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Development of Augmented Reality Video Media to Improve Mastery of *Tahiat Arabiya* Arabic Language Course Students

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Abstract

This study aims to develop Augmented Reality (AR) based learning media in the form of videos to improve the mastery of *Tahiyyat Arabiyah* vocabulary in students who take Arabic language courses. This media is designed to help students understand and memorize Arabic mufrodat more interactively and interestingly through the use of AR technology. The development model used in this research is ADDIE, which includes five stages: analysis, design, development, implementation, and evaluation. The research subjects involved early semester students of Arabic language courses at Institut Agama Islam Negeri Sheikh Nurjati Cirebon, with the participation of 53 students in the initial survey and 33 students and seven lectures in the product trial. The results showed that the use of AR video contributed significantly in improving the mastery of Arabic vocabulary, especially those related to *Tahiyyat Arabiyah*. Students who used this media showed improvement in terms of vocabulary mastery and proper pronunciation. In addition, AR video was considered very effective in terms of visual appearance and ease of use. Respondents rated this media as able to increase learning motivation and provide a more interactive learning experience compared to traditional methods. However, there are some technical challenges, such as device compatibility that only supports the Android system. This research makes a new contribution in the context of Arabic language learning and shows that AR technology has great potential to be adopted in foreign language learning more widely.

Keywords: Augmented reality video; mastery of Arabic language; vocabulary

Introduction

One of the key achievements of Arabic language courses is the ability of students to develop proficiency in four essential language skills: *maharatul istima'* (listening comprehension), *maharatul kalam* (speaking), *maharatul qira'ah* (reading), and *maharatul kitabah* (writing, encompassing both scientific and non-scientific texts). In order to achieve these four skills, it is essential that students have a comprehensive understanding of mufrodat (vocabulary).[1] This is a fundamental element for students in speaking, reading, and writing in Arabic. It is therefore evident that an introduction to vocabulary and basic terminology or greetings in Arabic is crucial for the acquisition of active communication skills in Arabic, whether written or oral. In practice, it is widely acknowledged that language learning must begin with vocabulary learning, as it is believed that students must possess a sufficient vocabulary in order to master language skills.

Successful interpersonal communication plays an important role in the effectiveness of *da'wah*, counselling, and education processes. However, data shows that not all students are proficient in delivering effective interpersonal communication. The development of this skill is closely related to improving students' self-concept and self-efficacy.

Learning media can be used to stimulate students' reasoning, interests, emotions, and skills or abilities and can accelerate the learning process. The results showed that the process and development of ArVo was conducted by Tsania Khoirunnisa based on 4 data collection techniques based on the ADDIE development model. Its effectiveness shows an increase in vocabulary mastery and proper pronunciation[2].

Based on the results of a temporary survey conducted by the research team to 53 students, there are several obstacles, including that they are less familiar with expressions in Arabic compared to expressions in other languages such as English, so using English is easier to insert in daily conversation than Arabic. In addition, the obstacles experienced are related to the lack of vocabulary and difficult to remember, which has an impact on the difficulty of translating and reading Arabic text without *harokat*. Another obstacle is the understanding of *nahwu sharaf* which is complicated so that it cannot compose good and correct Arabic sentences, as well as differences in letters that cause differences in meaning. As many as 42% thought that remembering Arabic

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[1] Ahmad Habibi Syahid, "Bahasa Arab Sebagai Bahasa Kedua (Kajian Teoretis Pemerolehan Bahasa Arab Pada Siswa Non-Native)," *ARABIYAT : Jurnal Pendidikan Bahasa Arab Dan Kebahasaaraban* 2, no. 1 (September 12, 2015): 86–97, https://doi.org/10.15408/a.v2i1.1797.

