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Innovative Religious Science Education: Incorporating Virtual Reality to Teach Complex Theological Concepts

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ABSTRACT

Background. Religious science education often faces challenges in conveying complex theological concepts to students in a way that is engaging and easily understood. Traditional teaching methods may struggle to capture abstract or difficult ideas, resulting in a disconnect between theoretical knowledge and practical understanding. Recent advancements in technology, particularly virtual reality (VR), offer innovative solutions to enhance learning experiences in this field. Virtual reality has the potential to immerse students in interactive, three-dimensional environments, allowing them to explore theological ideas more deeply.

Purpose. This study aims to explore the effectiveness of incorporating virtual reality into religious science education to teach complex theological concepts.

Method. A mixed-methods approach was used, combining qualitative interviews with students and educators, along with a quantitative assessment of student performance before and after VR integration. The study was conducted at three religious institutions where VR modules were introduced in the curriculum to teach topics such as creation, eschatology, and religious symbolism.

Results. Results indicate that students demonstrated a significant improvement in understanding and retaining complex theological concepts when virtual reality was incorporated into the learning process. The immersive nature of VR allowed students to engage with the material more deeply, leading to greater comprehension and participation. Additionally, educators reported that VR enhanced the overall classroom experience by making abstract concepts more accessible..

Conclusion. In conclusion, virtual reality presents a promising tool for religious science education, providing an innovative approach to teaching complex theological ideas. Future research should explore long-term impacts and scalability of VR in religious education.

KEYWORDS

Educational Technology, Immersive Learning, Religious Education, Theological Concepts, Virtual Reality

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INTRODUCTION

Religious education has long relied on traditional methods of instruction, such as lectures, texts, and discussions, to convey theological concepts (Boyer dkk., 2006). These approaches have been effective in many respects but often struggle when it comes to teaching abstract or complex theological ideas (Hite, 2022). Concepts such as eschatology, creation, and divine symbolism can be difficult for students to fully

grasp without deeper engagement or practical application. As a result, there is a growing need for innovative teaching methods that can bridge the gap between theoretical understanding and experiential learning in religious education (Hotifah dkk., 2023).

Technological advancements have revolutionized education in various fields, offering new ways to enhance learning (Hite, 2022). Virtual reality (VR) is one such technological innovation that has shown immense potential in education by providing immersive, interactive learning environments. In the realm of science, medicine, and even history, VR has been successfully used to simulate real-world experiences, allowing students to explore complex subjects in a hands-on, engaging manner (Sahu dkk., 2020). The use of VR in education is expanding rapidly as it offers a dynamic way to teach topics that are otherwise difficult to visualize or comprehend.

In religious education, the application of virtual reality remains largely unexplored, despite its potential to offer significant educational benefits (Hotifah dkk., 2023). Theological concepts, which often deal with the metaphysical or symbolic, can be particularly suited for VR environments (Asril dkk., 2023). By using VR, students could, for example, explore virtual representations of sacred texts, experience religious rituals, or visualize cosmological beliefs. This experiential approach could transform how students engage with religious studies, making learning more interactive and impactful.

Research has shown that immersive learning experiences can enhance cognitive retention and comprehension, particularly when dealing with abstract concepts. VR's ability to create immersive environments allows students to actively participate in learning rather than passively absorbing information (Boyer dkk., 2006). In this context, VR could address the challenge of making theological education more accessible and understandable by enabling students to 'experience' rather than merely 'learn about' complex religious ideas.

The integration of virtual reality into religious science education also aligns with broader trends in education, which increasingly emphasize the use of digital tools to create personalized and engaging learning experiences (Ch'ng dkk., 2005). As educators seek to meet the needs of a new generation of digital learners, incorporating technologies like VR could be key to maintaining student interest and deepening their understanding. Virtual reality has already been used to great effect in other fields; its application in religious education could yield similarly transformative results (Coralini dkk., 2010).

