

AUGMENTED REALITY AS AN INNOVATION IN ARABIC LANGUAGE LEARNING: A CASE STUDY IN MA'ARIF ISLAMIC SENIOR HIGH SCHOOL ANDONG BOYOLALI

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Abstract

This research aims to describe the impact of the implementation of Augmented Reality (AR) technology-based learning media for teachers and students at Al Ma'arif Andong High School. This study includes field research with a qualitative case study approach. Data collection techniques use observation, interviews, and documentation. Data analysis uses data reduction, data presentation, and drawing conclusions (data triangulation). The results of this study indicate that the implementation of augmented reality media in Arabic language learning at Al Ma'arif Andong Islamic High School has had a significant impact on teachers and students. Among them: School partners have given a positive response to AR learning media and will disseminate it on a wider scale. Teachers find it easier to teach and have an overview of the use of AR media in classroom learning, students become more enthusiastic in participating in class learning and can increase student learning motivation, especially in Arabic lessons. The limitations of this study are the lack of infrastructure that supports learning using AR media, many teachers who are less competent in using AR media-based technology. This research contributes to the development of Arabic language education by strengthening IT-based learning media innovation for teachers at Al Ma'arif Islamic High School in Andong through Augmented Reality-based learning. It also fosters students' enthusiasm for learning at Al Ma'arif Islamic High School in Andong.

Keywords: Augmented Reality, Innovation, Arabic Learning

INTRODUCTION

Education is a key pillar in developing quality human resources. In the era of globalization and the Fourth Industrial Revolution, the world of education is required to continuously adapt to increasingly rapid technological developments. Technology is not only a tool for learning but also a means to create more engaging, interactive, and effective learning experiences. However, the challenge facing many educational institutions, including schools in Indonesia, is the gap between technological advancements and teachers' ability to utilize them to support the learning process.(Elmqaddem, 2019)

The development of information and communication technology (ICT) has brought significant changes to the world of education. One emerging innovation is the use of Augmented Reality (AR) technology in learning media. AR is a technology that combines virtual objects with the real world in real-time and interactively, creating a more engaging and immersive learning experience.(Hakim, 2018)

Amidst the challenges of 21st-century education, high schools are required to creatively utilize technology to support the teaching and learning process. Al Maarif Islamic High School, Andong, as an Islamic-based educational institution that is adaptive to technology, has begun integrating AR media into several subjects, particularly science, mathematics, and even language. This article aims to examine how the implementation of Augmented Reality-based learning media was carried out, the benefits experienced by students and teachers, and the obstacles that emerged during its implementation.

Interactive learning media is a tool in the teaching and learning process designed to facilitate communication between teachers and students and increase learning effectiveness.(Sakban, 2024) Augmented Reality is a subset of interactive media that can present information in easy-to-understand 3D visuals.

Augmented Reality (AR) is a technology that combines digital elements (such as images, videos, sounds, or 3D objects) into the real world directly through devices like smartphones, tablets, or Augmented Reality glasses. In a media context, Aaugmented Reality is used to enhance the user experience in consuming information and entertainment.(Bower et al., 2014)

Augmented Reality can be linked to Islamic education by involving cognitive, affective, and psychomotor aspects that often require visualization of abstract concepts such as depictions of heaven, hell, Islamic historical events, worship procedures, and so on. Thus, Augmented Reality can facilitate a more concrete, interactive, and meaningful learning experience.(Yusuf, 2024) However, unfortunately, the use of this technology in the learning process in schools, especially at Al Ma'arif Islamic High School in Andong, is still very limited. In fact, AR has great potential to increase student motivation and interest in learning, as well as create a more dynamic and effective learning environment.

Today's students tend to be more attracted to visual and interactive content, so the use of AR-based learning media can be a solution to increase their engagement in the teaching and learning process. However, the main obstacle faced is a lack of teacher understanding and skills in developing and utilizing AR technology in learning.

Therefore, training on creating AR-based learning media for teachers at Al Ma'arif Islamic High School in Andong is crucial. This training aims not only to introduce teachers to AR technology but also to provide them with practical skills in creating innovative learning media. This way, teachers can create more engaging and relevant learning materials, thereby increasing student motivation and interest in Arabic language learning.