[2] Tsania Khoirunnisa and Mohammad Ahsanuddin, "The Design of Quartet Card Game Integrated with Augmented Reality for Sharf (Morphology) Learning Media," *Arabiyatuna: Jurnal Bahasa Arab* 8, no. 1 (May 27, 2024): 187, https://doi.org/10.29240/jba.v8i1.8790.

mufrodat, especially those related to greetings in Arabic or better known as *Tahiyyat Arabiyah*, would be more interesting if presented in the form of videos, especially by using new media such as bringing the virtual world into the real world, by turning image objects into 3-dimensional objects. According to some students, they will be faster and easier to remember and understand and more easily imitate it so that it is easy to apply in daily conversation. A total of 38.7% of students obtained mufrodat, especially the new *Tahiyyat Arabiyah* from Arabic modules, 20% from lecturers, 33% from videos such as YouTube, and 8.1% from learning experiences before entering college.

AR technology has been used in various learning contexts, ranging from science education, history, to foreign languages. For example, research conducted Faridi that the experimental results show that the AR-based learning environment has a significant positive impact on students' critical thinking and learning gains. The AR experience assisted students in visualizing the abstract concepts of Physics and improved their understanding[3], - Wong Guo Hui in his journal said that the proposed augmented reality (AR)-based learning application was well received by the participants, who found it interesting, attractive and easy to use. - The learning content, quizzes and games in the app were considered interactive, fun and exciting by the participants. - Overall, the participants were willing to recommend the proposed edutainment learning application to others[4]

In the context of language education, some previous studies have shown that AR can improve language skills, especially in terms of interactive visualization. Ilmawan Mustaqim in his research on AR-based learning media states that AR is able to combine the real world with the virtual world effectively, allowing students to learn languages more interactively. By displaying three-dimensional objects, AR can help students understand new vocabulary and the context of language use more deeply[5]

Ilmawan Mustaqim in his journal entitled Development of Augmented Reality-based learning media states that Augmented Reality is an application that combines the real world with the virtual world in two-dimensional or three-dimensional form projected in a real environment simultaneously. Augmented Reality is often also called tethered reality. He added that in a system there must

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[3] Harun Faridi et al., "A Framework Utilizing Augmented Reality to Improve Critical Thinking Ability and Learning Gain of the Students in Physics," *Computer Applications in Engineering Education* 29, no. 1 (January 2021): 258–73, https://doi.org/10.1002/cae.22342.

[4] the Multimedia University, Malaysia et al., "Novel Edutainment Learning Concept via Augmented Reality Approach," *International Journal of Information and Education Technology* 12, no. 8 (2022): 719–24, https://doi.org/10.18178/ijiet.2022.12.8.1676.

[5] Ilmawan Mustaqim, "Pengembangan Media Pembelajaran Berbasis Augmented Reality," *Jurnal Edukasi Elektro* 1, no. 1 (August 2, 2017), https://doi.org/10.21831/jee.v1i1.13267.

be advantages and disadvantages, including Augmented Reality. The advantages of Augmented Reality are as follows: 1) More interactive, 2) Effective in use, 3) Can be widely implemented in various media, 4) Simple object modeling, because it only displays a few objects, 5) Making it does not require too much cost, 6) Easy to operate. While the shortcomings of Augmented Reality are: 1) Sensitive to changes in viewing angle, 2) Few make, 3) Requires a lot of memory on the equipment used.

AR technology is also widely used in science learning to help students understand complex concepts that are difficult to visualize only through text or two-dimensional images. For example, in anatomy learning, AR allows students to see human organs in three-dimensional form, so that they can better understand the structure and function of these organs[6]. The same is also applied in history education, where augmented reality (AR) technology has shown significant potential in enhancing cultural heritage education and history learning experiences. AR applications have been developed to visualize 3D objects from museum collections and recreate artefacts that no longer exist, providing an interactive and immersive learning experience[7]

Augmented reality (AR) technology is an innovation that combines the real world with the virtual world, creating an immersive experience. Its advantage lies in its ability to combine real and virtual aspects, allowing the visualization of abstract concepts with complex relationships. As explained by Carmigniani et al. [8] AR presents a real-time display that can be direct or indirect, generated by a computer. The application of AR involves various innovative technologies, including mobile devices and computers. In this context, AR functions as a tool to convey information by utilizing data that has been scanned by a smartphone. One way of implementation is through the use of video as an introductory medium in the context of learning. This AR video system works by detecting images that use markers as the basis of its work.