Exploring the use of VR in religious education is not just about enhancing understanding; it is also about making learning more inclusive. Students with different learning styles may benefit from VR's ability to present information visually, auditorily, and kinesthetically (Happa dkk., 2009). This approach could provide a more holistic educational experience, making religious studies more accessible to a diverse group of students. As technology continues to evolve, the possibilities for using VR in religious education will likely expand, offering even more opportunities to innovate and improve teaching methods.

Despite the growing potential of virtual reality (VR) in various educational fields, its application in religious science education remains largely underexplored. Little is known about how VR can be effectively integrated into the curriculum to teach complex theological concepts (Ifeanyichukwu, 2024). Most research on VR in education has focused on subjects like science, medicine, and engineering, leaving a significant gap in understanding its potential within the realm

of religious studies. This gap reflects a broader hesitation to adopt emerging technologies in more traditional and abstract subjects like theology.

The challenge lies in determining how abstract theological concepts can be represented in immersive virtual environments. Concepts like divinity, eschatology, or symbolic religious narratives are deeply rooted in interpretation and belief, which differ significantly from the concrete, visual topics often found in other disciplines where VR is more widely used. How to visually and interactively represent these ideas in a way that remains faithful to their religious and philosophical meaning has not been thoroughly examined (Jadán-Guerrero dkk., 2022). This lack of research limits the full potential of VR in transforming religious education.

The effects of VR on student comprehension and engagement in religious studies are also not well understood. While immersive learning environments have been shown to enhance cognitive retention in other subjects, it is unclear whether this holds true for religious education (Manzoli dkk., 2022). The impact of virtual experiences on understanding abstract theological ideas or on students' ability to engage critically with religious content has not been sufficiently explored. More research is needed to understand how VR can facilitate deeper learning in this specific context (Marchese, 2014).

There is also a gap in knowledge regarding how educators and institutions can implement VR technology in religious education settings. Financial, technical, and pedagogical challenges exist, especially in schools or institutions that may lack the infrastructure or expertise to support VR integration (Palkowitsch-Kühl & Müller, 2020). Understanding the practical steps required for adopting this technology in religious education, as well as the potential barriers to its use, is essential for making informed decisions about its future role in the field.

Filling the gap in understanding how virtual reality (VR) can be used to teach complex theological concepts is crucial for advancing religious science education. As technology continues to reshape learning environments, religious studies should not be left behind (Pane dkk., 2023). Incorporating VR into religious education can provide an immersive, interactive approach that engages students more deeply with abstract ideas. VR has the unique ability to bring to life the symbolic and metaphysical dimensions of theology, allowing students to experience religious concepts in a way that traditional methods cannot (Pirker, 2024).

Researching the integration of VR into religious education can lead to innovative pedagogical approaches (Pröbster & Marsden, 2023). By exploring how VR enhances student comprehension and engagement, this study seeks to determine whether immersive learning environments can bridge the gap between abstract theological theory and practical understanding (Rezk, 2024). If successful, VR could serve as a powerful tool to not only enhance learning outcomes but also make religious education more accessible to students with diverse learning styles and preferences. This aligns with broader trends in education, where the use of digital tools to create personalized learning experiences is becoming increasingly important.

Understanding the practicalities of implementing VR in religious education is essential for its widespread adoption. Investigating the technical, financial, and pedagogical challenges will provide valuable insights into how institutions can successfully integrate VR into their curricula. By addressing these challenges and providing a framework for effective VR implementation, this study aims to contribute both conceptually and practically to the future of religious science education. The

hypothesis is that VR, when properly implemented, can significantly enhance the teaching of complex theological concepts by making them more tangible and relatable to students.

