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Research Article

Design of Augmented Reality–Based Learning Media for Islamic Religious Education Material on Replies to Non-Believers at Muhammadiyah 12 GKB Gresik Middle School

Novi Nazilatur Rohmah*

Magister Pendidikan Agama Islam, Universitas Muhammadiyah Malang, Indonesia

*Correspondence: novinazila0@gmail.com

Abstract : In supporting the learning process, teachers often use videos on YouTube, Instagram, and TikTok for learning media nowadays. One that can be used for learning media is Augmented Reality. Augmented Reality in the world of education has not been implemented and applied as a supporting medium for interactive education in schools, because no educational institution has implemented it as a mandatory media that functions as a learning tool. Muhammadiyah 12 GKB Gresik Middle School has a Digital Technology Class Program that strives to provide a forum for teachers and students to always actively use technology in learning in class and outside the classroom. With the material Reply for unbelievers, it is hoped that it can be visualized through Augmented Reality. Based on the background above, the author tries to explain the main statement (1) how to design an effective, efficient, and interesting Augmented Reality learning model for 8th grade students of the Quranic material, Surah Al Fajr, reply for unbelievers. (2) what are the advantages and disadvantages of the Augmented Reality learning media design. This study aims to describe the design of the Augmented Reality learning model so that it is effective, efficient, and interesting. As well as describing the advantages and disadvantages of Augmented Reality learning media design so that it can be effective, efficient and interesting for students. The research method used by researchers uses the Research and Development method by adopting the ADDIE development model in the first two steps: Analysis and Design. The results of the needs analysis on the use of Augmented Reality (AR) media in learning replies for non-believers, this is effective, efficient and interesting if used in the learning process for students, and is needed, especially in learning replies for non-believers.

Keywords : ADDIE, Augmented Reality, Learning Media, Quran, TikTok

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1. BACKGROUND

Globalization is an inevitable situation in the current industrial era. It has a complex impact on various aspects of life that have developed since then, because the development of globalization technology indirectly with the Indonesian education system has developed as a positive and negative impact on the effectiveness of the Indonesian education system (Sitakar et al., 2024). This globalization will intensify changes in all areas of life, including education, society, economics, law, politics, science and technology (scientific and technological). Science and technology are very influential in various fields, especially in education, and technological development is sometimes enhanced by innovation and creativity (S Nurfadhillah et al., 2021).

Development in this era cannot be separated from technology, and this also applies to the world of education. The world of education faces a new challenge, namely implementing technology in classroom learning activities (Indrayati & Jailani, 2015) . Technology is an effective and efficient tool that can be used to develop learning media (Wijaya & Tanuwijaya, 2020). Therefore, if learning media is given the right technological

touch, it is expected to increase student interest in learning and abilities. One technology that can support mathematics learning, especially abstract mathematics, is Augmented Reality Technology.

To support learning, educators often use YouTube, Instagram, and TikTok videos, starting during the pandemic. One potential learning medium is augmented reality. Augmented reality has not yet been implemented and applied as an interactive support tool in school learning. Only a few educational institutions have implemented and utilized augmented reality as a mandatory learning tool (Nistrina, 2021).

Augmented Reality (AR) is a technology that combines the real world with virtual elements (such as 3D images, text, or sound) displayed directly through devices such as smartphones, tablets, or special glasses. In the educational context, AR is used to enrich the learning experience with interactive and realistic visual displays. With a real learning experience, it will enable students to more quickly absorb and process information, thus making learning more effective. Epic displays and beautiful visuals make students not easily bored and attract attention in learning, allowing students to have longer concentration than using other media.

Muhammadiyah 12 Junior High School GKB Gresik has a Digital Technology Class Program that seeks to provide a platform for teachers and students to actively use technology in both classroom and out-of-class learning. This program is intended to support effective and efficient teaching and learning activities. The material, "Quranic Responses for Non-Believers," is expected to be visualized through Augmented Reality.

Based on the background above, the author tries to explain the main statement (1) how to design an effective, efficient and interesting Augmented Reality learning model for 8th grade students on the topic of replies to non-believers. (2) what are the advantages and disadvantages of the Augmented Reality learning media design.

2. THEORETICAL STUDY

Definition of Learning Media

Learning media is a tool that serves as an intermediary between educators and students in the teaching and learning process, connecting, providing information, and conveying messages, creating an effective and efficient learning process (Sungkono et al., 2022). Learning media is one of the most important supports in the learning process; in fact, the success or failure of the learning process is largely determined by the learning media used.