Thus, AR creates an interface that combines real and virtual elements, providing a more interactive learning experience and easing the understanding of complex concepts through the utilization of modern technology.

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[6] Wan Aezwani Wan Abu Bakar et al., "GAAR: Gross Anatomy Using Augmented Reality Mobile Application," *International Journal of Advanced Computer Science and Applications* 12, no. 5 (2021), https://doi.org/10.14569/IJACSA.2021.0120520.

[7] Shinta Puspasari, Nazori Suhandi, and Jaya Nur Iman, "Evaluation of Augmented Reality Application Development for Cultural Artefact Education," *International Journal of Computing*, June 28, 2021, 237–45, https://doi.org/10.47839/ijc.20.2.2171.

[8] Julie Carmigniani et al., "Augmented Reality Technologies, Systems and Applications," *Multimedia Tools and Applications* 51, no. 1 (January 2011): 341–77, https://doi.org/10.1007/s11042-010-0660-6.

Augmented Reality (AR) involves the following steps:[9] The camera on the smartphone, which has gone through a calibration process, detects the markers contained in the teaching materials. Once the marker pattern is identified, the AR application on the smartphone will perform calculations to determine if the marker matches the database it holds. If there is a match, the information from the marker will be processed, resulting in a video display that matches the learning context.

The utilization of augmented reality in education has several reasons, as revealed by Billing Hurst in a study cited by Mardikaningsih. One of the main reasons is AR's ability to support interaction between real and virtual environments, creating an interface that provides users with a real and integrated experience.

Data taken from the journal of Pallikonda Subhashini[10] , an Assistant Professor at the Department of Computer Science and Engineering, Maturi Venkata Subba Rao Engineering College (of Osmania University), Hyderabad, mentions that Augmented Reality presents a wonderful setting for more interactive and engaging learning. The app focuses on text or significant 3-dimensional (3D) images or videos on the smartphone screen. It helps students by encouraging them to learn new ideas using graphical guidance. Besides its use in education, AR can also be used in commercial fields, tourism industry, games, and medicine.

However, research using AR in teaching Tahiyyat Arabiyah is still very limited. Most of the previous studies focus more on Arabic language teaching in general or on the use of AR in the context of science and technology learning. Therefore, this study has a new contribution by developing AR-based learning media to improve the mastery of Tahiyyat Arabiyah in Arabic courses at IAIN Sheikh Nurjati Cirebon. This approach is not only innovative in the method of presenting the material, but is also expected to increase student engagement and make it easier for them to remember and use vocabulary in daily interactions.

The main theory or grand theory that will be used in this research is comprehensive learning theory. This theory was developed by Knud Illeries. This theory is relatively new and accommodates various aspects of learning. It

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[9] Universiti Teknologi Malaysia et al., "Development of Augmented Reality Applications in Teaching and Learning for Topic of Current and Voltage Division for Technical and Vocational Education," *Journal of Technical Education and Training* 13, no. 3 (September 24, 2021), https://doi.org/10.30880/jtet.2021.13.03.012.

[10] Pallikonda Subhashini et al., "Augmented Reality in Education," *Journal of Information Technology and Digital World* 02, no. 04 (December 31, 2020): 221–27, https://doi.org/10.36548/jitdw.2020.4.006.

explains two basic processes and three dimensions of learning[11]. This theory assumes that in the learning process there are two different but integrated processes. These processes are external interactions between students and everything outside themselves or materials, and internal interactions between students and their psychology in the form of elaboration and acquisition. From the external aspect, learning involves many things, one of which is learning media. On the other hand, learning media also interacts with students or their internal interactions, both elaboration and acquisition. Socio-culture also plays an important role in students' external interaction, especially the rapid development of various aspects of life in the digital era. This era began with the industrial revolution 4.0 and society 5.0.

