DEVELOPMENT OF AUGMENTED REALITY-BASED FLASHCARD MEDIA TO IMPROVE ELEMENTARY SCHOOL STUDENTS' ARABIC SPEAKING SKILLS

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ABSTRACT

This study aims to develop an Augmented Reality (AR)-based flashcard learning media to enhance the arabic speaking skills (maharah kalam) of students at SDIT As-Syifa Al Inayah 6 Kota Jambi. The ADDIE model was employed as the development framework, consisting of analysis, design, development, implementation, and evaluation stages. The analysis stage revealed that students require interactive-visual media to support vocabulary comprehension and build speaking confidence. During the design and development phases, the AR flashcards were created by integrating images, 3D animations, and pronunciation audio. Expert validation results indicated a high level of feasibility, with a percentage 90%. Implementation with a small student group demonstrated a significant improvement in vocabulary mastery, pronunciation accuracy, and the ability to construct simple sentences. Summative evaluation confirmed that AR media fosters a more active, communicative, and engaging learning environment. Overall, AR flashcards proved to be effective in enhancing speaking skills and serve as an innovative alternative for teaching Arabic at the elementary school level.

Keywords: ADDIE; Arabic Learning; Augmented Reality; Flashcards; Speaking Skills.

ABSTRAK

Penelitian ini bertujuan untuk mengembangkan media pembelajaran Flashcard berbasis Augmented Reality (AR) guna meningkatkan maharah kalam siswa SDIT As-Syifa Al Inayah 6 Kota Jambi. Model ADDIE digunakan sebagai dasar pengembangan yang meliputi tahap analisis, desain, pengembangan, implementasi, dan evaluasi. Hasil analisis menunjukkan bahwa siswa membutuhkan media visual-interaktif untuk membantu pemahaman kosakata dan meningkatkan keberanian berbicara. Pada tahap desain dan pengembangan, media AR dirancang dengan mengintegrasikan gambar, animasi 3D, dan audio pelafalan yang kemudian divalidasi oleh ahli dan dinyatakan sangat layak dengan persentase kelayakan 90%. Implementasi pada kelompok kecil siswa menunjukkan peningkatan signifikan dalam penguasaan kosakata, pelafalan, dan kemampuan menyusun kalimat sederhana. Evaluasi sumatif mengonfirmasi bahwa media ini

mampu menciptakan pembelajaran yang lebih aktif, komunikatif, dan menarik. Secara keseluruhan, Flashcard AR terbukti efektif dalam mendukung peningkatan maharah kalam dan dapat menjadi alternatif inovatif dalam pembelajaran bahasa Arab di tingkat dasar.

Kata Kunci: ADDIE; Augmented Reality; Flashcard; Maharah Kalam; Pembelajaran Bahasa Arab.

A. Introduction

In the era of digital transformation, Arabic language learning faces structural challenges and new development opportunities. Teacher-centered, content-based curricula no longer meet the needs of students who are increasingly visual, interactive, and technologically advanced (Sanusi et al., 2025). According to Yunansah (2022), the mismatch between traditional pedagogical approaches and the learning characteristics of today's generation leads to decreased student interest, low engagement, and difficulties in achieving tangible communicative skills. Therefore, Arabic language learning design must be modified to provide exploratory space, creative incentives, and interactions that enable students to experience authentic learning (Bustam et al., 2024).

One of the essential skills in mastering Arabic is maharah kalam (speaking). However, ironically, this ability is actually the most difficult skill to achieve for elementary school students (Padmawati et al., 2019. Various studies show that students do not have the courage to speak in class, cannot make simple sentences, and lack vocabulary (Adelina, 2017; Prawiyogi et al., 2020; Febriani & Sya, 2022; Isnaini, 2022; Kuntarto & Aritonang, 2023). This condition shows that creative interventions are needed for learning kalam. This not only requires repetition of memorized material but also requires linguistic experience, visualization of meaning, and use of language in representative situations.

Augmented Reality (AR) technology in learning can make abstract concepts tangible and explorable (Hermawan & Hadi, 2024). AR's interactive simulations, audio pronunciations, and three-dimensional visual experiences enable students to see and interact with ideas. This technology transforms language learning, as vocabulary

concepts are presented in the form of real objects rather than just text. Consequently, AR has the potential to increase student engagement and help them understand linguistic meaning contextually (Handayani et al., 2024).