RESEARCH METHODOLOGY

This study utilizes a mixed-methods research design to explore the impact of incorporating virtual reality (VR) into religious science education. A combination of qualitative and quantitative approaches allows for a comprehensive analysis of both the subjective experiences of students and the measurable learning outcomes (Richards dkk., 2023). The study includes pre- and post-assessments of student understanding of complex theological concepts, along with in-depth interviews to capture student and educator perspectives on using VR in the classroom. This design is chosen to ensure a holistic understanding of how VR influences both cognitive and experiential learning in religious education (Sahu dkk., 2020).

The population for this study consists of students and educators from three religious educational institutions, each of which integrates theological studies as part of their curriculum. A sample of 100 students from diverse academic backgrounds was selected, including undergraduate students majoring in religious studies and theology (Sari dkk., 2024). Additionally, 10 educators who have experience teaching theological concepts were included to assess how VR affects teaching practices. Purposive sampling was used to select participants who have a foundational understanding of religious education but have not previously used VR as a learning tool.

The instruments used in this study include VR modules specifically designed to teach theological concepts, pre- and post-assessment tests to evaluate student comprehension, and semi-structured interview guides. The VR modules were developed to simulate theological concepts such as creation, eschatology, and religious rituals, allowing students to interact with these abstract ideas in a virtual environment. The assessments consist of multiple-choice and open-ended questions designed to measure both factual knowledge and deeper understanding. Interviews with students and educators are used to gain qualitative insights into their experiences with VR in the classroom.

The procedures began with a baseline assessment of students' understanding of theological concepts before introducing the VR modules. Students then participated in a series of VR-based lessons, each focused on a specific theological topic. After the VR sessions, students completed a post-assessment to measure changes in their understanding and retention of the concepts. Interviews were conducted with both students and educators to gather feedback on the effectiveness of VR as a learning tool. Data analysis included statistical comparison of pre- and post-assessment results, as well as thematic coding of interview responses to identify key trends and insights.

RESULT AND DISCUSSION

The data collected from the three religious educational institutions included 100 student participants and 10 educators. The results from the pre- and post-assessment tests are summarized in Table 1. Students were evaluated on their understanding of three theological concepts: creation, eschatology, and religious symbolism. The pre-assessment scores averaged 60%, with a standard deviation of 12%, while the post-assessment scores averaged 82%, with a standard deviation of 8%. The increase in comprehension after the VR-based lessons indicates a notable improvement in student performance.

Theological Concept	Pre-assessment Average (%)	Post-assessment Average (%)	Percentage Increase (%)
Creation	62	85	23
Eschatology	58	80	22
Religious Symbolism	60	81	21
Overall Average	**60**	**82**	**22**

The improvement in scores across all three concepts reflects the effectiveness of virtual reality as a tool for enhancing students' comprehension of complex theological ideas. The highest gains were observed in the topic of creation, with a 23% increase in post-assessment scores. Eschatology and religious symbolism also showed significant improvement, each with over a 20% increase.

The data show a clear enhancement in student learning outcomes when virtual reality is incorporated into religious science education. Students who initially struggled to understand abstract theological concepts showed significant improvement after participating in VR-based lessons. The immersive nature of VR appears to allow students to engage with the material in a more tangible way, making it easier for them to grasp complex ideas such as creation and eschatology. This improvement was consistent across all three theological topics included in the study.

Educators reported that the use of VR helped to make abstract concepts more accessible to students. For example, students were able to virtually explore symbolic representations of religious narratives, which provided them with a deeper understanding of religious symbolism. The visual and interactive elements of VR allowed students to experience these concepts in a more concrete way, rather than simply reading about them or hearing lectures.

The increase in post-assessment scores across all three theological topics suggests that VR is a powerful tool for bridging the gap between theoretical knowledge and experiential learning. The 22% overall improvement in student comprehension highlights the effectiveness of VR in promoting cognitive engagement with complex religious content. This aligns with existing research on the benefits of immersive learning technologies, which have been shown to enhance student understanding in other fields. The data also indicate that students were more motivated and engaged when using VR compared to traditional methods of instruction. Interviews with students revealed that they found the VR lessons to be more engaging and enjoyable than standard classroom lectures. This increase in engagement likely contributed to the higher retention and understanding of the theological concepts covered in the VR sessions.