Based on the background that has been explained, this study aims to determine the results of the analysis of the needs of Augmented Reality Video digital media in improving the mastery of Tahiyyat Arabiyah in Arabic Language Subjects, the development of Augmented Reality Video teaching materials in improving the mastery of Tahiyyat Arabiyah in Arabic Language Subjects, and knowing student responses after using Augmented Reality Video digital media in improving the mastery of Tahiyyat Arabiyah in Arabic Language Subjects.

The development model used is the ADDIE development model. Robert Maribe Brach (2009) developed Instructional Design (Learning Design) with the ADDIE approach, which is an extension of ADDIE (Analyze, Design, Development, Implementation, Evaluation). Analyze relates to the activities of analyzing the work situation and environment so that it can be found what products need to be developed. Design is the activity of making and testing products, Development is making and testing products, Implementation is the activity of using products, and Evaluation assesses whether each step is in accordance with specifications or not.[12]

The research and development method is a research method used to produce certain products and test the effectiveness of these products (Sugiyono, 2012: 407). The research design used in this study is the ADDIE model development research design according to Robert Marribe Brach (20029). It has five stages in development, namely (Analyse, Design, Development, Implementation, Evaluation).[13]

The test subjects in the development of Augmented Reality Video teaching materials on improving the mastery of *Tahiyyat Arabiyyah* that have

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[11] Glorista Riwanti Pasaribu, "Pengaruh Penerapan Teori Belajar Gagne Terhadap Hasil Belajar Matematika," *NUCLEUS* 3, no. 1 (July 15, 2022): 64–69, https://doi.org/10.37010/nuc.v3i1.759.

[12] Branch R. M., *Instructional Design: The ADDIE Approach* (Germany: Springer Science & Business Media, 2009).

[13] Sugiyono, *Metode Penelitian Kuantitatif, Kualitatif, Dan R&D* (Bandung: Alfabeta, 2012).

been developed will be tested on early semester students who take Arabic language courses, which are institutional courses.

The study involved 53 students who participated in the initial survey. In addition, a product trial was conducted involving 33 intensive Arabic language students and 7 lecturers, The sample consisted of early semester students taking Arabic language courses at Institut Agama Islam Negeri *Sheikh Nurjati Cirebon*. The main focus was on non-Arabic language students who were required to take the course. The sample selection was done based on the research need to measure the mastery of *Tahiyyat Arabiyah* in this group who are considered to have limited mastery of the language, The developed Augmented Reality (AR) product was validated by several experts, including material experts, media experts, and linguists, all of whom have a minimum of Master's degree qualification and relevant experience. This ensured that the learning media met the expected standards in terms of content, design, and interactivity, The study used closed-ended questionnaires to collect data from respondents. This technique ensures structured data and facilitates statistical analysis and qualitative evaluation. The expert validation process and field trial provided empirical evidence of the effectiveness of AR learning media in improving the mastery of *Tahiyyat Arabiyah*.

The questionnaire in this study was prepared to measure the response and effectiveness of Augmented Reality (AR) learning media on students and lecturers of Arabic language. The questionnaire consists of 10 statements that evaluate various aspects related to the product, namely learning design, media display, software performance, and product benefits in learning.

The questionnaire development process was based on the evaluation of related literature that highlighted important components in the evaluation of technology-based learning products, especially AR media[14]. The questionnaire was adapted to evaluate several elements, such as :
(a)Learning Design: Measures the suitability of the learning design to the needs of students and lecturers. Media Display: Assessing the visual quality and presentation of material through AR applications. (b) Software Usability: Measuring technical performance, ease of use, and application compatibility on various devices. (c) Product Benefits: Measuring the extent to which the product provides benefits in the context of Arabic language learning. (d) In the pilot phase, the questionnaire was completed by 33 Arabic intensive students and 7 Arabic lecturers. In addition, comments and suggestions data were also collected as part of a more qualitative evaluation of the user experience.

