it was found that the use of Virtual Reality-based learning media significantly improved students' learning interest. Thus, the alternative hypothesis (H_a) was accepted, while the null hypothesis (H_0) was rejected. The t-test calculation yielded a t-value of 3.024. To determine the correlation between variable X (pre-test) and variable Y (post-test), Pearson's Product Moment Correlation was applied, as cited from Arikunto. The result showed an r_{xy} value of 0.768, indicating a positive correlation between the use of Virtual Reality media and students' learning interest in Christian Religious Education and Character Education at PGRI-20 Private Senior High School, Sidorong-borong, in the 2024/2025 academic year.

According to Sugiyono, "Correlation analysis can be followed by calculating the coefficient of determination by squaring the correlation coefficient." Based on this, the coefficient of determination (r^2) was calculated as follows:

$$\begin{aligned} r^2 &= (r_{xy})^2 \\ r^2 &= (0.761)^2 \\ r^2 &= 0.579 \end{aligned}$$

Sugiyono further explains that the percentage of effectiveness can be obtained by multiplying the coefficient of determination (r^2) by 100%. Thus, the contribution of Virtual Reality media to learning interest was 57.9%.

After tabulating and analyzing the respondents' answers, it was revealed that the overall average score of students' learning interest increased from a pre-test score of 77.46 to a

post-test score of 81.18. This indicates an overall improvement in students' interest in Christian Religious Education and Character Education by 49.61 points due to the implementation of Virtual Reality media.

The distribution of pre-test data showed that among the 25 questionnaire items, the highest score was obtained for item 13 (score = 112, mean = 3.5), where most students strongly agreed with the statement regarding punctuality in order to follow the lesson from the beginning. The lowest score was for item 9 (score = 88, mean = 2.75), where most students agreed with the statement about internalizing and applying what had been learned to bring about personal change.

Regarding indicators, the pre-test results showed that the highest average score was found in Indicator 3 (interest), with a mean of 3.1602, while the lowest was in Indicator 2 (willingness), with a mean of 2.8125.

The post-test distribution revealed that the highest scores were obtained for items 8 and 13 (score = 115, mean = 3.5938), reflecting students' agreement with the statements "I do not delay completing assignments given by the teacher" and "I am never late so that I can follow the lesson from the beginning." The lowest score was obtained for item 6 (score = 92, mean = 2.875), which states, "I always want to explore the material more deeply."

The post-test indicators showed that the highest average score was in Indicator 3 (interest), with a mean of 3.2891, while the lowest was in Indicator 2 (willingness), with a mean of 3.0313.

The hypothesis testing using the t-test indicated that t-value (3.024) was greater than t-table (2.042), leading to the rejection of H_0 and the acceptance of H_a . This confirms that Virtual Reality media had a significant effect on students' learning interest in Grade X at PGRI-20 Private Senior High School, Siborong-borong, in the 2024/2025 academic year. From the correlation test, a positive relationship between variable X and variable Y was confirmed with $r_{xy} = 0.761$. Furthermore, regression analysis produced the following results: a) The regression equation was $Y = 49.61 + 0.82X$, indicating that with a constant of 49.61, every additional unit of Virtual Reality usage increases learning interest by 0.82 units. b) The coefficient of determination was $r^2 = 0.579$, showing that the use of Virtual Reality media contributed 57.9% to students' learning interest in Christian Religious Education and Character Education at PGRI-20 Private Senior High School, Siborong-borong, in the 2024/2025 academic year.

Conclusion

Based on the results and discussion, it can be concluded that the use of Virtual Reality media is effective in increasing students' interest in learning Christian Religious Education and Character Education. This is evidenced by the post-test score of the experimental class (81.18) compared to the pre-test score (77.46). These findings are further supported by the SPSS results, which indicate that the influence on the experimental class reached 57.9%, while in the control class it was only 26%. Christian Religious Education teachers are encouraged to optimize classroom learning to further enhance students' interest in Christian Religious Education and Character Education. This research may serve as a useful reference for teachers at PGRI-20 Private Senior High School, Siborong-borong.

In line with the highest-scoring items in the students' responses, Christian Religious Education teachers are expected not only to maintain but also to strengthen the use of

technology-based learning media. Future researchers who intend to study students' interest in Christian Religious Education and Character Education are advised to consider other variables that may influence students' learning interest. Moreover, those who wish to examine the broader impact of Virtual Reality-based learning media are encouraged to connect it with other variables, as its potential influence may extend to various aspects of students' learning, such as learning interest and academic achievement.

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