Teachers at Al Ma'arif Islamic High School in Andong, Boyolali, are expected to be able to direct the strengthening of learning activities that have been programmed by the school towards the implementation of 21st-century learning demands and are oriented towards the Society 5.0 Era. The form of training that can be carried out is strengthening learning through the implementation of augmented reality-based learning media for subject teachers (Arabic, Indonesian, Biology, and Mathematics). Some of the reasons for using augmented reality media in learning are increasing students' intrinsic motivation, building a constructivist approach, and collaboration as a student experience. (Billinghurst, 2002) The expected positive impact is the formation of a system and culture of learning habits with technological devices so that learning activities are not hampered by online learning.

AR innovation in Islamic education aims to provide interactive visualizations of abstract and theoretical concepts, often difficult to grasp through conventional methods. (Wu et al., 2013) Several studies, including those conducted by Saidin et al., have shown that AR media can improve student engagement, learning outcomes, and information retention. (Saidin et al., 2015) Furthermore, research by Khansa found that using AR applications on respiratory system material in 11th-grade high school students significantly improved student learning outcomes compared to conventional learning. (Hartati, 2025) Although several previous studies from (Isti'ana, 2024) have

proven the effectiveness of Augmented Reality, research focusing on the *teacher training process* and *technology adoption* in Islamic-based secondary school environments in Indonesia is still limited.

Therefore, this research is expected to provide many benefits for teachers. One of them is that teachers will improve their technological competency, particularly Augmented Reality mastery, so they can create innovative and engaging learning media. This encourages teachers' creativity in designing more visual and interactive materials, making it easier for students to understand abstract concepts. Furthermore, the use of Augmented Reality increases teaching effectiveness, making the learning process more engaging and efficient. Overall, this training improves teachers' professional competence as well as their motivation and satisfaction in teaching.

The research problem formulation is: How is the readiness of teachers in utilizing technology in learning? What are the main challenges faced by teachers in adopting Augmented Reality (AR) technology in classroom learning? To what extent do teachers understand the concept of AR in learning? How do teachers respond to technology-based learning media innovations? The purpose of this research is to improve teachers' understanding of the basic concepts of Augmented Reality in learning. Help teachers in using applications such as Assemblr Edu & Canva to create AR-based learning media. Equip teachers with practical skills in designing and developing AR media that are appropriate to their subjects. Encourage teachers to integrate AR in the learning process to increase student engagement and motivation.

RESEARCH METHOD

This research is a field research using a qualitative approach with a case study design. This research was conducted in April 2025, located at Al Ma'arif Islamic High School Andong. The data sources in this study were teachers teaching various subjects at Al Ma'arif Islamic High School Andong, including: Arabic teachers, Indonesian teachers, Biology teachers, and Mathematics teachers. Data collection techniques include: Observation of learning activities with AR. Observations were carried out by measuring the impact and obstacles in implementing AR at Al Ma'arif Islamic High

School Andong. In-depth interviews with teachers, principals, and several students. Documentation related to AR-based learning policies and materials.

Data analysis was conducted interactively following the Miles and Huberman's model, which includes three simultaneous activity streams: data reduction (selecting and focusing raw data from interview transcripts and field notes), data presentation (organizing data in narrative and matrix forms), and drawing conclusions and verification. (Assingkily, 2021) Data validity checks in this study used triangulation techniques by confirming data findings from interviews with teachers through direct classroom observation and document analysis in the form of lesson plans.

RESULTS AND DISCUSSION

Implementation of Aaugmented Reality Media in Al Ma'arif Islamic High School Andong Boyolali

The implementation of Augmented Reality (AR) media in learning at SMAI Al Ma'arif Andong presents a creative and attractive method, and has great potential in the realm of contemporary education. AR technology that combines the real environment with virtual components is able to provide a more immersive and interactive learning experience for students. Especially at the high school level, the use of AR can deepen students' understanding of Islamic values and help overcome obstacles that arise in conventional teaching approaches. Through AR technology, it is hoped that the learning process of Islamic Religious Education can provide a more interesting and efficient learning experience for students.