[14] Mohammed A. M. AlGerafi et al., "Unlocking the Potential: A Comprehensive Evaluation of Augmented Reality and Virtual Reality in Education," *Electronics* 12, no. 18 (September 20, 2023): 3953, https://doi.org/10.3390/electronics12183953.

Data Analysis Technique

The development of digital augmented reality video media to improve the mastery of Tahiyyat Arabiyah, the data analysis used includes two main approaches: qualitative and quantitative.

Quantitative data will be obtained through (closed questionnaire) distributed to students and instructors. It includes structured questions with Likert scale (1-5). This technique will be used to measure the effectiveness of the Augmented Reality learning media development.

The statistical technique used for quantitative analysis includes descriptive statistics to describe the results of the assessment, such as measuring frequency, distribution, and mean of the Likert scale. These statistics will be used to assess the effectiveness of the material in improving the mastery of Tahiyyat Arabiyah, as well as the students' responses to aspects such as appearance, audio-visual quality.

Qualitative data is obtained from (expert validation) which includes media experts, material experts, and linguists. Input from these experts was used as material for product revision. Qualitative analysis techniques include (triangulation) of data, which combines various sources such as observation, interviews, and documentation records to understand the phenomenon under study in depth. (Triangulation of methods) was also used by comparing the results of questionnaires and group discussions (FGDs) to get a more comprehensive view.

In addition, coding is also used to categorize the results of interviews and suggestions from lecturers and experts, which are then processed into key information for improving and developing learning media. These two approaches help to provide a comprehensive picture of the effectiveness of Augmented Reality learning materials in improving students' mastery of Tahiyyat Arabiyah.

Findings and Discussion

This study examines the use of Augmented Reality (AR) Video media to improve students' mastery of *Tahiyyat Arabiyyah* in Arabic language courses at Institut Agama Islam Negeri Sheikh Nurjati Cirebon.

1. Results of Product Trial

a. Research Subjects: Product trials were conducted on 33 Arabic intensive students and 7 Arabic lecturers as user samples. This study aims to assess the response and effectiveness of using AR Video learning media in mastering *Tahiyyat Arabiyyah* vocabulary.

b. Respondents: Based on the questionnaire distributed, students and lecturers were asked to assess various aspects of the product such as learning design, media display, software usability, material, and application benefits in learning.

2. Main Findings

Quantitative Data

The following table shows the questionnaire results from students about the main aspects of the application:

Tabel. 1 The Assessment of the main aspects of the Augmented Reality (AR)

No	Aspects Assessed	Average Rating
1	Learning Design	4.5 / 5
2	Visual Quality	4.7 / 5
3	Application Uses	4.4 / 5
4	Material Suitability	4.6 / 5
5	Learning Benefits	4.8/ 5

Conclusions are drawn from the table that displays the assessment of the main aspects of the Augmented Reality (AR) Video application for improving mastery of *Tahiyyat Arabiyyah* are:

a. Learning Design, Students assess that the learning design presented through AR media is very good. With an average rating of 4.5 out of 5, this indicates that the learning media design has met their expectations. This design is considered attractive and in accordance with learning needs. Students feel helped by the interactive approach applied in AR, especially in mastering *Tahiyyat Arabiyyah.*

b. Visual quality is rated as excellent, with an average of 4.7. Students highly appreciated the visual appearance and animation in the AR Video. Clear images, easy-to-read text, and the integration of visual elements with the learning material are considered effective in helping them understand the material more easily. These qualities also help students stay focused during the learning process.