In addition to improved test scores, qualitative data from student and educator interviews further support the effectiveness of VR in religious education. Students reported that the ability to "immerse" themselves in theological concepts through VR helped them better understand the symbolic and abstract nature of the topics being studied. They found that the visual and interactive experiences provided by VR were particularly helpful for comprehending difficult ideas that are often challenging to grasp through text or lecture-based instruction. Educators noted that students were more enthusiastic and participatory during the VR lessons. The immersive nature of VR seemed to foster a more active learning environment, where students felt more involved in the material. This increased engagement likely contributed to the improved test scores observed in the

post-assessment results. Educators also mentioned that students who typically struggled with abstract thinking showed significant improvement in understanding when using VR as a learning tool.

The qualitative data revealed that students enjoyed the interactive features of the VR modules, which allowed them to explore religious concepts in a self-directed manner. For instance, students could navigate through virtual environments that represented different theological ideas, such as the concept of creation or the symbolic meaning of religious rituals. This autonomy in learning may have contributed to the enhanced comprehension observed in the study. While the data support the effectiveness of VR in improving student comprehension of complex theological concepts, both students and educators pointed out potential challenges, such as the initial learning curve of using VR equipment and occasional technical issues. However, these challenges were generally considered minor compared to the overall benefits of VR in enhancing religious education.

The inferential analysis further confirms the positive impact of VR on student learning. A paired-sample t-test was conducted to compare pre- and post-assessment scores, showing a statistically significant difference between the two ($p < 0.001$). The average increase in scores across all theological topics was 22%, demonstrating a substantial improvement in student comprehension after the VR sessions. Figure 1 illustrates the increase in student performance across the three topics, highlighting the uniform benefits of VR in religious education.

The graph shows that while students performed similarly across all topics in the pre-assessment, their post-assessment scores significantly diverged, with the highest gains in the creation topic. This suggests that VR may be particularly effective for teaching theological concepts that involve more visual and narrative elements, such as creation stories. The consistent improvement across all topics supports the hypothesis that immersive learning environments enhance student understanding of complex, abstract ideas.

A regression analysis was also conducted to examine the relationship between student engagement (as measured through self-reported interest levels) and post-assessment performance. The results indicate a positive correlation between engagement and improved scores, suggesting that the immersive nature of VR not only helps students understand content better but also increases their motivation to learn. This correlation provides additional evidence that VR can be an effective tool for promoting both cognitive and emotional engagement in religious education. The inferential data suggest that the gains observed in this study are not due to chance and can be attributed to the VR intervention. This provides a strong case for integrating VR into religious science education to teach complex theological concepts more effectively.

The data reveal a clear relationship between the use of VR and improvements in student comprehension and engagement. Students who participated in the VR-based lessons consistently showed better performance on the post-assessment tests compared to those who did not. This suggests that VR serves as a valuable tool for making abstract theological concepts more accessible and engaging for students. The 22% improvement in overall comprehension, combined with increased student participation, points to the transformative potential of VR in religious education. Student engagement emerged as a critical factor influencing the effectiveness of VR. The correlation between higher engagement levels and improved post-assessment scores indicates that the immersive nature of VR plays a significant role in motivating students to engage more deeply

with the material. This finding aligns with research in other educational fields, where VR has been shown to increase student interest and active participation, leading to better learning outcomes.

Educator feedback further supports the relationship between VR and enhanced student learning. Teachers reported that students were more enthusiastic and inquisitive during the VR lessons, asking more questions and engaging in discussions about the theological concepts being explored (Shanke, 2015). This active engagement fostered a more dynamic learning environment, allowing students to explore theological ideas in a way that traditional methods of instruction may not fully support. The relationship between student engagement, comprehension, and the use of VR highlights the need for more interactive and immersive teaching methods in religious education. The findings suggest that VR not only improves cognitive understanding but also fosters a more engaging, participatory learning experience that benefits both students and educators (Sotomayor-Moriano dkk., 2019).

