INTIQAD: JURNAL AGAMA DAN PENDIDIKAN ISLAM
ISSN 1979-9950 (print) || ISSN 2598-0033 (online), http://jurnal.umsu.ac.id/index.php/intiqad
DOI: 10.30596/24043
Vol. 17, No. 1 (June 2025)

The Utilization of Augmented Reality in PAI Learning Based on Cognitive Theory

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Abstract

This study aims to explore the potential utilisation of Augmented Reality technology in Islamic learning, especially Islamic Religious Education (PAI). With a cognitivistic theory approach, the use of Augmented Reality. This research method uses the type of field research (Field Research). While the approach in research using a qualitative approach. The subjects in this study were Islamic Religious Education teachers and students of Tahfidz Hanifah house. Rumah Tahfidz Hanifah was chosen as the research location because it is an Islamic education institution that has a good reputation in Islamic Education learning. The results of this study show several benefits including: 1) the use of Augmented Realty (AR) as a technology that combines two or three-dimensional objects in real time such as students can see visualisation of religious materials such as ka'bah, historical mosques or simulation of prayer movements in 3D; 2) Learning outcomes in using Augmented Realty (AR) media based on cognitive theory can foster student learning motivation; 3) Augmented Realty (AR) media can provide space for students or santri to imagine so as to improve cognitive learning outcomes which include aspects of remembering, understanding, applying and analysing.

Keywords ***:*** Augmented Reality; PAI; Cognitive.

Artikel Info

Received:
March 15, 2025
Revised:
April 26, 2025
Accepted:
May 22, 2025
Published:
June 10, 2025

Abstrak

Penelitian ini bertujuan untuk menggali potensi pemanfaatan teknologi *Augmented Reality* dalam pembelajaran Agama Islam, khususnya Pendidikan Agama Islam (PAI). Dengan pendekatan teori kognitivistik, penggunaan *Augmented Reality*. Metode penelitian ini menggunakan jenis penelitian lapangan (*Field Research*). Sedangkan Pendekatan dalam

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penelitian menggunakan pendekatan kualitatif. Adapun subjek dalam penelitian ini guru Pendidikan Agama Islam dan peserta didik rumah Tahfidz Hanifah. Rumah Tahfidz Hanifah dipilih sebagai lokasi penelitian karena merupakan lembaga pendidikan agama Islam yang memiliki reputasi baik dalam pembelajaran PAI. Hasil penelitian ini menunjukkan beberapa manfaat diantaranya: 1) penggunaan *Augmented Realty* (AR) sebagai suatu teknologi yang menggabungkan objek dua atau tiga dimensi dalam waktu yang nyata seperti siswa dapat melihat visualisasi materi agama seperti ka'bah,masjid bersejarah atau simulasi gerakan sholat dalam bentuk 3D; 2) Hasil belajar dalam menggunakan media Augmented Realty (AR) berbasis teori kognivistik yaitu dapat menumbuhkan motivasi belajar peserta didik; 3) Media Augmented Realty (AR) dapat memberikan ruang siswa atau santri untuk berimajinasi sehingga mampu meningkatkan hasil belajar kognitif yang meliputi aspek dalam mengingat, memahami, menerapkan dan menganalisis.

Kata Kunci : Augmented Realty; PAI; Kognivistik.

A. Introduction

Education serves as an effort to improve well-being and shape human culture. Education has a significant impact on human well-being. With the rapid advancement of technology today, the learning process can be conducted in a more active and interactive manner. A teacher needs to have the ability to adapt and create new approaches in the learning process (Ngalim Purwanto, 2010). The purpose of this is to prevent student boredom with the ongoing learning activities. The learning process interconnects methods and media, making them inseparable. There are various technologies designed to enhance efficiency in the learning process. The technology applied in learning media includes augmented reality (AR). Augmented Reality (AR) is a medium that integrates elements from the virtual world with aspects of the real world.