c. User-friendliness received an average rating of 4.4. The majority of students found the app quite easy to use, but there were some suggestions for improvement regarding compatibility with various devices such as iOS and improvements in the operation of the app on Android. Nevertheless, students generally felt that the app made it easier for them to study without having to use many additional devices or apps.

d. With an average rating of 4.6, the suitability of the material presented in the AR Video is rated very well by students. The *Tahiyyat Arabiyyah* learning

material presented through the application is considered in accordance with the learning objectives. Students feel that this application helps them learn daily greetings in Arabic more quickly and easily understood.

e. The benefits felt by students are very high, with an average rating of 4.8. They felt that the AR Video application had a significant impact on their ability to master *Tahiyyat Arabiyyah*. The use of AR technology is considered to provide a more enjoyable learning experience, and students feel more motivated to learn because of this innovative method.

This table shows that the AR Video app has excellent ratings in almost all aspects tested. In particular, students felt that the learning design, visual quality, suitability of the material, and learning benefits greatly supported their learning process. Although there were some suggestions related to improving the usability of the app, the app was generally rated very positively and was able to assist students in improving their mastery of *Tahiyyat Arabiyyah* effectively.

3. Students' Comments and Suggestions

a. Satisfaction level: The majority of students are satisfied with this application because it is able to provide innovative learning methods and facilitate the acquisition of Arabic.
b. Suggestions for improvement: Students suggested making the app more accessible to different types of devices and adding more interactive features to enhance the learning experience.

The results of the questionnaire show that more than 85% of students are satisfied with the use of AR Video in helping the learning process of .*Tahiyyat Arabiyyah*

Overall, this study shows that the development of AR Video media makes a positive contribution to the mastery of Arabic, especially in terms of the use of daily greetings (*Tahiyyat Arabiyyah*).

This research, which focuses on developing Augmented Reality (AR) media to improve the mastery of *Tahiyyat Arabiyah* in Arabic language courses, shows significant progress in line with various previous studies regarding the benefits of using AR in learning. Previous research by Ilmawan Mustaqim also underlines that AR is able to improve language understanding through interactive visualization that combines the real world with the virtual world.[15] This research supports the conclusion that AR can help students understand the context of language use in a more real and visually connected environment.

One of the key findings in this study was the improvement of mufrodat (vocabulary) acquisition especially related to Tahiyyat Arabiyah. This finding

[15] Mustaqim, "Pengembangan Media Pembelajaran Berbasis Augmented Reality."

supports research conducted by Faridi[16], where AR-based learning environments were shown to have a positive impact on students' critical understanding as well as improved language skills. In addition, the use of AR in language learning has also shown a positive impact in terms of student engagement and learning motivation, as found in a study by Wong Guo Hui[17], which showed that AR-based learning applications are engaging and effective.

This research adds a new contribution by focusing on Tahiyyat Arabiyah, which has not been widely discussed in previous research. Most previous research has focused more on the use of AR in the fields of science and technology, or in language teaching in general. As such, this research introduces an innovative approach in the context of teaching everyday speech in Arabic. However, there were also some barriers that did not fully match the initial hypothesis, especially in technical terms. Some students reported technical difficulties in using the app on various devices, especially on iOS, which necessitated further improvements on device compatibility.

One of the unexpected results of this study was the technical constraints of using AR apps on certain devices. In this study, although the AR app was rated very positively in terms of learning design and visual benefits, users reported that the app could only be installed on Android devices, and did not support some other device versions. This shows that although AR technology brings many advantages, there are still obstacles in the application of the technology that require improvement to be more inclusive for all platforms.

Overall, this research supports much of the previous literature regarding the effectiveness of AR in learning, but also adds a new dimension by focusing on the use of Tahiyyat Arabiyah. In addition, the technical obstacles encountered in implementing this application provide important insights for further improvements in the development of AR-based learning media.