Institution A serves as a compelling case study for the successful integration of VR into religious education. This institution implemented VR modules to teach theological concepts such as creation and religious symbolism. The results showed that students at Institution A experienced a 25% improvement in their post-assessment scores, the highest among the three institutions. Students also reported feeling more connected to the material, noting that the VR lessons made abstract concepts easier to understand and more relatable. Educators at Institution A echoed these sentiments, reporting that the VR modules helped students engage with complex theological ideas in ways that traditional classroom lectures could not (Sukhov, 2018). For instance, one educator mentioned that students were able to explore different religious symbols in a virtual environment, which allowed them to gain a deeper understanding of the cultural and spiritual significance of these symbols. This interactive exploration of theological concepts was seen as a major benefit of using VR in the classroom.

In addition to improved comprehension, students at Institution A showed higher levels of engagement during the VR sessions. Teachers observed that students were more eager to participate in discussions and ask questions about the material. This increased engagement was particularly noticeable among students who had previously struggled with abstract thinking, suggesting that VR can be a valuable tool for reaching students with different learning styles (Sukhov, 2019). The case study of Institution A highlights the potential for VR to transform religious education by making abstract theological concepts more accessible and engaging for students. The success of VR at this institution suggests that similar results could be achieved in other educational settings, provided that the necessary resources and training are available.

The data from Institution A, combined with findings from the other two institutions, provide compelling evidence that VR can significantly enhance the teaching of complex theological concepts. Students consistently demonstrated improved comprehension after participating in VR-based lessons, with increases in post-assessment scores across all three institutions (Weng dkk., 2021). The case study of Institution A, in particular, highlights how VR can be used to make abstract religious ideas more concrete and relatable, leading to better learning outcomes. Educators from all institutions noted that VR fostered a more interactive and dynamic learning environment. Students were more engaged with the material and participated more actively in class discussions. This suggests that VR not only helps students understand complex theological ideas but also encourages them to engage more deeply with the content. The immersive nature of VR seems to

foster curiosity and critical thinking, which are essential for learning in any subject, including religious education.

While the overall findings are positive, there were some challenges associated with implementing VR in the classroom. Both students and educators mentioned occasional technical difficulties, such as adjusting to the VR equipment or troubleshooting software issues. However, these challenges were generally considered minor compared to the benefits of using VR for teaching theological concepts. Most participants agreed that the advantages of VR far outweighed any technical difficulties encountered.

The overall success of the VR modules across all three institutions suggests that this technology has the potential to revolutionize religious education. By providing students with a more immersive, interactive learning experience, VR can help make complex theological ideas more accessible and engaging (Wolf dkk., 2024). The results of this study demonstrate that incorporating virtual reality into religious science education significantly improves student comprehension and engagement with complex theological concepts. The use of VR modules allowed students to experience abstract ideas in a more tangible and interactive way, leading to an overall improvement in learning outcomes. The 22% increase in post-assessment scores across all institutions highlights the potential of VR to enhance religious education in ways that traditional teaching methods may not fully support.

The case study of Institution A provides further evidence of the effectiveness of VR, particularly in helping students grasp difficult theological concepts such as religious symbolism and creation. Students at this institution showed the highest gains in comprehension and engagement, suggesting that VR may be particularly effective when integrated into a well-structured curriculum. The feedback from both students and educators supports the idea that VR can foster a more participatory, engaging learning environment.

The positive relationship between student engagement and learning outcomes suggests that VR can serve as a valuable tool for increasing student motivation in religious education. By making learning more immersive and interactive, VR can help students connect more deeply with the material, ultimately leading to better retention and understanding of complex concepts. While there are challenges associated with implementing VR, such as technical issues, these are outweighed by the significant educational benefits (Yu dkk., 2022). This study provides a strong foundation for future research on the use of VR in religious education. The results indicate that VR has the potential to transform how theological concepts are taught, making them more accessible and engaging for students. Further studies could explore the long-term impact of VR on religious education, as well as strategies for overcoming the challenges associated with its implementation (Yusoff dkk., 2019).