Research findings through direct observation show that one of the media currently being utilized to support learning activities is Augmented Reality (AR). In practice, AR integrates the real world with virtual elements as a medium for delivering material to students. Educators can use AR technology as a learning tool that can arouse students' interest in learning. This technology also functions as a learning aid that makes it easier for students to understand the material through visualization of images that appear as if they were real. Teachers and students have the opportunity to imagine and innovate in the

teaching and learning process. The application of AR technology can increase student learning motivation and create a fun and interactive learning atmosphere.

Augmented Reality (AR) is defined as a technology that allows users to see and interact with virtual elements that overlap with the real world. This can be done through devices such as smartphones, tablets, or smart glasses equipped with cameras and sensors. The results of the study, using an interview method with informants including Arabic language teachers, biology teachers, mathematics teachers, and Indonesian language teachers, showed that the use of Augmented Reality (AR) media in biology learning is very helpful as a learning medium that can be utilized to support the effectiveness of the learning process. As stated by a biology teacher:

"One Arabic language teacher stated, 'With Assemblr, I can show a 3D in the learning. The children are much more enthusiastic than just looking at a picture in a book.' (Interview, Teacher A, August 16, 2025)"

AR can be used by educators as an interactive learning medium that enriches the delivery of material in a more engaging and effective way. This will improve the quality of learning and student understanding.

The results of the study using observation and interview methods are learning activities at SMA Islam Al Ma'arif Andong in Arabic subjects in Class X-10 utilizing Augmented Reality (AR) technology as one of the learning media. Arabic learning is carried out for 3 hours of lessons divided into two meetings in one week taught by BA Teacher, Mr. Muhammad Faishal, M.Pd. Class X SMAI Al Ma'arif Andong has 36 students consisting of 16 male students and 20 female students. BA learning activities for class X are carried out on Thursday for 1 hour of learning and Friday for 2 hours of learning. BA learning using AR technology requires internet access and students' smartphones. In class X, Wi-Fi access has been provided as a means of supporting student learning from the school. When using AR technology, the teacher gives a piece of paper containing an image related to the learning material, in the image there is a QR code to make it easier for students to use AR technology. Each student gets a sheet of image from the teacher and then uses their smartphone to scan the QR code listed. How to use AR

technology: After all students scan the QR code, their smartphones automatically connect to the AR visualization website. A real-life image then appears over the image on a sheet of paper. During the learning process, students are engaged because they can see the images they are studying in real-time. This provides a new experience in BA learning.

Teachers at Al Maarif Islamic High School in Andong, Boyolali, discussed the potential of integrating augmented reality into lesson plans (RPP). They were introduced to the Assemblr Edu platform, an application that allows users to create augmented reality content practically without requiring a design or programming background.

Figure 1.

The picture of AR Media Creation by Teachers at SMAI Al Ma'arif



Teachers at Al Maarif Islamic High School in Andong have created a variety of AR learning media featuring three-dimensional (3D) images, including audio, narration, and interactive text. Students can access all of these creations by scanning QR codes on their mobile phones. This tool allows teachers to deliver learning materials in a more visual, engaging, and contextual way.

The advantages of this program include its sufficient duration (3 hours) to understand the theory and practice of AR media creation. The hands-on training method allows teachers to immediately try creating AR-based learning media. The use of free and easily accessible applications, such as *Assemblr Edu* and *Canva*, facilitates post-training implementation. Support modules and tutorials help teachers learn independently after the training session is complete.

AR in education is the use of technology that adds digital elements (such as 3D models, animations, or audio) to learning materials to enhance student understanding. AR can be accessed via smartphones, tablets, or AR glasses.(Billinghurst, 2002)

