Implementation of Digital Innovation through Virtual Reality Technology in Improving Students' Understanding and Learning Experience in Islamic Religious Education Subjects

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ABSTRACT

Virtual Reality is one of the technological innovations that has the potential to increase the effectiveness of learning, including in the subject of Islamic Religious Education. This technology allows for a more immersive learning experience, where students can understand religious concepts more deeply through interactive simulations. This study discusses the application of virtual reality in Islamic Religious Education learning, its impact on student understanding, and challenges and solutions in its implementation. The method used in this study is a literature review method by analyzing various scientific sources related to the use of Virtual Reality in Education. The results of the study show that the use of Virtual Reality can increase students' understanding of religious concepts, increase learning motivation, and enrich the learning experience. However, challenges such as high costs, limited facilities, and lack of teachers' skills in using Virtual Reality are still major obstacles. Therefore, the right strategy is needed in its application so that the benefits of this technology can be optimized in the learning of Islamic Religious Education.

Keywords: Digital Innovation, Virtual Reality, Understanding, Experience, PAI

ABSTRAK

Virtual Reality merupakan salah satu inovasi teknologi yang berpotensi meningkatkan efektivitas pembelajaran, termasuk dalam mata pelajaran Pendidikan Agama Islam. Teknologi ini memungkinkan pengalaman belajar yang lebih imersif, di mana siswa dapat memahami konsep keagamaan dengan lebih mendalam melalui simulasi interaktif. Penelitian ini membahas penerapan virtual reality dalam pembelajaran Pendidikan Agama Islam, dampaknya terhadap pemahaman siswa, serta tantangan dan Solusi dalam implementasinya. Metode yang digunakan dalam kajian ini adalah metode kajian pustaka dengan menganalisis berbagai sumber ilmiah terkait penggunaan Virtual Reality dalam Pendidikan. Hasil kajian menunjukkan bahwa penggunaan Virtual Reality dapat meningkatkan pemahaman konsep keagamaan siswa, meningkatkan motivasi belajar, serta memperkaya pengalaman belajar. Namun, tantangan seperti biaya tinggi, keterbatasan fasilitas, dan kurangnya keterampilan guru dalam mengunakan Virtual Reality masih menjadi kendala utama. Oleh karena itu, diperlukan strategi yang tepat dalam penerapannya agar manfaat teknologi ini dapat dioptimalkan dalam pembelajaran Pendidikan Agama Islam.

Kata Kunci: Inovasi Digital, Virtual Reality, Pemahaman, Pengalaman, PAI

I. INTRODUCTION

Education is a process of seeking knowledge that must be pursued by every human being so that his life is directed and able to achieve the desired goals (Rossa & Hosna, 2024). To facilitate the implementation of education, adequate technology is needed (Hasibuan et al., 2025). The development of technology in the world of education has brought significant changes to learning methods. One of the technological innovations that is beginning to be applied in education is Virtual Reality which offers a more immersive and interactive learning experience (Ruzakki et al., 2024). This technology allows students to understand abstract concepts through simulations that are close to reality (Saurik et al., 2019). In the context of Islamic Religious Education, Virtual Reality can be a solution in explaining religious concepts that are difficult to understand only through texts and lectures.(Khotima et al., 2024)

In the subject of Islamic Religious Education, some materials such as Islamic History, Hajj and Umrah procedures, and moral values are often difficult for students to understand because of their abstract nature and cannot be observed directly (Hakim & Syawaludin, 2025). The application of Virtual Reality can help students experience deeper learning by visually experiencing historical places, worship practices, and various Islamic values in daily life (Barkati & Cahyadi, 2024).

However, although Virtual Reality has great potential in the world of education (Charles Charles et al., 2023), its application in Islamic Religious Education subjects still faces challenges, such as device limitations, lack of educators' skills in operating this technology, and high costs (Kurniawati et al., 2023). Therefore, this study aims to analyze how the application of Virtual Reality in Islamic Religious Education subjects, its impact on student understanding and involvement, and the challenges faced in its implementation.