AR-based flashcards have emerged as an innovative medium that combines the visual repetition power of flashcards with the immersive experience of AR (Okdiansyah et al., 2021; Oktavia et al., 2024). This medium allows students to see images, hear pronunciations, and observe objects through a digital camera, making learning a multisensory experience. Besides effectively enriching vocabulary, this media encourages independent exploration, increases speaking confidence, and minimizes learning boredom (Mustofa & Arsita, 2023; Kanedi, 2024). AR integration makes flashcards not only a memorization tool but also a facilitator of dialogue between students and serves as learning material.

SDIT As-Syifa Al Inayah 6, Jambi City, uses Arabic to build students' linguistic and religious identities. However, learning outcomes show that media use is still limited to conventional visual aids. As a result, media use does not sufficiently enhance Arabic literacy. Students have limited active vocabularies, low verbal participation, and nervousness when interacting with Arabic in class. These issues suggest the need for new learning media to boost student confidence, enhance oral production, and create a more lively communication environment (Daniyati et al., 2023; Meiarni, 2025).

Technology-based media is considered an important part of developing contemporary learning models to accelerate Arabic language learning (Maryam et al., 2025; Rahmawaty et al., 2025). The presence of AR-based flashcards can help teachers shift the learning paradigm from knowledge transfer to a fun learning experience, where students can see, imitate, and create language independently through media interactions (Maritza & Scarvanovi, 2024). This aligns with the active learning approach, which emphasizes the role of students as the center of learning activities, rather than mere recipients of information (Habibi et al., 2025). Students can experience linguistic events directly with visual and auditory simulation

facilities. As a result, the process of language internalization occurs naturally and gradually.

Therefore, the purpose of this research is to develop an AR-based flashcard learning medium to improve students' Arabic speaking skills at SDIT As-Syifa Al Inayah 6, Jambi City. It is hoped that the use of this medium will not only make learning enjoyable but also help improve the literature on technology-based Arabic language learning at the elementary level. This medium also has significant pedagogical benefits because it provides teachers with the opportunity to modify learning models to be more communicative, contextual, and responsive to students' unique needs.

Furthermore, the integration of AR into flashcards can serve as a prototype for adaptable learning innovations. for different materials and educational levels. Therefore, the results of this study can serve as an implementation reference and inspiration for the development of similar media in Islamic and general educational settings. Therefore, this research has strategic value because it will not only improve students' speaking skills but also offer references for relevant digital learning methods in Arabic language learning in the era of educational technology.

B. Methods

This research employed a Research and Development (R&D) approach with the ADDIE (Analysis, Design, Development, Implementation, Evaluation) development model (Sugiyono, 2023; Rayanto, 2020). This model was chosen because it provides a systematic framework for developing technology-based learning media, while also enabling testing of the product's feasibility and effectiveness in improving elementary school students' Arabic language comprehension (Syahid et al., 2024).

Using the ADDIE model, media development is carried out systematically and continuously, resulting in a learning product that is not only theoretically feasible but also effective in the practice of Arabic language learning in elementary schools (Rustandi, 2021). This model focuses not only on product development but also on the validation process and testing of its effectiveness in real-life learning contexts.

The product developed in this research is an Augmented Reality (AR)-based flashcard media designed to support students' Arabic language comprehension interactively and contextually.

The research stages refer to the ADDIE model as follows: Analysis. This stage is conducted to identify learning needs, elementary school student characteristics, and challenges in learning maharah kalam. The analysis also includes a review of the curriculum and relevant materials.

Design. This stage involves designing AR-based flashcard media, including material selection, visual design of flashcards, AR usage scenarios, and the development of research instruments such as validation sheets and response questionnaires.

Development. The development stage involves creating an AR-based flashcard media product according to the design. The product is then validated by media and material experts to assess its feasibility in terms of content, language, and presentation.

Implementation. The media, which has been deemed suitable, is piloted with elementary school students. This stage aims to assess the effectiveness of the media's use and collect data related to the improvement of students' maharah kalam.

Evaluation was conducted both formatively and summatively to assess the media's effectiveness in improving students' language comprehension. Data were obtained through test results, student response questionnaires, and observations during the learning process.

To measure the validity of the flashcard learning media, media experts, material experts, and language experts were given a questionnaire to obtain a quantitative overview of the product's feasibility and quality. This was done using a multilevel rating scale. Respondents rated each statement in four categories: Strongly Agree (SS) was given a score of 4, Agree (S) was given a score of 3, Disagree (TS) was given a score of 2, and Strongly Disagree (STS) was given a score of 1. This weighting system allowed researchers to structuredly measure the acceptability and accuracy of the product design and identify elements that needed improvement. The scores

collected from each expert were then processed descriptively to determine the media's feasibility percentage. The assessment results provide an empirical overview of the media's effectiveness in terms of presentation, material comprehension, language relevance, and ease of use.

