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Development of Arabic Language Learning Media "IqraAR" Based on Augmented Reality to Improve Reading Skills of MTs Students

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Abstract

The problem of low maharah al-qira'ah or reading ability in Arabic language learning at Madrasah Tsanawiyah (MTs) remains a significant challenge. This is caused by low reading motivation, limited vocabulary mastery, and the lack of interactive learning media that suit the learning styles of the digital-native generation. Arabic reading learning generally still uses conventional methods that rely on textbooks and teacher explanations, making it difficult for students to actively engage and understand the text's content. Unlike languages widely used in society, Arabic is rarely encountered outside the classroom, so opportunities for contextual practice are limited. This problem needs to be addressed to improve students' understanding and interest in Arabic texts. The purpose of this study is to propose an Augmented Reality (AR)-based learning media "IqraAR" designed to present Arabic reading material interactively through the integration of text, audio, and 3D visuals. This study uses conceptual research with a focus on a theoretical framework and needs analysis without field testing. "IqraAR" was developed to be easy for teachers to use, engaging for students, and compatible with existing madrasah infrastructure. The results of this study are expected to contribute to the development of AR-based educational technology that is able to improve vocabulary mastery, pronunciation, and contextual understanding, as well as serve as a reference for further empirical research.

Keywords **Augmented Reality, Learning Media, IqraAR, Reading Skill**

مستخلص البحث

مشكلة ضعف مهارة القراءة (مهارة القِراءة) في تعلم اللغة العربية في مدارس المَدْرَسَة الثانَوِيَّة الإسلامية (المتوسطة الإسلامية) تظل تحديًا كبيرًا. ويرجع ذلك إلى انخفاض دافعية القراءة، وضعف إتقان المفردات، ونقص وسائل التعلم التفاعلية التي تناسب أساليب التعلم لجيل الرقميين. عمومًا، لا تزال طرق تعليم القراءة العربية تعتمد على الأساليب التقليدية التي تقتصر على الكتب المدرسية وشرح المعلم، مما يصعّب على الطلاب المشاركة الفعالة وفهم محتوى النصوص. وعلى عكس اللغات المنتشرة في

المجتمع، نادرًا ما يلتقي الطلاب باللغة العربية خارج الصف الدراسي، لذا فإن فرص الممارسة السياقية محدودة. هذه المشكلة تحتاج إلى معالجة لتحسين فهم الطلاب واهتمامهم بالنصوص العربية. هدف هذه الدراسة هو اقتراح وسيلة تعليمية قائمة على تقنية الواقع المعزز تُسمى "اقرأ AR" (Augmented Reality) مصممة لتقديم مادة القراءة العربية بشكل تفاعلي من خلال دمج النص والصوت والصور ثلاثية الأبعاد. تستخدم هذه الدراسة البحث المفاهيمي مع التركيز على الإطار النظري وتحليل الاحتياجات دون إجراء تجارب ميدانية. تم تطوير اقرأ "AR" لتكون سهلة الاستخدام للمعلمين، مشوقة للطلاب، ومتوافقة مع البنية التحتية القائمة في المدارس. من المتوقع أن تسهم نتائج هذه الدراسة في تطوير تقنية تعليمية قائمة على الواقع المعزز قادرة على تحسين إتقان المفردات، النطق، والفهم السياقي، كما ستُستخدم كمرجع لأبحاث تجريبية مستقبلية.

كلمات أساسية الواقع المعزز، الوسائل التعليمية، اقرأ**AR** ، مهارة القراءة

INTRODUCTION

Reading (مهارة القراءة) plays a crucial role in Arabic language learning because it is a basic skill that serves as the foundation for developing other language skills. Through reading activities, students not only learn to recognize letters and words, but also develop an understanding of the meaning of texts, enrich their vocabulary, and improve their critical thinking skills (Purnomo, 2022). In the context of learning at the Madrasah Tsanawiyah (MTs) level, reading skills are essential for understanding various materials such as kitabah (writing), nahwu (grammar), and Islamic texts, which are integral parts of the curriculum. Therefore, reading mastery is key for students to more effectively access and absorb knowledge delivered in Arabic.

In the field, many problems are still found that hinder the effectiveness of learning to read Arabic texts at the Madrasah Tsanawiyah (MTs) level. One of the main issues is students' low ability to read Arabic texts, especially those with vowels (Umamah, 2024). This difficulty is often caused by a lack of adequate training, a monotonous learning approach, and minimal use of interactive and contextual learning media (Annisa et al., 2025). On the other hand, teachers also face obstacles in presenting material in an engaging manner, primarily due to limitations in selecting or developing media that suit the characteristics of today's students.