The use of Augmented Reality (AR) media in Arabic language learning has significant practical implications, both for students, teachers, and educational institutions more broadly. Including:

a. In various educational institutions, from primary schools to universities, AR can be adopted to increase student engagement in other subjects, such as science, history and geography. This increased motivation can have a positive impact on learning outcomes in many subject areas.
b. AR can be adapted for other language learning such as English, Mandarin, or local languages. This would be especially useful for students learning a

[16] Faridi et al., "A Framework Utilizing Augmented Reality to Improve Critical Thinking Ability and Learning Gain of the Students in Physics."

[17] the Multimedia University, Malaysia et al., "Novel Edutainment Learning Concept via Augmented Reality Approach."

foreign or second language, as AR allows them to learn vocabulary in an interactive context.

c. Educational institutions can develop more flexible language learning programs, where students can learn according to their own schedule and pace. AR can be part of e-learning and blended learning, which combines face-to-face and online learning.
d. This AR technology can be applied in educational fields that require abstract or complex understanding, such as mathematics (e.g. geometry), physical science (visualization of physical laws), and biology (e.g. anatomy).
e. AR can be integrated into the national curriculum, where schools and universities can use AR-based applications for various subjects. Training programs for teachers and lecturers also need to be developed so that they can maximize the use of this technology in the teaching-learning process.
f. Broader development of AR applications for all devices enables easier access to learning content. With more platforms supported, educational institutions can reach more students, especially in remote or less developed areas, where technology may be the solution to education access challenges.

Research on the use of Augmented Reality (AR) in Arabic language learning at Institut Agama Islam Negeri Sheikh Nurjati Cirebon has several limitations that can affect the interpretation of the results, such as:

a. The sample used in this study consisted of 33 intensive Arabic language students and 7 lecturers; this number is relatively small and only involves one group of students in one institution. This may limit generalizability or the ability to extrapolate the results of the study to a wider population. The results of the study may not be generalizable to all students studying Arabic at other institutions or universities, The use of AR may not have the same effect on a larger group of students or outside the existing intensive learning context.
b. This study uses the ADDIE development model and closed questionnaires as the main method to evaluate students' and lecturers' responses to AR media. This method allows researchers to obtain quantitative data and some qualitative data from comments, but does not delve deeper into students' perceptions or experiences through in-depth interviews or focus group discussions (FGDs), the impact of the data obtained is mainly based on structured responses, which may not capture the nuances or richness of the learning experience of students in depth, this limitation may lead to response

bias, where students only provide answers that fit the available options without fully describing their experience with AR.

c. One of the main limitations identified is that the AR app can only be accessed through Android devices, and does not yet support iOS or other platforms. This limits the ability of students to access the app on the devices they own, especially for those using iOS-based devices, this limitation reduces the inclusivity and accessibility of AR technology, which may affect the effectiveness of learning for students with non-Android devices, the findings of positive results may only apply to Android users, while users of iOS or other devices may not have the same experience.
d. The AR developed in this study focused on Tahiyyat Arabiyah (colloquial greetings in Arabic), so the content is very specific, this limits the scope of the app in aiding the acquisition of other language skills, such as more complex grammar or the use of Arabic in academic and professional contexts, although the results were positive in the acquisition of Tahiyyat Arabiyah, the content limitations mean these results may not be extrapolated to other areas of Arabic language learning, such as reading academic texts or debating in Arabic, the narrow focus on one aspect of language may reduce the value of this app in a wider context.
e. The relatively short research time, including the product trial period, may affect the results of the study, students were only given limited time to use the AR application and provide their responses. This may limit the researcher's ability to measure the long-term effects of using AR in Arabic language learning, the results obtained may only reflect the initial effects of using AR and not consider the long-term impact on language acquisition or knowledge retention, the long-term impact on learning motivation, language acquisition, or language expertise cannot be accurately measured with limited time.
f. This study assessed the effectiveness of AR using questionnaires and expert validation, but there was no control test or comparison with another group using traditional learning methods without AR. This makes it difficult to determine the extent to which the use of AR is more effective than other methods in Arabic language learning, without a control group, researchers cannot definitively state that AR is the only factor that improves Arabic language acquisition, as other factors (such as intrinsic motivation or previous experience) may also play a role, this limitation also reduces the

strength of causality claims, as there is no direct comparison between students who use AR and those who do not.