Learning media functions as a significant tool in supporting the learning processand thereby enhancing student engagement and activity. Learning media plays an important role in achieving changes in student behavior, supporting their imagination to actively participate in class, and

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fostering a spirit of learning (Wulandari et al., 2023). Therefore, to start education, they need to be introduced to various media that not only have one element in the learning process but also contain other elements that can develop students' imagination.

Learning media serves as a channel for conveying messages and capturing students' thoughts, attention, and desires to initiate the learning process on their own (Sapriyah, 2019). According to (Setyansah et al., 2024), there are two types of learning media: digital and non-digital. Digital media requires devices such as smartphones, laptops, or computers. Non-digital media, on the other hand, require the role of humans and the surrounding environment as their tools. Currently, digital media based on augmented reality (AR) is still underutilized by teachers due to their understanding and the limitations of AR facilities.

According to Pasande & Hakim (2025), augmented reality (AR) media is a type of media that integrates images, videos, audio, and text into the real environment. In other words, augmented reality (AR) media gives students the opportunity to experience what they see. Augmented Reality (AR) technology makes two-dimensional objects that were previously unreal seem real and blend with their surroundings.

Learning outcomes are what students do after the learning process. Behavior can change based on what is learned in class (Sajidan, 2019). Cognitive learning outcomes, according to Pranoto, (2023), are behaviors that occur in the field of cognition. Behavioral changes resulting from cognitive learning include several aspects of cognitive domain abilities, such as C1 (remembering), C2 (understanding), C3 (applying), C4 (analyzing), C5 (evaluating), and C5 (analyzing). Cognitive learning outcomes are measured with the aim of obtaining an accurate picture of the components of cognitive abilities.

According to Indah (2024), another reason why measuring cognitive learning outcomes is very important is as a way to improve student achievement or quality. According to the information above, qualitative research examining the impact of augmented reality (AR) on cognitive learning outcomes has not yet been conducted. Therefore, further research is needed on the impact of

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augmented reality (AR) on cognitive learning outcomes.

B. Methods

This study employs field research methods that utilize a qualitative approach. The research was conducted directly at Rumah Tahfidz Hanifah, an Islamic educational institution that is active in PAI (Islamic Religious Education) and open to the use of technology. The research subjects consist of Islamic Religious Education teachers and students participating in the teaching and learning activities at the institution.

The researchers conducted direct observations of the learning process using augmented reality (AR) media, such as the visualization of the Ka'bah, 3D simulations of prayer movements, and the introduction of historical places in Islam. In addition, in-depth interviews were conducted with teachers to understand their goals and methods in integrating AR into PAI materials, as well as with students to explore their responses, understanding, and learning motivation. The researcher also collected documentation, such as photos of learning activities, videos of AR media usage, and examples of AR-based learning materials.

All the data collected were examined using the Miles and Huberman qualitative analysis model, which has three steps: data reduction (picking out important information), data presentation (arranging the data into stories or charts), and making conclusions based on the patterns or results that come up during the research (Denzin & Linconl, 2017).

C. Result and Discussion

This research aims to explore the utilization of augmented reality (AR) technology in Islamic religious education (PAI) learning at Rumah Tahfidz Hanifah, using a cognitive theory approach. The findings from observations, interviews, and documents showed that AR greatly helps improve the quality of learning by making it easier for students to understand religious concepts and keeping them more engaged, which also boosts their cognitive learning results.

Visualization of More Concrete and Engaging Material

AR technology allows teachers to present PAI material, which was previously abstract, in a more contextual,

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visual, and easily understandable manner. For example, in the material on the procedures of the Hajj pilgrimage, students can directly see the sequence and important locations such as the Ka'bah, the hills of Safa and Marwah, Muzdalifah, and the stoning of the devil in Mina in 3D form.

This is different from conventional learning that relies solely on textbooks or static images. According to the results of the interview with the teacher, students appeared more focused and enthusiastic, especially when viewing the visualization of the Ka'bah that could be rotated, enlarged, and viewed from various angles.