Learning media includes tools physically used to convey the content of teaching materials, including books, tape recorders, cassettes, video cameras, video recorders, films, slides, photographs, images, graphics, television, and computers. In other words, media are components of learning resources or physical equipment containing learning materials in the student's environment that can stimulate students to learn (Jurusan et al., 2019).

The term "learning media" is often used interchangeably with the word "media." Generally, learning media can be grouped into three categories: first, visual media, which utilizes solely the student's sense of sight to convey learning messages. Second, audio media, which utilizes only the student's sense of hearing (Ida Umam et al., 2021).

Understanding Augmented Reality Learning Media

Augmented Reality began to develop from 1957 to 1962. There was a cinematographer, Morton Heilig, who created Sensorama, a simulator with visuals, vibrations, and smells. Then in 1966, Ivan Sutherland invented the head-mounted display, which he considered a window to the world. Then in 1975, Myron Krueger invented Videoplace, the first invention that allowed interaction with virtual objects. Then in 1989, Jaron Lanier invented Virtual Reality, and in 1992 Augmented Reality was developed to repair Boeing aircraft. Still in 1992, LB Rosenberg developed Virtual Fixtures which are still in the AR system for use in the US Air Force Armstrong Labs (Amrulloh, n.d.).

Augmented Reality-based learning media is a technology that combines the real world with the virtual world. In other words, Augmented Reality (AR) presents an object in the form of a video or photo/image into the real world in 3D form (Alfitriani et al., 2021). The Augmented Reality system works using a smartphone camera to detect existing markers or objects. The camera then scans the marker pattern and compares it with an existing database. If the database matches, the information on the marker will appear as a 3D object according to the animation that has been created (Ambo & Sidik, n.d.).

Principles of Augmented Reality Learning Media

According to Kolb (1984), effective learning occurs when students are directly involved in and reflect on experiences (Kolb, 1984). This theory, which underlies the development of AR media, is Kolb's experiential learning theory. AR-based learning media is not just about technology, but must be designed in accordance with pedagogical principles to be truly effective in enhancing learning:

1. The Principle of Interactivity. AR should enable active interaction between learners and learning materials. Learners can rotate, zoom in, or explore virtual objects directly. The goal is to engage learners, not passively, but actively. For example, learners can rotate a 3D model of the human heart to understand the function of each part.
2. The Principle of Relevance to Learning Objectives. AR media must align with core competencies and learning indicators. It should not only be visually appealing but also support the desired learning outcomes. For example, in science lessons, AR is used to explain the water cycle in a coherent and scientific manner.
3. The Principle of Ease of Access and Use. AR applications should be easy to use for students and teachers, not overly complex or requiring expensive equipment. The interface should be intuitive and user-friendly. Recommendation: Use smartphone-based AR applications that are free to download.

4. The Principle of Visualizing Abstract Concepts. AR is ideal for explaining material that is difficult to visualize directly. These visualizations help accelerate understanding and reduce misconceptions. For example, visualizing the Earth's revolution and rotation in a geography lesson.
5. The Principle of Emotional Engagement. AR media should be designed to evoke curiosity, amazement, or a positive emotional experience. Emotional engagement strengthens students' retention of the material. For example, AR displays the stories of the prophets or Islamic history in dramatic visuals and narratives.
6. The Principle of Integration in Learning Strategies. AR media should be part of the learning strategy, not just entertainment. The teacher remains a facilitator, guiding students' exploration. For example, AR is used in group discussions, presentations of observation results, or reflections on learning.
7. Safety and Ethics Principles. AR content must be in line with educational values and must not contain violence, pornography, or other negative elements. Access must be controlled to prevent misuse outside of the learning context.

Augmented Reality-Based Islamic Education Learning Media Design

In designing Augmented Reality-based learning media, you must first prepare several things, namely:

1. Media Title: The title can be adjusted to the material that will be discussed during learning.
2. Media Objectives: The objectives of using the media in learning.
3. Topic or Title of Material: Chapter or material to be presented.
4. AR Media Features: In creating media, what features are needed.

Feature	Description
3D Visuals	Displays movement in the form of 3D characters.
Audio/reading	Prayer readings or story settings used.
Simulation	Students can "visit" the story setting, certain rooms or tools, etc.
Interactive Quiz	Multiple choice or drag-drop quizzes to evaluate student understanding.
Marker-Based AR	A printed book or worksheet with marker images that can be scanned with an app to reveal 3D content.