As mentioned by Al Abror & Hosna in their research conducted in 2022, the world of education is always evolving along with the times, so innovation in ahar learning methods is needed to remain relevant and effective (Al Abror & Hosna, 2022). Thus, technology-based learning innovations such as virtual reality can be a solution to increase the effectiveness of education, especially in the religious field which often has abstract concepts and is difficult for students to understand.

Based on this background, this study seeks to answer the following questions: 1. How is the application of Virtual Reality technology in Islamic Religious Education subjects? 2. What is the impact of the use of Virtual Reality on students' understanding of religious concepts in PAI? 3. What are the challenges and solutions in the implementation of Virtual Reality in Islamic Religious Education subjects?

Through this literature review, it is hoped that this research can provide insight for educators and make policies in utilizing Virtual Reality technology as a digital innovation in Islamic Religious Education subjects. The theoretical study in this study covers several main aspects, namely the concept of virtual reality, technology-based learning theory, and the implementation of Virtual Reality technology in religious learning.

1. Virtual reality concept. Virtual reality is a technology that allows users to interact with virtual environments simulated by computers (Pratiwi et al., 2020). By using a device like a Virtual Reality headset, users can experience an experience that almost resembles the real world. Virtual Reality has been widely used in various fields, including

medical, military, entertainment, and now penetrates the world of Education.

2. Technology-based learning theory. Technology-based learning is based on the theory of constructivism put forward by Piget and Vygotsky, where students build their understanding through direct experience (Rohaendi & Laelasari, 2020). Virtual Reality supports this approach by providing a learning environment that allows for deeper exploration, simulation, and interaction than conventional learning methods (Fauzia & Hadikusuma Ramadan, 2023).

3. The implementation of Virtual Reality technology in religious learning in the context of PAI, Virtual Reality technology can be applied to:

   a. Islamic History learning, by allowing students to visit virtually historical places such as the Grand Mosque, the Prophet's Mosque, or the site of the Prophet Muhammad's migration event (Hasibuan et al., 2025).

   b. Worship simulation, where students can experience Hajj and Umrah virtually, understand the order of worship, and learn prayer procedures more interactively (Alfiannur et al., 2025).

   c. Learning Islamic morals and ethics, through interactive simulations that teach moral values and decision-making in real situations (Aqmarinal & Susilo, 2025).

Previous research shows that the use of Virtual Reality in Islamic Religious Education can increase students' understanding, which is 85-90%, strengthen memory, and this study will further examine the impacts and challenges of implementing virtual reality in Islamic Religious Education subjects.

II. METHODS

This study uses the Literature review method, which is a research method that is carried out by collecting, analyzing, and compiling information from various relevant literature sources (Ridwan et al., 2021). This literature review aims to understand the implementation of Virtual Reality in the subject of Islamic Religious Education and the challenges of solutions it faces.

The steps in this study include:

1. Data collection
   a. Identify literature sources from national and international journals that discuss the use of Virtual Reality in Education, especially in PAI.
   b. Collecting data from previous research related to the impact of Virtual Reality on students' understanding and motivation in religious learning.
   c. Use references from books, scientific articles, as well as previous research results relevant to this topic.

2. Data analysis
   a. Analyze and compare findings from various studies on the effectiveness of Virtual Reality in improving students' understanding of religious concepts.
   b. Classify information based on themes, such as benefits, challenges, and solutions in the implementation of Virtual Reality in Islamic Religious Education subjects.

3. Interpretasi dan penyajian hasil
   a. Compile the results of the analysis in a systematic form by comparing various studies that have been conducted.
   b. Draw conclusions based on the findings of the literature review to provide recommendations in the application of Virtual Reality in

Islamic Religious Education subjects.

With this approach, the research is expected to provide deeper insights into the benefits, challenges, and solutions in the application of virtual reality as a digital innovation in Islamic Religious Education.