The limitations of conventional learning media exacerbate this situation. Textbooks used in learning are often static and less able to engage students, especially those from the digital generation accustomed to visual and interactive technology (Fadilah et al., 2023). Meanwhile, existing audio- or video-based learning media are not always interactive and tend to be one-way, making them less able to adapt to students' individual learning needs (Safitri et al., 2025). Furthermore, Arabic language learning media that utilize modern technologies like Augmented Reality (AR) are still very limited, even though this type of technology has great potential to increase student engagement and understanding in the learning process.

Augmented Reality (AR) technology has emerged as a significant breakthrough in education, particularly in bridging the gap between conventional learning and the needs of 21st-century learning. Through its ability to interactively combine the real world with digital elements, AR provides a more immersive and engaging learning experience. In the context of Arabic language learning, this technology offers significant opportunities to enrich students' learning. By presenting three-dimensional visual objects that users can interact with directly, AR can improve concentration, deepen understanding of reading material, and transform the learning environment into a more enjoyable and meaningful experience (Mu’minah et al., 2025).

In response to the various challenges in learning to read Arabic, an innovative solution was developed in the form of AR-based learning media called "IqraAR." This media is specifically designed to present Arabic reading materials with a more interactive and contextual approach (Dewi, 2023). Beyond simply presenting text, IqraAR combines three-dimensional audio and visual elements, allowing each vocabulary word or sentence learned to be visualized in vivid animation. This way, students are not only engaged in the reading process but also experience a more comprehensive and enjoyable learning experience. This approach is expected to improve memory, strengthen understanding of meaning, and foster a deeper interest in learning Arabic.

The presence of "IqraAR" also represents a concrete step in addressing the needs of a digital generation familiar with technology and visualization. In a world increasingly connected by digital devices, MTs students require a learning approach that aligns with the

way they interact with information. By integrating AR into Arabic language learning, "IqraAR" not only offers an innovative media alternative but also opens up space for personalization and active student engagement in the learning process (Muti et al., 2024). Through this technology, learning is no longer one-way but becomes a dynamic, two-way experience, where students play an active role in building their understanding of Arabic.

This research aims to develop and test the feasibility of the "IqraAR" learning media as an innovative tool for improving the reading skills of Islamic Madrasah Tsanawiyah (MTs) students. By integrating Augmented Reality (AR) technology, this media is designed to provide a more interactive, engaging, and contextual learning experience. This development is expected to overcome various challenges faced in learning Arabic reading, such as low learning motivation, limited vocabulary, and the lack of learning media that support active student engagement.

Furthermore, the goal of this development is not limited to technical aspects, but also to meet the needs of 21st-century students who demand adaptive, collaborative, and technology-based learning. "IqraAR" is expected to be an effective and relevant alternative media for use in formal educational environments, particularly in MTs (Islamic Madrasah Tsanawiyahs), as well as a tangible contribution to the development of learning media that encourages increased Islamic literacy and a more comprehensive mastery of the Arabic language.

METHOD

This study uses a conceptual research design with a focus on developing a conceptual model that specifically utilizes conceptual description as the primary method. Jaakkola, E. (2020), explains that conceptual research with a modeling approach aims to build a theoretical framework capable of predicting relationships between concepts and providing a comprehensive picture of a particular object, event, or process (Fahraini & Almaliki, 2024). This conceptual model identifies key issues that need to be addressed in the study, while also explaining how the phenomenon works based on a review of previous models, the results of previous research, and various possibilities related to the main constructs being studied. The conceptual model does not aim to explain the causes of a phenomenon, but rather only discusses relevant concepts and relationships to describe the phenomenon in detail (Sinambela & Sarton, 2022). Therefore, conceptual research is descriptive, focusing on modeling phenomena or events without conducting direct empirical testing. In practice, these models are usually enriched with diagrams and charts to simplify the presentation of information, making it simpler and more understandable for the reader.

In the context of developing Arabic language learning media, the Augmented Reality (AR) technology-based "IqraAR" media is designed to improve the reading skills of students in Islamic Madrasah Tsanawiyahs (MTs). This media was developed as a solution to various obstacles faced in learning Arabic reading, especially those that still use traditional methods that are monotonous and less able to attract the interest of digital generation students. By utilizing AR technology, "IqraAR" provides a more interactive and contextual learning experience. Students can interact directly with Arabic texts presented complete with audio pronunciation and visual animations that support understanding of the text's content. This approach not only makes it easier for students to recognize letters and words, but also helps enrich vocabulary and strengthen understanding of the text's meaning more comprehensively, while creating a more enjoyable and engaging learning atmosphere.