1. Technology and Tools used:
   a) AR Engine Application: Unity + Vuforia / 8th Wall / Zappar
   b) Device: Android/iOS smartphone or tablet
   c) 3D Content: Blender or library of models you want to create
   d) Audio: Reading narration
2. Learning Flow

a) Stage 1: Introduction, contains the introduction that the teacher wants to give
b) Stage 2: AR Exploration, Students scan markers using the AR application.
c) Stage 3: Discussion and Reflection, The teacher guides students to discuss related topics, Students fill out a reflection journal
d) Stage 4: Evaluation, Students work on interactive quizzes in the application or integrated Google Form.

Media Name and Type

The media designed in this study is named "SABARI" (Simulasi Punab Bagi Yang Tidak Percaya Augmented Reality Interactive). This media is an Augmented Reality (AR)-based learning application developed to help students understand the story of the people who disobey Allah and the punishment they receive visually, interactively, and contextually. This type of media is included in interactive learning media based on mobile technology that can be accessed via Android-based smartphones or tablets. This application is equipped with a specially designed image scanning feature, so students can see a 3D animation of the situation of the people that appears on their device screen in real-time. According to Mayer, the combination of images, text, and sound in the learning process can improve student understanding, especially in complex material (Mayer, 2009).

Media Specifications

The learning media developed in this research is named "SABARI" (Simulasi Punab Bagi yang Tidak Belief Augmented Reality Interactive), which is an application based on Augmented Reality (AR) technology designed to support learning about the punishment for non-believers. This application was developed for the Android platform with an APK file format, so it can be installed and run on smartphones or tablets with Android operating systems of at least version 8.0 and above and equipped with a camera. In its development, this media uses Unity 3D software as the main programming base, interactivity: Users can select scenes from each story in the Qur'an and observe the consequences of the behavior of people who deny the teachings of Allah. Audio Narration: Equipped with a narrator's voice that briefly explains the interpretation of the verse. Verse Subtitles and Translations: Displays verses in Arabic, Indonesian translations, and a summary of moral messages. Evaluation Quiz: There is a mini quiz at the end of the session to measure the user's understanding of the content of the material.

3. RESEARCH METHODS

This study aims to describe the design of an Augmented Reality learning model that is effective, efficient, and interesting for students and to describe the advantages and disadvantages of the Augmented Reality learning media design so that it can be effective, efficient, and interesting for students. The research method used by researchers uses the Research and Development method by adopting the ADDIE development model in the first two steps: Analysis and Design.

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4. RESULTS AND DISCUSSION

The SABARI learning media was developed as an innovation in teaching the subject of Surah Al-Fajr verses 6–14, which tells the story of the destruction of the previous people due to their disobedience to Allah SWT. This media uses Augmented Reality (AR) technology that allows students to see a visual simulation of the punishment described in the verse. The design of the SABARI media emphasizes the contextualization of religious meaning through a visual approach and interactive learning experiences. The goal is for students not only to understand the contents of the Quranic text cognitively, but also to deeply internalize its moral and spiritual messages.

SABARI is an acronym for Simulation of Punishment for the Unbelievers Augmented Reality Interactive, an AR-based learning media developed for the material of Surah Al-Fajr, specifically in verses 6–14. These verses contain stories of previous peoples who were destroyed by Allah SWT because of their arrogance, disbelief, and injustice, such as the people of 'Aad, Thamud, and Pharaoh. SABARI media was developed using marker-based AR technology with the help of applications such as Unity and Vuforia. Through 3D simulation, students can directly see the representation of Allah's punishment in a visual form that is close to reality (realistic). It is hoped that this media can: 1) Improve understanding of the content of the verses. 2) Grow spiritual awareness and fear of Allah. 3) Change students' perspectives from cognitive learning to affective and reflective learning. The implementation results show that SABARI media is able to have a positive impact on:

1. Discipline in worship, because students become more afraid of Allah's punishment.
2. Social concern, after they realized that social injustice is also a cause of punishment.
3. Moral awareness, through the values of honesty, responsibility, and gratitude that they understand from the simulation broadcast.

With an approach that touches on cognition, affection, and psychomotor, SABARI media strengthens Islamic character values and is relevant to the Merdeka Curriculum, which emphasizes project-based learning and value reflection.