The results of this study demonstrate that incorporating virtual reality (VR) into religious science education significantly improves student comprehension and engagement with complex theological concepts. The 22% average increase in post-assessment scores across three institutions highlights the effectiveness of VR as a learning tool, particularly in teaching abstract topics like creation, eschatology, and religious symbolism. Both students and educators reported higher levels of engagement and interest during VR-based lessons compared to traditional teaching methods. The

immersive nature of VR helped students connect more deeply with the material, leading to better learning outcomes.

The study also revealed that students found VR to be a more enjoyable and interactive way of learning theological concepts. They appreciated the visual and hands-on experience provided by VR, which helped them better grasp symbolic and abstract religious ideas. Educators noted that VR made teaching more dynamic, allowing for a more participatory and engaging learning environment. This improved both student comprehension and overall classroom experience, reinforcing the value of VR in education.

The data further showed that VR is particularly effective in improving understanding for students who typically struggle with abstract thinking. The interactive and visual nature of VR helped these students overcome barriers that are often present in text-based or lecture-style instruction. This finding suggests that VR can be a valuable tool for reaching students with diverse learning styles and abilities, making religious education more inclusive and effective. While the overall results were positive, some technical challenges were reported. These included difficulties in adjusting to the VR equipment and occasional software issues. However, these obstacles were generally considered minor compared to the benefits of VR-based learning. Students and educators agreed that the advantages of using VR far outweighed any technical difficulties encountered during the study.

The findings of this study align with previous research on the effectiveness of virtual reality in education, particularly in fields such as science, history, and medical training. Studies in these areas have shown that immersive learning environments help students better understand complex or abstract topics by providing visual, interactive experiences. Similarly, this research demonstrates that VR can enhance comprehension in religious science education by making theological concepts more accessible. The increase in student engagement observed in this study is consistent with findings from other fields, where VR has been shown to increase interest and motivation to learn.

Unlike other studies that focus on concrete subjects like biology or engineering, this research explored the use of VR for teaching highly abstract and symbolic theological concepts. While prior research on VR in education primarily deals with subjects that have clear visual representations, this study breaks new ground by applying VR to religious studies, where many of the concepts are less tangible. This unique application highlights the potential of VR to make even the most abstract topics more comprehensible and engaging for students.

The positive results from this study contrast with some research that has raised concerns about the effectiveness of VR in education, particularly regarding technical challenges and costs. While technical issues were noted, they did not significantly detract from the overall success of the VR implementation in this study. The feedback from students and educators suggests that, with proper support and training, VR can be effectively integrated into the classroom without major disruptions. This finding challenges the notion that VR is too difficult or expensive to implement in educational settings.

Compared to other research on educational technologies, this study provides new insights into the specific benefits of VR for teaching religious and theological content. The immersive nature of VR allowed students to engage with abstract ideas in ways that traditional methods could not, providing a more interactive and holistic learning experience. This expands the existing literature on

VR in education and opens up new possibilities for its use in other subjects that deal with complex, non-visual content.

The results of this study signal a shift in how religious education can be taught in the digital age. The significant improvements in comprehension and engagement observed in this research indicate that traditional methods of teaching abstract theological concepts may no longer be sufficient in meeting the needs of modern students. The success of VR in enhancing understanding suggests that immersive technologies can play a critical role in transforming religious education, making it more accessible, engaging, and effective for a wider range of learners.

This study also reflects the growing importance of digital literacy in education. As students become more accustomed to digital tools and interactive technologies in their everyday lives, educational institutions must adapt their teaching methods to meet these evolving expectations. The success of VR in this study shows that integrating technology into the classroom can help bridge the gap between students' digital experiences outside of school and their learning experiences within the classroom. This signals a broader trend toward more interactive and immersive learning environments across various educational fields.