In addition, the development of this learning media takes into account the needs of three main elements in the learning process, namely students as the main users, teachers as learning facilitators, and the madrasa environment which provides supporting facilities and infrastructure (Al Aluf & Sutiah, 2024). The “IqraAR” media is designed to be easy to use

by students and teachers without requiring complex technical training, and is able to run optimally with the technological infrastructure generally available in madrasas. Thus, this media is expected to significantly increase student learning motivation, active engagement during the learning process, and the effectiveness of teaching Arabic reading. Not only that, "IqraAR" also adapts to the demands of 21st-century education that prioritizes the use of technology and interactivity as part of a more modern and adaptive learning strategy to the needs of today's digital generation. Through this innovation, it is hoped that Arabic language learning in MTs can be more dynamic, contextual, and provide a sustainable positive impact on the development of students' language skills.

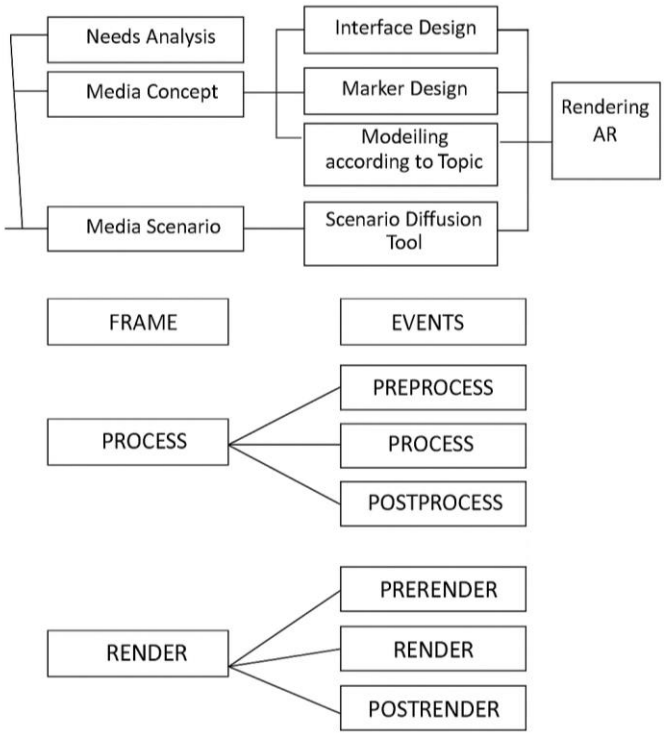
RESULT AND DISCUSSION

As technology advances in the digital era, the need for innovation in learning has become increasingly urgent. The world of education is required to adapt to the changing times and the characteristics of 21st-century students living in an environment saturated with digital technology. One technology that holds significant potential to address these challenges is Augmented Reality (AR). AR is a technology that allows users to interact with real environments enriched by virtual elements such as three-dimensional images, text, sound, and animation. This technology can create an immersive learning experience, where students not only passively receive information but also directly interact with the subject matter in a more engaging and meaningful way.

In the context of learning to read Arabic, AR can be optimized to present Arabic texts which are usually abstract in a more concrete and easy to understand way (Qomah et al., 2024). For example, students can scan a specific image and see Arabic text appear digitally, accompanied by audio pronunciation and animations illustrating the meaning of the word or sentence. This kind of visualization not only helps students understand sentence structure and word meaning, but also improves pronunciation and strengthens vocabulary retention. Furthermore, AR allows for a more individualized learning approach, allowing students to access materials at their own pace and learning style.

The use of AR-based media can also boost students' learning motivation. When learning materials are presented in an engaging, interactive format that mimics a playful experience, students will feel more challenged and actively engaged in the learning process (Nursyafitri et al., 2024). They are not only recipients of information, but also actors in the search and exploration of meaning. This aligns with modern learning principles that emphasize active student engagement, the use of technology, and the development of 21st-century skills such as critical thinking, collaboration, and digital literacy.

Thus, integrating Augmented Reality technology into Arabic reading instruction is not merely an option but a strategic necessity. This innovation is expected to address the challenges of conventional and static learning and open up new opportunities to improve students' Arabic literacy skills in a more effective, engaging, and sustainable manner.