III. RESULTS AND DISCUSSION

A. Application of Virtual Reality in Islamic Religious Education Subjects

Virtual Reality in Islamic Religious Education learning is a technology that creates an interactive digital environment simulation that allows students to experience learning in an immersive manner. Virtual Reality allows students to experience immersive learning, which can enhance their understanding of religious concepts and Islamic History without having to be in the actual location (Raharjo et al., 2023). By using devices such as Virtual Reality headsets, students can explore historical Islamic sites, understand worship procedures, and explore religious concepts in a more real way without having to be in the actual location. This technology helps students understand abstract Islamic Religious Education materials, such as the history of Islamic civilization, worship practices and moral values, in a more interesting and easy-to-understand way (Toni Yunanto, 2024).

Virtuality Reality has developed as one of the technologies that can support the development of learning media. Virtual Reality enables knowledge engagement in an easy, kind, precise, fast, and rewarding way. Virtual Reality also allows users to experience an immersive experience in a simulated digital environment, allowing interaction with objects and concepts learned to be more immersive. With Virtual Reality-based technology, the dissemination, learning, and presentation of information conveyed by educators can be more effective and efficient, because learning can be done by exploring the virtual world without having to be in an actual physical location (Typhoon Bahari et al., 2023).

According to research, the use of Virtual Reality technology in Islamic Religious Education has great potential in increasing student involvement and understanding of religion. able to create an interactive and immersive learning environment, allowing students to explore religious concepts in depth and reflective (Isti'ana, 2024).

One of the main advantages of Virtual Reality in Islamic Religious Education subjects is its ability to create simulations of complex religious experiences. For example, this technology allows students to experience the Hajj virtually (M Elman, 2024), explore historical places in Islam, or understand the social and cultural context of the time of the Prophet (Yasir, 2025). Simulations like this can help students not only understand the theory, but also experience firsthand experiences that improve their memory and understanding (Sulistyowati & Rachman, 2017). The same principle can be applied in Islamic Religious Education subjects, especially for abstract materials such as Islamic History and worship procedures.

Virtual reality can be used to create the experience of Islamic Religious Education subjects in several aspects, including:

1. Islamic History Lessons. Virtual Reality can be used to revive historical events in Islam, such as the migration journey of the Prophet Muhammad Saw, the development of Islamic

civilization in Andaulisia, and the explanation of Islam in various parts of the world. With Virtual Reality, students can as if visiting historical places such as the Grand Mosque, the Prophet's mosque, or the Alhambra in Spain that previously could only be learned through text and images (Rusdiana, 2025).

2. Simulating worship. With Virtual Reality, students can practice performing tawaf around the Kaaba, understand the steps of sa'i between shafa and Marwah, and feel the atmosphere of worship at the Grand Mosque without having to be in the actual location. This can increase students' understanding of the pillars of Islam and strengthen their readiness to carry out worship directly.

3. An exploration of Islamic culture. Islam has a rich cultural diversity in various countries. Virtual Reality can be used to introduce Islamic culture in the Middle East, Southeast Asia, Africa, and Europe, so that students can understand how Islamic values are implemented in the lives of different Societies. For example, students can explore Muslim life in Morocco, Turkey, or Indonesia and understand the variations in religious practices that still adhere to the universal teachings of Islam.

4. Learning Islamic faith and ethics. Virtual Reality can also be used to deepen students' understanding of the concepts of faith such as the realm of barzah, life after death, and the depiction of heaven and hell in Islam. With a more tangible visual experience, students can understand these concepts better than just reading descriptions in textbooks (Sampurna et al., 2022).

Previous research has shown that the use of Virtual Reality in math learning in elementary schools can improve students' understanding in a more interactive and fun way. In addition, Virtual Reality also supports the development of critical thinking in Islamic Religious Education subjects (Nurhayati et al., 2024). Through this technology, students can be exposed to various religious ethical scenarios that require analysis, evaluation, and decision-making based on Islamic values. For example, in the simulation of Islamic History events, students can develop the ability to reflect more deeply on religious teachings (Khotima et al., 2024).