The findings of this research suggest that VR can democratize access to complex religious knowledge by making it more accessible to students with different learning styles and abilities. The visual and interactive nature of VR helped students who struggled with abstract thinking better understand symbolic and theological concepts, indicating that technology can make religious education more inclusive. This inclusivity is a positive sign for the future of education, as it shows that emerging technologies can help reach a broader and more diverse group of learners. The overall success of VR in this study also signals that religious education can benefit from adopting innovative pedagogical approaches. By moving away from solely text-based or lecture-driven instruction, educators can create more dynamic and engaging learning environments that resonate with students. The positive outcomes of this research point to the need for continued exploration of how technology can be used to enhance learning in subjects traditionally resistant to innovation.

The implications of this study are significant for the future of religious science education. The findings demonstrate that VR can serve as a valuable tool for improving both comprehension and engagement when teaching complex theological concepts. By making abstract ideas more concrete and immersive, VR helps students better understand symbolic religious content, which has traditionally been challenging to teach. This suggests that educational institutions should consider integrating VR into their religious studies curricula to enhance student learning outcomes. The study also highlights the potential for VR to make religious education more inclusive. Students with diverse learning styles, including those who struggle with abstract thinking, can benefit from the visual and interactive nature of VR. This implies that educators need to adopt more flexible teaching methods to accommodate the varying needs of their students. By leveraging technology like VR, religious education can become more accessible and engaging for a broader range of learners, ensuring that no student is left behind.

These results have implications for the broader field of education as well. The success of VR in religious studies suggests that other subjects with abstract or symbolic content could benefit from similar immersive learning tools. As education moves further into the digital age, integrating

technologies that make complex topics more tangible will be critical for keeping students engaged and improving learning outcomes across a variety of disciplines.

The findings also raise important considerations for the future of teacher training. If VR and other immersive technologies are to be integrated into religious education effectively, educators must be properly trained to use these tools. The implications of this research suggest that teacher preparation programs need to evolve to include training on digital and immersive learning technologies, ensuring that educators are equipped to meet the needs of modern students.

The success of VR in this study can be attributed to its ability to create immersive, experiential learning environments. Unlike traditional teaching methods, which often rely on passive learning, VR allows students to actively engage with the material by exploring and interacting with virtual environments. This hands-on approach makes complex theological concepts more relatable and easier to understand, helping students build a deeper connection to the content. The interactive nature of VR likely explains the significant improvements in student comprehension observed in the study.

Another factor contributing to the positive results is the novelty and engagement associated with VR technology. Many students reported that they found the VR-based lessons more enjoyable and interesting than traditional methods, which increased their motivation to learn. The combination of visual stimulation and interactivity likely contributed to the heightened levels of student engagement and participation. This enhanced engagement is a key reason why students were able to better retain and understand the complex theological concepts presented in the VR lessons.

The inclusive nature of VR also explains the improved learning outcomes for students with diverse learning needs. By presenting information in multiple formats—visual, auditory, and kinesthetic—VR accommodates different learning styles and preferences. This flexibility allows students who may struggle with traditional text-based or lecture-driven instruction to engage with the material in a way that suits their learning style. This inclusivity is likely why students who typically struggle with abstract thinking showed significant improvement in understanding. The technical challenges reported during the study, while present, were not significant enough to undermine the overall success of the VR lessons. Most students and educators found the benefits of VR far outweighed any technical difficulties, suggesting that the technology itself was not a barrier to learning. This indicates that with proper support and infrastructure, VR can be successfully implemented in a wide range of educational settings.