Needs Analysis

Learning Arabic reading in Islamic Madrasah Tsanawiyahs (MTs) still faces significant challenges, primarily because the approach used tends to be textual and lacks visualization. Teachers rely heavily on lectures and textbooks, while students struggle to comprehend reading due to limited vocabulary, a lack of visual context, and low reading interest. The goal of developing learning media *"IqraAR"*. This program was formulated to address various challenges in learning Arabic reading at the Madrasah Tsanawiyah level and to adapt to the needs of students in the digital era. Specifically, the objectives of this development include:

1. Challenges of Reading Learning in MTs

Learning Arabic, particularly reading skills (maharah al-qira'ah), at the MTs (Madrasah Tsanawiyah) level faces quite complex challenges. Many students struggle to understand Arabic texts due to limited vocabulary, complex sentence structures, and a lack of learning media that support comprehensive comprehension. Furthermore, student engagement remains low due to the monotonous methods used.

2. Limitations of Conventional Media

Common learning media used in the classroom, such as textbooks and lectures, are inadequate to meet the learning needs of digital-generation students. These conventional media are static and don't provide interactive learning experiences. As a result, students lack motivation and learning progresses suboptimally. However, today's students are more responsive to approaches that incorporate visual elements, audio, and direct interaction.

3. The Need for Contextual and Interactive Media

MTs students need learning media that not only present text but also provide engaging and contextual learning experiences. Media equipped with audio and visualizations will help students understand the content of the reading more easily and enjoyably. This approach can also increase student interest and participation, while adapting to the learning characteristics of the digital generation, accustomed to interactive technology.

4. The Potential of Augmented Reality (AR) in Arabic Language Learning

Augmented Reality (AR) is a technology capable of displaying virtual objects such as text, sound, images, and animations integrated with the real world through digital devices. In Arabic language learning, AR can present Arabic texts directly, accompanied by audio pronunciation, supporting images, and interactions that help students focus and understand the content. AR creates a fun, visual, and contextual learning experience.

5. Relevance of "IqraAR" Media Development

The development of the augmented reality-based "IqraAR" media is an innovative solution to improve the reading skills of MTs students. This media is designed to present Arabic texts equipped with audio, animation, and visual interaction features, thereby overcoming the barriers of conventional learning. This approach is expected to increase learning motivation, develop students' reading skills, and make Arabic learning more engaging, effective, and in line with current demands.

User Analysis

The "IqraAR" learning media was designed with the needs of three main user groups in mind: students, teachers, and the madrasah environment. First, MTs students aged 12–15 are a digital-native generation who are very familiar with the use of technological devices such as smartphones and tablets. They have a strong interest in visual, interactive, and fun learning media. However, in the context of learning Arabic, particularly reading skills, they still face obstacles such as limited vocabulary, poor understanding of text context, and a lack of media that facilitates direct visualization of meaning. Therefore, media is needed that can help them understand the content of the reading in a more concrete and engaging way.

Second, Arabic language teachers, as learning facilitators, play a crucial role in integrating media into the teaching and learning process. However, not all teachers have a technological background or sufficient time to learn complex applications. Therefore, the "IqraAR" media is designed to be easy to operate, does not require complex technical training, and can be directly applied in daily learning. This media is expected to be an effective tool for teachers in increasing student engagement and understanding of Arabic texts.

Third, the madrasah environment is also crucial in supporting the use of technology-based media. Generally, madrasahs already have basic infrastructure, such as internet connections and Android devices owned by students. However, the use of Augmented Reality technology in learning remains very limited. Yet, this technology has great potential to bring learning materials to life and make learning more contextual and enjoyable (Sumatraputra et al., 2023). Therefore, the presence of "IqraAR" is expected to be an innovative solution that can address students' needs, support teachers' roles, and encourage madrasas to begin adopting technology in their learning more effectively.

Software Requirements Analysis

To ensure the "IqraAR" learning media operates optimally and meets the needs of users in madrasah environments, its development must be based on technical specifications that are relevant, adaptive, and contextual to the educational unit's conditions. These software specifications include:

1. Operating Platform

This media is designed for the Android operating system, with a minimum version of 8.0 (Oreo). This platform was chosen considering the predominance of Android devices among students, ease of distribution, and flexibility of use on various devices without requiring special equipment.

2. Programming Languages and Augmented Reality Technology

The application development uses Unity 3D as the primary platform because it supports interactive multimedia integration. To support Augmented Reality (AR) features, the Vuforia SDK or similar technology is used, enabling marker recognition and real-time virtual object appearance (Susant et al., 2022). The combination of the two allows this medium to provide an immersive and contextual learning experience.

3. Key Features

The "IqraAR" media is equipped with a number of features designed to support students' reading skills, including:

a. Marker recognition, either text or images, which serves as a trigger for the appearance of AR content.
b. The appearance of 3D objects or animations, which are relevant to the content of the reading, to strengthen understanding.
c. Arabic pronunciation audio playback, to practice listening and pronunciation skills.
d. Display of Arabic text along with Indonesian translation, as a bridge to understanding the meaning and context of the reading.