The following is a bar diagram showing the proportion of the use of Virtual Reality in Islamic Religious Education subjects:
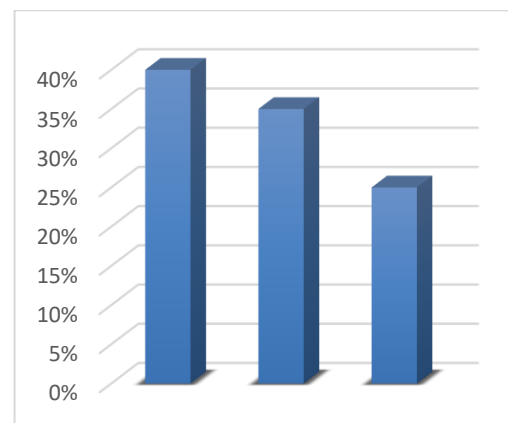
Gambar 1.1. Proporsi Penggunaan Virtual Reality dalam Mata Pelajaran Pendidikan Agama Islam

From the diagram above, it can be seen that "interactive" has a contribution of 45%, which shows the focus on the implementation of Virtual Reality technology in Islamic Religious Education learning. Then "student engagement" is at 35%, reflecting group interactions that help students in understanding the material collaboratively. Meanwhile, "critical

thinking" reached 25%, which illustrates that Virtual Reality technology is still not optimally applied in the context of Islamic Religious Education subjects. This data confirms that other digital innovations can further improve students' understanding and learning experience. Therefore, further optimization of student engagement and critical thinking is needed to have a greater impact.

B. The Impact of Virtual Reality Use on Students' Understanding and Learning Experience

Virtual Reality technology has become an important innovation in the world of Education, especially in the learning of Islamic Religious Education. Virtual Reality offers an immersive and interactive learning experience, allowing students to understand abstract concepts more realistically. Here are the various impacts that have been found based on research:

1. According to Yulita Indah Rizkiana, the research conducted at SMP Negeri 2 Sokaraja is to research the implementation of Virtual Reality technology as a medium for Islamic Religious Education and Ethics subjects, especially in Hajj and Umrah materials. The results are:
   a. Virtual Reality helps students understand the stages of the hajj in a more concrete way, by allowing them to experience being in Makkah.
   b. Students who learn using Virtual Reality show an 85% increase in comprehension compared to conventional methods, which only achieve about 60% comprehension.
   c. In interviews, students revealed that interactive simulations in Virtual Reality help them more easily memorize and understand the procedures of the Hajj, compared to just reading textbooks.
   d. Virtual Reality also reduces students' boredom and increases their motivation to learn, so they feel directly involved in learning.

The use of virtual reality in Islamic Religious Education subjects has been proven to increase students' understanding and motivation, especially in materials that are abstract and difficult to imagine directly (Yulita, 2024). According to Rizki and Maulana (2022), their research highlights that Virtual Reality can present a more realistic religious experience, especially in the simulation of Islamic history and the hajj. The results of the research are:

a. With Virtual Reality, students can "walk" around the Grand Mosque, see the Kaaba, and understand Islamic historical events firsthand.
b. Virtual Reality-based learning improves students' memory by up to 90% compared to conventional methods.
c. Students are more interested in discussing material after learning with Virtual Reality, as their experience feels more real.
d. The study also found that Virtual Reality can help students understand the relationship between Islamic teachings and real-life contexts through interactive simulations.

Virtual reality makes learning more interesting and effective, especially in improving memory and understanding of Islamic history and ritual worship.

2. According to Husnul Khotima, Abdurrahmansyah, and Satria Abadi. Their research highlights how Virtual Reality can assist students in critical thinking and making ethical decisions in religious contexts. The results of the research are:

   a. Virtual reality creates a more complex and contextual learning environment, allowing students to analyze and evaluate religious teachings in a variety of real-life situations.

   b. Students who learn using Virtual Reality show significant improvements in reflective and analytical thinking skills.

   c. Virtual Reality technology also helps students better understand Islamic moral and ethical concepts, because they can see firsthand the impact of various ethical decisions in virtual scenarios (Khotima et al., 2024).