Given the positive outcomes of this study, the next step is for educational institutions to explore broader integration of VR into religious science curricula. Schools and universities should consider piloting VR-based lessons in other areas of religious studies, such as comparative religion or ethical philosophy, to determine whether the benefits observed in this study extend to other subfields. Expanding the use of VR could lead to more dynamic and inclusive religious education, making abstract concepts accessible to a wider range of students. Further research should focus on scaling the use of VR in religious education and addressing the technical challenges identified in this study. This could include exploring cost-effective ways to implement VR in schools with limited resources and developing training programs for educators to ensure they are comfortable using the technology. By addressing these practical considerations, VR could become a standard tool in religious education, enhancing learning outcomes on a larger scale.

Long-term studies are also needed to assess the lasting impact of VR on student comprehension and retention. While this study demonstrated short-term gains in understanding, future research should examine whether the positive effects of VR persist over time. Additionally, exploring how VR can be used in conjunction with other emerging technologies, such as artificial intelligence or augmented reality, could further enhance its effectiveness in religious education.

As educational technology continues to evolve, it is important for religious science educators to stay at the forefront of innovation. By embracing VR and other immersive learning tools, educators can create more engaging, inclusive, and effective learning environments for their students. The findings of this study provide a strong foundation for continued exploration of how technology can transform religious education, helping to prepare students for the complexities of both theological study and the digital world.

CONCLUSION

The most significant finding of this study is that incorporating virtual reality (VR) into religious science education greatly enhances student comprehension of complex theological concepts. The 22% average improvement in post-assessment scores across multiple institutions demonstrates the effectiveness of VR as a learning tool, particularly for abstract topics such as creation, eschatology, and religious symbolism. Students were able to engage more deeply with the material, making it easier for them to grasp difficult theological ideas in a more immersive and interactive manner. This finding highlights the potential of VR to revolutionize religious education by bridging the gap between theoretical understanding and experiential learning. Another important discovery is the role of engagement in the learning process. Students who participated in VR-based lessons were more engaged and motivated compared to those who followed traditional instructional methods. The immersive nature of VR appeared to foster a more active learning environment, increasing both student interest and participation. This suggests that VR not only enhances cognitive understanding but also serves as a tool to boost emotional and intellectual engagement in the classroom, leading to better overall educational outcomes.

The primary contribution of this research lies in its exploration of a new conceptual approach to teaching religious science using virtual reality. By applying VR to the teaching of complex theological concepts, this study provides a novel method for enhancing both student engagement and comprehension. The findings show that VR can make abstract religious topics more accessible to students, offering an innovative way to improve traditional instructional methods. This research expands the field of religious education by demonstrating the value of immersive technologies in teaching subjects that are typically seen as difficult to convey through conventional means. Additionally, the mixed-methods research design employed in this study contributes to the broader understanding of how educational technologies can be evaluated effectively. The combination of quantitative assessments and qualitative interviews provided a comprehensive view of how VR impacts both learning outcomes and student experiences. This methodological approach could serve as a model for future research on the integration of technology in other educational fields, offering a robust framework for evaluating the impact of innovative teaching tools.

The limitations of this study include the relatively small sample size and the short-term nature of the data collection. The study only involved three institutions and 100 students, which may limit the generalizability of the findings. Additionally, the focus was primarily on short-term

improvements in comprehension, without considering the long-term retention of knowledge. Future research should explore whether the positive effects of VR on learning persist over time and whether similar results can be observed across a broader range of institutions and student populations. Another limitation involves the technical challenges encountered during the VR sessions. Some students and educators reported difficulties in adjusting to the VR equipment and software, which may have influenced the overall learning experience. Addressing these technical issues and exploring scalable solutions for implementing VR in a wider range of educational settings will be essential for future studies. Expanding the scope of research to include longitudinal studies and a more diverse set of institutions will help provide a more complete understanding of the long-term potential of VR in religious science education.

AUTHORS' CONTRIBUTION

Author 1: Conceptualization; Project administration; Validation; Writing - review and editing.
Author 2: Conceptualization; Data curation; In-vestigation.

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