4. User Interface Design

The interface is designed with a simple, intuitive, and responsive approach, making it easy for students to use independently. The language used is bilingual (Arabic-Indonesian) to facilitate navigation and content comprehension. The visual design is tailored to the learning styles of the digital generation to increase user engagement during the learning process.

5. Operation Mode

The app was developed with offline mode as a priority, allowing it to be used without relying on an internet connection. However, an online mode is optionally provided to support content updates or additional access if needed.

Hardware Requirements Analysis

For the Augmented Reality (AR)-based "IqraAR" learning media to run optimally and provide an interactive learning experience, hardware with certain minimum specifications is required, both from the user (student and teacher) and the developer side. These specifications are designed to ensure that the application is accessible to the majority of users in the madrasah environment and to support the efficient and professional AR content production process.

1. Devices (Users: Students and Teachers)

The primary users of the "IqraAR" app are MTs students and Arabic language teachers. Therefore, the device specifications must be aligned with those commonly available in Madrasah Tsanawiyah environments. The recommended minimum specifications are as follows:

a. Operating System: Android 8.0 (Oreo) or later. This is important because most current AR technologies require an operating system that supports graphics processing and camera sensors.

b. RAM: Minimum 3 GB, to ensure smooth operation when running applications that combine text, sound, and 3D visuals simultaneously.

c. Camera: Minimum resolution of 8 Megapixels, to be able to detect and recognize markers accurately.

d. Internal Storage: Minimum 500 MB, used for application installation, storing local data, and caching visual content.

e. Screen: Minimum resolution 720p (HD), so that users can see Arabic text, 3D objects, and animations clearly without experiencing distortion.

Devices with these specifications are considered quite common among students and teachers today, especially in madrasa environments that have begun to adopt digital-based learning.

2. Developer Computer Devices

To design, develop, and produce the "IqraAR" learning media, the development team required a computer with higher specifications. This is because the AR development process involves 3D modeling, graphics processing, programming, and complex audio and visual integration. The minimum specifications for a developer's computer are as follows:

a. Processor: Intel Core i5 or equivalent (minimum 8th generation), to support stable performance when running development software.

b. RAM: Minimum 8 GB, to be able to handle multitasking when opening heavy applications such as Unity, Blender, and Photoshop simultaneously.

c. GPU: A dedicated graphics card such as the NVIDIA GTX/RTX series or AMD Radeon, to speed up the process of rendering 3D objects and AR simulations in real-time.

d. Required Software:

1) Unity 3D: As the main platform for AR application development.

2) Vuforia SDK (or AR Foundation): To integrate AR functions such as marker recognition and object interaction.

3) Blender: To create and edit 3D objects that will be displayed in the application.

4) Photoshop/CorelDRAW: To design visual elements such as UI/UX and application interface appearance.

The hardware specifications above represent the minimum requirements for optimal development and use of the "IqraAR" media. By considering device availability in the field and the technical requirements for content development, this media can be effectively implemented in madrasah educational environments undergoing digital transformation.

CONCLUSION

Reading skills (مهارة القراءة) are an essential foundation for Arabic language learning, particularly at the Madrasah Tsanawiyah (MTs) level. However, learning this skill still faces various obstacles, ranging from low student interest, limited media, to teaching methods that tend to be conventional and unengaging. Students still struggle to understand Arabic texts due to a lack of visual context, inadequate vocabulary mastery, and limited interactive support tools. With the advancement of digital technology, innovative approaches are essential to make learning more relevant and meaningful. One strategic solution offered is the use of Augmented Reality (AR) technology in the "IqraAR" learning medium. This

technology allows Arabic texts to be visualized through 3D objects, animations, and audio pronunciations, helping to clarify meaning and increase student engagement. The "IqraAR" media is designed not only to address the challenges of conventional learning but also to adapt to the characteristics of 21st-century learners who are more responsive to interactive technology. This application is developed with key features such as marker recognition, AR content display, Arabic audio, and an easy-to-use bilingual interface. Supported by hardware and software specifications realistic for the madrasah environment, this media enables learning to take place independently or in an integrated manner with the teacher's role. With the right technology integration, "IqraAR" is expected to significantly improve students' reading skills, stimulate learning interest, and create a more engaging, effective, and contextual learning environment. This innovation represents a concrete step in transforming Arabic language education to be more adaptive to the demands of the times and the needs of today's learners.

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