   Virtual reality not only improves religious understanding, but also develops critical thinking skills and decision-making skills based on Islamic values.

3. According to Setiawan and Wiranti (2021), their study focuses on how virtual reality enables students to understand Islamic teachings from various perspectives. The results of the research:

   a. Students who use Virtual Reality will find it easier to understand differences of opinion in Islam and how Islamic teachings can be applied in various social cultural contexts.

   b. With the Islamic History simulation, students can see how various Decisions in Islamic History were made and understand the consequences firsthand.

   c. Virtual reality improves students' ability to discuss, as they have a deeper understanding and are based on hands-on experience.

   Virtual reality broadens students' horizons about Islam, helping them understand the diversity of teachings and their application in real life.

4. According to Ibrahim and Rahman (2023), their research emphasizes that Virtual Reality can be used as a tool to train students in dealing with religious ethical dilemmas. The results of the research:

   a. In the Virtual Reality simulation, students can face various ethical scenarios, such as how to respond to religious differences in their environment or how to respond to hoax information from an Islamic perspective.

   b. Students are more confident in making moral decisions after going through Virtual Reality simulations.

   c. Virtual reality helps students understand the concepts of justice, honesty, and responsibility in Islam in a more practical way.

   Virtual reality is not only a learning aid, but also an effective tool in training students to face ethical dilemmas in daily life based on Islamic teachings.

5. According to Agung Zulfikri, who researches mathematics learning in

Sukabumi. The results of the research:

a. Virtual reality improves students' understanding of mathematical concepts through interactive simulations.

b. In this study, students' math test scores improved significantly after using Virtual Reality, with a higher average post-test than pre-test.

c. Students become more confident in solving math problems, as Virtual Reality helps them visualize abstract concepts such as geometry and algebra.

d. Students' motivation to learn increases, because they are more interested in technology-based learning (Zulfikri, 2023).

Virtual reality not only improves understanding of concepts, but also increases students' motivation and confidence in learning. In addition, there is a relationship with the subject of Islamic Religious Education, namely if in mathematics Virtual Reality helps students understand abstract concepts such as geometry, in the subject of Islamic Religious Education Virtual Reality can help students understand religious concepts that are difficult to understand only through text, such as the History of Islam or worship procedures (M Elman, 2024). The following is a pie chart that is a summary of various research results on the impact of virtual reality on learning:
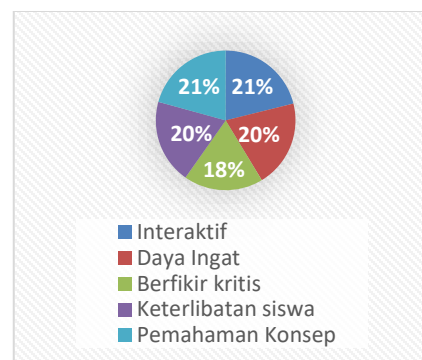
Figure 2.1 Various Research Results

Note:
1. Yulita Indah Rizkiana's research: understanding of concepts increased by 85% in Islamic Religious Education subjects.
2. Agung Zulfikri's research: students' post-test results significantly increase in mathematics learning after using Virtual Reality.
3. Rizki and Maulana's research: students' memory increased by 90% after using Virtual Reality in the Islamic History simulation.
4. Ibrahim and Rahman's research: 92% of students find learning with Virtual Reality more interesting and interactive than conventional methods.

So the diagram shows that virtual reality has a positive impact on improving students' understanding, engagement, and memory in various subjects.

C. **Challenges and Solutions in the Implementation of Virtual Reality in Islamic Religious Education Subjects**

In the implementation of Virtual Reality in learning, there are various challenges that must be faced. One of the main challenges is:

1. The cost is high, where the construction of a special laboratory with Virtual Reality equipment and high-performance computers requires a large investment. Not only the hardware, but also other aspects such as lighting and ventilation must be taken into account for the learning experience to be optimal. In addition, the use of Virtual Reality in Education also faces obstacles in terms of high operational costs (Azmi, Mansu, et al., 2024).