The assessment results were calculated using the following formula:

$$\mathrm{P} = \frac{\sum x}{\sum xi} x100\%$$

Note:

P= percentage of validity value

$\sum x$ = total answer value

$\sum xi$ = total ideal value

Referring to the following validity level values (Akbar, 2013):

Table 1 Validity Level

Percentage Score	Validity Level
85,1%-100%	Very Valid
70,1%-85%	Valid
50,1%-70%	Less Valid
0%-50%	Not Valid

This method not only produces numbers but also provides a theoretical basis for product development that meets the needs of industrial learning. Consequently, this analysis method serves as an evaluation tool to ensure that AR-based flashcard media is truly feasible, functional, and aligns with Arabic language learning objectives.

Therefore, the use of the ADDIE model in this study provides a strong scientific basis to ensure that AR-based flashcard media is truly feasible to use and is able to objectively improve students' Arabic speaking skills.

C. Result and Discussion

During the analysis phase, Arabic language learning at the school still faced several fundamental obstacles. Students experienced fear and hesitation when speaking, lacked an active vocabulary, and lacked learning media capable of providing visual experiences that support the process of constructing meaning. Because conventional teaching methods of lectures and translation still dominated learning, most students appeared passive and unengaged in speaking activities. Students preferred visual learning over contextual and interactive media, which exacerbated this situation. As a result, students struggled to develop speaking skills and expand their speaking skills more effectively.

Therefore, innovative learning media that combine visual, interactive, and hands-on elements are needed to help students connect their vocabulary to real-world situations or objects, which can help them understand meaning and structure it into sentences. Therefore, this media was designed to meet the cognitive developmental characteristics of elementary school students who tend to be visual learners, enjoy exploring, and require engaging yet easily understood visuals (Annisa et al., 2025). It is hoped that this AR Flashcard media will help students understand vocabulary contextually and encourage their confidence in constructing sentences through interactive and enjoyable learning experiences.

The design phase involves designing AR flashcards containing object images, audio pronunciations of Arabic vocabulary, three-dimensional animations that appear when the card is scanned through the app, and simple example sentences appropriate to the student's abilities. This phase is the first step toward the design phase. The dual coding principle, which combines visual and verbal stimuli, is used in the creation of this section (Nachiappan, 2013). The goal is to better retain the data in long-term memory and facilitate student comprehension. Furthermore, the flashcard design adheres to the principles of readability and visual simplicity, such as using bright colors, clean layouts, and markers that are easily recognized by the device's camera to ensure a smooth scanning process (Akbar, 2022).

During the development phase, an initial AR Flashcard prototype was created after undergoing a validation process by three parties: a media expert and an Arabic language subject matter expert. The validation results indicated that the media received a "Very Suitable" feasibility score. This was because the design was deemed attractive, responsive, and suited to the needs of elementary school-aged children. The media expert gave the highest marks for its appearance, visual quality, and ease of navigation. According to the subject matter expert, in terms of material substance, the selected vocabulary aligns with students' needs for learning the Arabic language and supports the development of their basic communication skills. Overall, the validation results indicated that the

media achieved a "Very Suitable" feasibility score with a score of 90%. This indicates that the media meets standards and is suitable for use in learning, taking into account suggestions for improvement.

The implementation phase was conducted through small group trials with a number of students as an initial representation of the media's application. The implementation results demonstrated significant changes in student engagement during the learning process. When using AR Flashcards, students appeared more focused, enthusiastic, and exhibited heightened curiosity, especially when three-dimensional animations appeared on the device screen. The media not only captured attention but also triggered a more active learning response. Students began to spontaneously imitate vocabulary pronunciation without direct instruction from the teacher (Ayu et al., 2024). In the speaking practice phase, they were able to construct simple sentences by associating AR visual objects with the vocabulary learned, indicating a transfer of understanding from visual representation to real linguistic use. Furthermore, the results of the student response questionnaire indicated that more than 94% of participants found this media enjoyable, easy to understand, motivating, and helped them gain confidence in speaking Arabic. These findings confirm that AR Flashcards contribute not only to improving vocabulary comprehension but also to enhancing affective aspects and the courage to communicate in the target language (Sardi, 2024).