Stages of Implementing AR in Learning

There are four main stages to the application of AR technology in learning (Fauzan et al., 2020): (1) The teacher designs a lesson plan (RPP) that integrates AR media with teaching materials. The teacher also selects AR applications such as 3D Salat Guide, Muslim AR, or a custom-made application designed to introduce the procedures of worship. (2) During the lesson, the teacher first explains the objectives and the material to be learned, then directs the students to activate the AR application. The teacher uses AR media to display content like the movements of ablution, prayer, or simulations of historical places in Islam. (3) Students are given time to explore AR content independently or in groups. The teacher acts as a facilitator by providing guidance and discussion-provoking questions. For example, the teacher asks, "Why is the Ka'bah the direction of prayer?" or "What is the meaning of each prayer movement you see in the app?"(4) At the end of the session, the teacher gives a quiz or reflective discussion to evaluate the students' understanding. Some teachers also implement project-based assessments, such as creating short videos using AR to explain the pillars of Islam.

Improvement of Cognitive Learning Outcomes

Through a cognitive approach, AR has been proven to aid the process of knowledge internalization Dessye et al (2024). Students can remember (C1) recalling the sequence of prayer movements or the names of places in the

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pilgrimage. Understanding (C2): Explaining the function and meaning of each pillar of Islam. Applying (C3) Demonstrating the proper way to perform ablution or prayer according to AR visualization. Analyzing (C4): Comparing correct and incorrect worship practices based on their observations from the AR application.

Figure 1. Implementation of Augmented Reality in PAI Learning Based on Cognitive theory. (*Source:* Rumah Tahfiz Hanifah)

The results of the interviews with the students show that most of them find it easier to understand the material through visualization and feel more confident in recalling the PAI material that has been taught.

Increase in Motivation and Active Participation

Students' motivation to learn has also increased (Susilowati et al., 2020). Based on observations, students are more active in asking questions, discussing, and even suggesting ideas for creating other AR materials. The learning environment has become more dynamic and enjoyable.

This shows that AR not only serves as an auxiliary medium but also as a cognitive and affective stimulus in the learning process.

Challenges and Solutions for Implementation

Although it has a positive impact, the implementation of AR also faces several challenges, such as limited devices (not all students have smartphones), unstable internet connections, and the need for teacher training to become proficient in using AR applications. However, Rumah Tahfidz Hanifah addresses such obstacles by providing devices on a rotating basis and offering brief training sessions for teachers. We recommend collaborating with educational technology developers as a strategy moving forward.

Relevance to Cognitive Theory

The results of this research support the basic principles of cognitive theory, which state that effective learning occurs

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when students are actively engaged in mental processes, such as organizing, structuring, and connecting information. AR helps students form strong mental representations, making learning more meaningful. This technology also supports the processes of assimilation and accommodation in the formation of new schemata.

D. Conclusion

Based on the research conducted at Rumah Tahfidz Hanifah, it can be concluded that the utilization of augmented reality (AR) technology in Islamic religious education (PAI) learning has a significant positive impact on the learning process and outcomes of students.

Through AR technology, students can see and interact with religious objects in the form of three-dimensional visualizations, such as the Ka'bah, historical mosques, and simulations of prayer movements. Such an approach makes the material, which was previously abstract, more concrete and easier to understand. In addition, the use of AR can enhance students' learning motivation, as seen by their enthusiasm for following lessons and their active participation in learning activities. From a cognitive perspective, AR has been proven to support students' learning outcomes, especially in the aspects of remembering, understanding, applying, and analyzing learning materials.

These results align with the principles of cognitive theory, which emphasize the importance of visual and interactive learning experiences to build meaningful understanding. However, the implementation of AR also faces several challenges, such as limited devices and the need for teacher training, but these can be overcome with adequate facilities and training. Overall, AR is an innovative and effective learning medium to be applied in PAI education, and it can serve as a solution to provide more engaging, contextual, and impactful learning for students.

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