Advantages of SABARI Media

SABARI media has several advantages that make it a strategic innovation in Islamic Religious Education (PAI) teaching, particularly in its material on warnings and retribution for those who disobey Allah. Some of these advantages are as follows:

1) Contextual and Realistic Visualization

SABARI presents a 3D visual display based on Augmented Reality (AR) that simulates the punishments inflicted on previous generations, such as the people of 'Ad, Thamud, and Pharaoh. This visualization bridges the gap between the Quranic text and students' abstract understanding, making it easier for them to grasp the verses' meanings contextually and deeply.

2) **Increasing Student Motivation and Active Participation.**

The interactive nature of SABARI makes students more engaged and active in learning. The technological approach used can stimulate interest, especially among the digital-native generation, making the learning process more lively and enjoyable.

3) **Facilitating Multi-Sensory Learning**

By combining visual, audio, and physical interaction elements, SABARI supports multisensory learning. This helps strengthen students' memory (retention) and deepens their emotional engagement in understanding the spiritual message of the Quran.

4) **Cultivating Awareness of Spiritual and Moral Values**

SABARI's primary advantage is not only its informative delivery of material, but also its internalization of religious values such as fear of God, awareness of the consequences of disobedience, and motivation to improve worship and noble character. This medium effectively stimulates self-reflection in students.

5) **Supporting 21st Century Learning Models and Independent Curriculum**

SABARI is designed in line with 21st-century learning approaches that emphasize creativity, problem-solving, critical thinking, and collaboration. Furthermore, this medium aligns with the principles of the project to strengthen the Pancasila student profile in the Independent Curriculum, emphasizing spiritual values, mutual cooperation, and reflection.

6) **Encouraging Independent and Differentiated Learning**

The SABARI app allows students to explore material independently, both at school and at home. This supports a differentiated learning approach that adapts to students' learning styles and pace.

7) **User Friendly and Accessible**

The user interface is designed to be simple and intuitive, making it accessible to eighth-grade students without requiring advanced technical skills. The app can also be run on commonly used Android devices.

Analysis of Weaknesses of SABARI Media

Although SABARI media offers an innovative Augmented Reality (AR)-based approach to Islamic Religious Education learning, its implementation still has several weaknesses that require attention and evaluation for further development. The following is a description of the identified weaknesses:

1) **Dependence on Technology Devices and Connectivity**

Using SABARI requires supporting devices such as a smartphone/tablet and a camera with specific specifications compatible with AR applications. In some schools or areas with limited technological facilities, this tool is less than optimal.

Furthermore, some AR features require stable internet access, which can be a challenge for offline learning or in areas with limited network connectivity.

2) **Lack of Mastery of Technology by Teachers and Students**

Not all teachers and students have sufficient digital literacy to use AR applications. This results in ineffective media use, especially without adequate training or technical guidance. Some teachers are still more accustomed to conventional lecture methods and struggle to adapt to technology-based media.

3) **Limitations of Narrative and Depth of Material**

In its initial development, the content presented in SABARI media tended to be visually descriptive, but did not fully provide interpretive analysis or spiritual insight appropriate to the diverse understandings of students. This could limit students' ability to more comprehensively connect the messages of the Quranic text to the context of everyday life.

4) **Risk of Misperception Due to Visualization**

The use of 3D visuals depicting punishment simulations has the potential to create frightening or traumatic experiences for some students, especially those with more sensitive personalities. Without proper teacher guidance and value reflection, students may misinterpret the material or perceive only the horror aspect, rather than the intended moral and spiritual message.

5) **Development Limitations for Other Materials**

SABARI media was specifically developed for the Al-Fajr surah and the theme of punishment for unbelievers. This limits its application to a single theme or topic and makes it less flexible for development into other Islamic Religious Education (PAI) subjects, such as faith, morals, or jurisprudence.

6) **Not Yet Integrated with Authentic Assessment**

Currently, SABARI media is primarily used as a presentation aid. There is still a need to develop integrated, authentic assessment modules, such as worksheets, written reflections, attitude assessments, or digital journals that allow teachers to systematically evaluate the value impact of media use.

While SABARI represents a significant breakthrough in technology-based learning that combines religious values and interactive digital media, its effectiveness still depends on several supporting factors. To truly optimize and sustain this medium, improvements in content quality, teacher training, digital infrastructure support, and appropriate pedagogical approaches are required.

5. CONCLUSION AND SUGGESTIONS

The results of this study indicate that based on the results of the needs analysis on the use of Augmented Reality (AR) media in learning replies for non-believers, this is

effective, efficient and interesting if used in the learning process for students, and is needed, especially in learning replies for non-believers. It is hoped that this media will produce output of faithful and pious humans and quality education to welcome the golden generation of Indonesia in 2045.

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