The evaluation phase was conducted using two approaches: formative and summative evaluation. Formative evaluation was conducted in stages throughout the development process with the aim of refining the product based on expert input. Improvements were made to several aspects, such as increasing the clarity of pronunciation audio, adjusting sentence structure, and updating the marker design to be more responsive to camera scanning.

Simultaneously, summative evaluation was implemented to assess the effectiveness of the media by comparing students' abilities before and after using AR Flashcards in learning. The evaluation results showed significant improvements in vocabulary mastery, speaking

confidence, pronunciation fluency, and the ability to construct simple sentences. These changes were evident both in student performance assessments and in their affective responses to the learning process.

Based on the series of stages in the ADDIE model, it can be concluded that the AR Flashcard media developed not only meets the eligibility criteria but has also proven effective in improving elementary school students' Arabic pronunciation skills. Therefore, it can be recommended as an alternative innovative medium in Arabic language learning.

This research discussion focuses on how Augmented Reality (AR)-based Flashcard media can directly contribute to improving students' Arabic pronunciation. AR provides realistic visualizations that make it easier for students to understand vocabulary contextually. When students see three-dimensional animations appearing on cards, they can connect the object's shape with the Arabic term they are learning. This visual representation automatically motivates students to name or describe the object. This aligns with the findings of Nizar et al. (2025) that AR can transform abstract concepts into concrete experiences, facilitating the understanding of language meaning. In other words, the appearance of objects in AR is a key trigger that encourages students to produce language spontaneously.

Furthermore, AR Flashcards can boost students' speaking confidence because learning takes place in a fun, non-stressful environment. Multisensory AR media combines images, animations, and audio, creating an immersive learning experience that makes students feel like they're playing, not being tested. This environment psychologically reduces student anxiety and boosts their confidence in trying to pronounce words or sentences in Arabic. Khairani & Nasution (2023) stated that AR can increase student engagement and reduce boredom, a practice evident when students demonstrate high levels of enthusiasm during learning.

AR Flashcards also support the principles of active recall and repetition, which are crucial in language learning. Students can scan the cards repeatedly to view animations or listen to recitations. This repetition strengthens both declarative memory (vocabulary) and procedural memory (pronunciation and word

usage in sentences). This process contributes to students' increased fluency in speaking because they don't just see or hear the words once, but repeatedly through the medium. Thus, AR Flashcards offer repetition that doesn't get boring, as each repetition is accompanied by an engaging visual experience.

Additionally, AR provides a visual context that helps students understand language use in more realistic situations. Learning to read and write requires not only the ability to memorize words, but also the ability to use them to describe objects, hold conversations, or construct descriptive sentences. When students see AR objects moving, they can immediately connect them to the sentences they are speaking. This kind of visual context helps students develop an understanding of language pragmatics, namely how language is used in real-life situations. This type of learning is far more effective than memorizing vocabulary in isolation without context.

From a psychological perspective, AR Flashcards also help overcome barriers such as the fear of making mistakes. Students' focus is more on the AR objects that capture their attention, rather than on the potential mistakes they might make. When all students are engaged in the same activity and the classroom atmosphere becomes lively, students' confidence increases. They feel that speaking Arabic is not stressful, but rather a fun part of the learning process (Syahid et al., 2024). Therefore, AR can create a communicative and interactive learning environment and encourage natural language production.

Overall, AR Flashcards have been shown to have a positive influence on Arabic pronunciation. Through realistic visualizations, multisensory experiences, active repetition, a communicative context, and a fun learning atmosphere, AR creates an ideal environment for students to practice speaking. This medium aligns with the needs of Arabic language learning in the digital age, especially for elementary school students who require strong visual stimulation and interactive learning experiences. Therefore, AR-based flashcards are a relevant, effective, and applicable pedagogical innovation for improving students' speaking skills.

E. Conclusion

This study successfully developed Augmented Reality (AR)-based Flashcard learning media through the ADDIE model and showed that the media was feasible and effective in improving students' maharah kalam at SDIT As-Syifa Al Inayah 6, Jambi City. The feasibility of the AR Flashcard media was evaluated based on assessments from several validators. Validation conducted by media experts resulted in a score of 90.2%, classified as "very feasible," while validation by subject matter experts resulted in a score of 90%, also categorized as "very feasible." In addition, the feasibility assessment based on teacher and student responses to the developed AR Flashcard media reached a score of 94%, indicating a classification of "very feasible." These findings indicate that the AR-based Flashcard learning media in improving maharah kalam received very positive responses, which confirms its ability to engage students and improve students' maharah kalam.

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