The application of AR in high school education includes: 1). Biology Lessons Example: When students scan a picture of the human body in a textbook, a 3D model of the body's organs appears that can be rotated and disassembled one by one (heart, lungs, etc.). Benefits: Helping students understand the structure and function of organs better. 2). History Lessons Example: When scanning a photo of Borobudur Temple, an animation of the construction of the temple or a past scene from the Mataram Kingdom era appears. Benefits: Building historical imagination and emotional connection to the material. 3). Mathematics Example: Visualization of geometric shapes in 3D, such as spheres, prisms, and pyramids, which can be rotated and studied their sizes. Benefits: Helping students who have difficulty imagining spatial shapes. 4). Language & Literacy Example: Children's story books that can display animated characters when scanned. Characters can "talk" or tell stories. Benefits: Increase interest in reading and understanding of the story. 5). Crafts / Technology Example: Projects to make robots or electrical circuits can be visualized with AR before they are actually assembled. Benefits: Reduce errors, develop practical skills.(Garzón, 2021)

Existing AR Educational Apps: Quiver – A children's coloring book that comes to life when scanned. Merge EDU – Learn anatomy, astronomy, and science in AR. Google Expeditions (discontinued, but replaced by other tools) – Virtual tours and AR for learning about geography and culture.(Lee, 2012)

Benefits of AR in Education: Learning becomes more engaging, interactive, and less boring. It's suitable for both visual and kinesthetic learning styles. It helps students grasp abstract and complex concepts. It can be used for distance learning (online learning).

Challenges Requires devices (smartphone/tablet) and internet access. Teachers and students need training in using AR. Not all schools have adequate technological resources. AR Project Ideas for High Schools Title: "Learning Indonesian Culture with AR" Contents: Social studies textbooks about regional culture (traditional clothing,

dances, traditional houses) can be scanned to display: 3D models of traditional houses
Traditional dance videos Sounds of regional musical instruments in Indonesia.

AR media is used in Biology to display 3D models of human organs and in Physics to simulate Newton's laws. Applications used include Human Anatomy Atlas and Assemblr Edu. Teachers prepare the content in advance, then students access it via school-provided tablets or personal devices.

AR media is used in Arabic language learning to display 3D models of speakers in listening and reading learning. Applications used include Human Anatomy Atlas and Assemblr Edu. Teachers prepare the content in advance, and students then access it via school-provided tablets or personal devices.(Kaufmann, 2003)

Teachers' Responses to the Implementation of AR Media at Al Maarif Islamic High School Andong Boyolali

The results of this response serve as initial material that positive partner perceptions will be the first step to long-term success at Al Maarif Islamic High School, Andong. These results have also been reported that positive perceptions of the development of digital-based teaching materials are the initial key to successful learning (Syifa'uddin et al., 2022). School partners, in this case Al Maarif Islamic High School, Andong Boyolali, provided suggestions that follow-up workshop activities could be implemented more systematically to achieve the goals of Al Maarif Islamic High School, Andong, Boyolali, in utilizing AR media in subjects.

Furthermore, teachers at Al Ma'arif Islamic High School in Andong, Boyolali, are able to design and use AR-based learning media. Teachers are more confident in integrating digital technology into their lessons. Learning becomes more interactive, engaging, and digitally appropriate. The school is a pioneer in utilizing AR for learning in the surrounding area.

The use of Augmented Reality (AR)-based learning media at Al Ma'arif Islamic High School in Andong, has been proven to positively contribute to the learning process, particularly in helping students understand complex material visually and interactively. Despite challenges in its implementation, with the right strategies, such as

teacher training and infrastructure provision, AR has great potential to become an integral part of future learning systems.

CONCLUSIONS

Based on the description of the results and discussion above, it can be concluded that: 1) Al Ma'arif Andong Islamic High School as an institution has prepared a plan for developing AR-based learning media for a five-year period, 2) teachers have been able to develop their learning materials by utilizing augmented reality-based media in the form of; Asmlr Edu, Canva. 3) students have given a very good response to the implementation of augmented reality (AR) technology-based learning media activities. It is recommended that follow-up training be programmed periodically at Al Ma'arif Islamic High School in Andong. Furthermore, similar initiatives could be implemented at other schools for wider dissemination.

The limitations of this research are the lack of infrastructure to support learning using AR media, and the lack of competence of many teachers in using Augmented Reality-based technology. This research contributes to the development of Islamic education, including strengthening IT-based learning media innovation for teachers at Al Ma'arif Islamic High School, Andong, through Augmented Reality-based learning. It also fosters students' enthusiasm for learning at Al Ma'arif Islamic High School, Andong.

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