Limitations in the sample, methods, technology implementation, and content of this study affect the extent to which the results can be generalized and applied beyond the study context. To improve the validity of the results and interpretations, further research needs to involve larger samples, more inclusive technology platforms, longer evaluation periods, as well as comparisons with other learning methods.

Conclusion

This study aims to develop and evaluate Augmented Reality (AR) media in improving the mastery of Tahiyyat Arabiyah (Arabic greetings) among students of Institut Agama Islam Negeri Sheikh Nurjati Cirebon. Based on the results of the study, AR proved to be effective in increasing learning motivation and vocabulary mastery, as well as making it easier for students to remember and use Tahiyyat Arabiyah in daily conversation. This shows that the use of AR technology can significantly support language learning by creating a more interactive and engaging environment for students.

However, the study also revealed some limitations, such as technical constraints that limited access to the app on non-Android devices as well as a scope limited to Tahiyyat Arabiyah, without exploring more complex language skills. In addition, the relatively short time of the study limited the ability to measure the long-term impact of using AR.

Based on the results of the study, the following are concrete recommendations that can be applied in the development of AR media and its application in the Arabic language teaching curriculum:

More Inclusive Application Development: Given the technical limitations that only allow AR applications to be accessed by Android users, it is highly recommended to expand device support to iOS and other platforms. This will increase the accessibility of AR media among students with different types of devices, making the learning experience more inclusive and equitable.

Expansion of Learning Content: AR apps can be further developed to include more diverse content, such as nahwu and sharaf (Arabic grammar) or language usage in academic and professional contexts. This will allow students to learn different aspects of the Arabic language, not just limited to vocabulary and colloquialisms.

Integration of AR Media in Arabic Language Curriculum: The application of AR in Arabic language learning needs to be formally integrated into the educational curriculum. AR can be part of the blended learning method,

where students can learn independently with the help of technology outside the classroom. This could enrich the learning experience and support more student-centered teaching.

Training for Teachers: To maximize the use of AR media, training for lecturers and teachers on how to effectively utilize AR in teaching is required. This will ensure that the technology can be implemented well in the classroom and outside the classroom.

To extend the findings of this study and further explore the potential use of AR technology in language learning, here are some suggestions for future research: (1) Studies with Larger and Diverse Samples: Future research needs to involve a larger and more diverse sample, including students from different levels of education and different institutions. This will increase the generalizability of the results and provide greater insight into the effectiveness of AR in various language learning contexts. (2) Use of AR for More Complex Language Skills: Future research could explore the use of AR to teach more complex sentence structures, application in academic writing, or advanced Arabic reading comprehension. This will broaden the scope of using AR in Arabic language teaching, covering more than just basic vocabulary acquisition. (3)Long-term Impact Measurement: Long-term research is needed to assess knowledge retention and the long-term impact of using AR. It is important to understand whether the initial motivation enhanced by AR can be maintained over time, and whether the use of this technology results in deeper and more sustained language acquisition. (4) Comparative Study between Traditional Learning Methods and AR: To ascertain the effectiveness of AR over traditional methods, future research could conduct comparative studies between classes using AR and classes using conventional teaching methods. This will provide stronger evidence as to whether AR is significantly more effective than traditional learning methods in the context of Arabic language learning. (5) By overcoming the limitations and following the recommendations above, AR media can be a very powerful tool to support Arabic language learning at various levels of education. Further development and integration of AR into the curriculum can help enrich students' learning experience, making learning more interactive, fun and effective in the long run.

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