2. The lack of understanding and skills of teachers in using virtual reality is a significant obstacle. The implementation of virtual reality in Islamic Religious Education subjects does not only depend on technology, but also on the readiness and support of madrasah heads, as found in the research of Hosna, Ismail, and Fauzi (2025), the role of madrasah heads in academic supervision greatly determines the success of learning innovations. Collaborative leadership can help overcome technical obstacles and improve teachers' competence in utilizing new technologies (Hosna & Fauzi, 2025). With structural support from school leaders, the implementation of virtual reality can be effective and sustainable.

3. The lack of quality Virtual Reality educational content is also an obstacle. Until now, there is still little content that is really in accordance with the current curriculum standards, there is still little content that is really in accordance with the curriculum standards and can be integrated into learning. This hinders the widespread application of Virtual Reality because the available materials are not as relevant to the needs of students.

4. Motion sickness or cybersickness. Many students experience discomfort such as dizziness and nausea after using Virtual Reality devices for long periods of time. In fact, a study showed that about 71.4% of students experienced these symptoms when using Virtual Reality-based applications, such as Youtube Virtual Reality. Motion sickness can occur due to the difference between movements seen by the eye and the actual body condition.

5. Limited facilities. Some schools do not have adequate computer labs or fast enough internet access to support an optimal Virtual Reality experience. This is an obstacle in the equitable use of Virtual Reality as a learning medium.

6. Difficulty integrating Virtual Reality with the curriculum. Changes in learning methods require curriculum adjustments, as well as support from policy makers so that this technology can be widely adopted in the world of education.

7. Reduce direct interaction between students and teachers. With more and more virtual world-based learning, it is possible that students are missing out on important social experiences in the teaching and learning process. Physical presence in the classroom that has been part of the educational experience can be reduced. Therefore, a balance is needed so that Virtual Reality remains a tool without replacing overall social interaction.

To overcome these challenges, several solutions can be implemented, namely:

1. Gradual investment and funding can be made to ensure that schools can adopt Virtual Reality according to their capacity. Schools can seek support from the government or the private sector to help procure the devices.
2. Training for teachers is needed so that they can understand and optimize the use of Virtual Reality in learning (Azmi, Mansur, et al., 2024a).
3. The development of Virtual Reality-based educational content must also continue to be carried out to be in harmony with the curriculum and student needs.
4. To overcome motion sickness, the use of Virtual Reality should be limited to a certain duration so that students do not experience visual fatigue. The design of the Virtual Reality app also needs to be adjusted so as not to cause inconvenience.
5. Increasing access to technology in schools needs to be done so that there is no inequality in the implementation of Virtual Reality in various regions (Azmi, Mansur, et al., 2024b).
6. Virtual Reality must be integrated with in-person learning methods, such as direct discussions or project-based learning, so that there is still social interaction in the learning process (Indarta et al., 2022).

IV. CONCLUSION

The application of virtual reality in Islamic Religious Education learning shows great potential in increasing students' understanding of religious concepts. This technology provides a more immersive and interactive learning experience, allowing students to understand abstract material such as Islamic history, worship practices, and moral values in a more concrete and engaging way. In addition, virtual reality also contributes to increasing student motivation and involvement in the learning process. However, the implementation of Virtual Reality in Education still faces a number of challenges, such as high device costs, limited facilities, lack of teachers' skills in operating this technology, and limited educational content that is in accordance with the curriculum. Therefore, the right strategy is needed to optimize the use of virtual reality in Islamic Religious Education subjects, such as gradual investment in the procurement of devices, training for educators, and the development of educational content that suits the needs of students. With the various challenges faced, the implementation and appropriate solutions as well as adequate support, virtual reality can be an effective digital innovation in improving the quality of Islamic Religious Education subjects. It is hoped that this technology will not only help students understand Islamic teachings better, but also encourage them to internalize Islamic values in their daily lives in a more meaningful way.

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