

Development of Augmented Reality-Based Learning Media in Increasing the Interest in Learning Arabic for Grade VII Students of Madrasah Tsanawiyah

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Abstract

This research aims to develop augmented reality (AR)-based Arabic learning media using the Assemblr EDU application for grade VII students of Madrasah Tsanawiyah (MTs), as well as test the feasibility of the media and its relevance in increasing interest in learning Arabic. This research uses the research and development (R&D) method with the 4D (Define, Design, Develop, Disseminate) development model of Thiagarajan, Semmel, and Semmel. The data collection technique used observation, interviews with Arabic teachers in grade VII MTs Azzaky, Mr. Fuad Hadi, Lc., M.Pd., validation questionnaires of media experts and material experts, and questionnaires of students' learning interests after the use of media. The results of validation by media experts showed a feasibility percentage of 87.5% with the very feasible category, while the validation of material experts showed a percentage of 93.1% with the very feasible category. Limited implementation of AR media in grade VII A showed that students' interest in learning Arabic was in the high category on the indicators of attention, pleasure, engagement, and desire continued, with an overall average score of 3.50 on a scale of 4. These findings are in line with various international studies that confirm that AR can increase motivation, engagement, and meaningful learning experiences. Thus, AR-based Arabic learning media based on Assemblr EDU is declared feasible and relevant to support the increase in interest in learning Arabic for grade VII MTs students, and has the potential to be further developed in other themes and in other madrasah.

Keywords: *augmented reality, Assemblr EDU, Arabic learning media, learning interest, Madrasah Tsanawiyah*

Introduction

Arabic has a very important position in the Islamic education system in Indonesia. In madrasahs, especially Madrasah Tsanawiyah (MTs), Arabic is not only positioned as a foreign language, but also as a religious language that is the key to understanding the sources of Islamic teachings, classical books, and contemporary Islamic literature. The Arabic language curriculum at the MTs level mandates the development of four language skills (أربعة مهارات) namely مهارة الكلام, مهارة الكتابة, مهارة القراءة, مهارة الاستماع with a focus on mastery of mufradāt, simple sentence structure, and expressions used in daily life in the madrasah environment. However, in practice, various

research reports and field experiences show that Arabic language learning is still often faced with the problem of low student interest and motivation.

Students often complain that Arabic is difficult to learn, especially when it comes to memorizing vocabulary and understanding sentence structure. In some MTs, learning is still centered on the teacher with a mechanical method of lectures and mufradāt memorization assignments. The media used is generally limited to textbooks, whiteboards, and sometimes presentation slides. This has implications for monotonous learning activities and does not accommodate the needs and characteristics of today's students. In the perspective of contemporary learning theory, such conditions do not support the growth of students' interest and active involvement in learning (Heinich, Molenda, Russell, & Smaldino, 2002; Sadiman, Rahardjo, Haryono, & Rahardjito, 2010; Arsyad, 2014).

MTs students are currently dominated by a generation that in popular literature is called the Alpha generation, which is the generation born after around 2010. This generation has lived in an environment that is heavily influenced by digital technology, gadgets, and the internet since childhood. McCrindle and Fell (2018) explain that the Alpha generation is the first generation to be fully digital, who since toddlers have been used to interacting with touch screens, watching videos, and playing educational or entertainment games. Prensky (2001) calls this generation digital natives, which are generations that process information, learn, and communicate in a different way than the previous generation called digital immigrants. Bower, Howe, McCredie, Robinson, and Grover (2014) and Akçayır and Akçayır (2017) show that this digital generation has a strong preference for learning experiences that are visual-rich, interactive, and provide opportunities for active exploration, while they tend to be less interested in text-based learning and static lectures.

In the context of MTs Azzaky Buaran Pekalongan, the results of initial observations and interviews with grade VII Arabic teachers, Mr. Fuad Hadi, Lc., M.Pd., confirmed the gap between student characteristics and the still conservative Arabic language learning pattern. Students mostly have Android smartphones, are used to using social media and watching online videos, but these devices are rarely used as a learning medium in the classroom. Teachers revealed that they often face challenges in keeping students' attention when explaining Arabic materials such as mufradāt and qawāid. Students get bored easily and are less motivated to memorize the vocabulary presented from textbooks. In this kind of learning, interest in learning Arabic tends to be low, which is reflected in the attitude of students who are passive, reluctant to ask questions, and only memorize vocabulary when approaching formative assessments.

Theoretically, interest in learning is one of the most important affective factors in learning success. Schiefele (1991) explains that interest is a stable motivational orientation towards a domain characterized by attention, engagement, and relatively lasting pleasure. Hidi and Renninger (2006) developed a four-phase model of interest development, ranging from triggered situational interest, preserved situational interest, emerging individual interest, to developing individual interest. To spark students' situational interest, the learning experience needs to be designed in such a way that it is engaging, relevant, and positively challenging. Keller (2010) through the ARCS (Attention, Relevance, Confidence, Satisfaction) model emphasizes that attention, relevance, confidence, and satisfaction are components that must be met in order for learning motivation to

be maintained. In the context of learning Arabic, Slameto (2010) emphasized that interest in learning appears when students show a liking for the subject, concentrate their attention, be actively involved, and have a desire to continue learning (Hania et al., 2022; Hijriyah et al., 2022; Huda, 2016; Sya'bani & Anwar, 2023).

However, the use of more cutting-edge technologies such as augmented reality (AR) in Arabic language learning in MTs is still very rarely reported. In fact, in the international realm, AR has become one of the innovations that is widely researched in the context of education. Azuma (1997) defines AR as a technology that combines virtual objects with real environments in real time and is registered in three dimensions. Wu, Lee, Chang, and Liang (2013) suggest that in education, AR has great potential to create immersive, multimodal, and contextual learning experiences, for example by displaying 3D models on top of textbooks, or bringing up additional information when the camera is pointed at a specific object in a real environment.

Bacca, Baldiris, Fabregat, Graf, and Kinshuk (2014) through a systematic review of AR research in education found that most studies report the positive effects of AR on student motivation, engagement, and attitudes, in addition to its potential in visualizing abstract concepts. Radu (2014) conducted a meta-review and concluded that AR is generally superior to non-AR media in improving motivation and understanding of concepts, although he also noted the need for attention to cognitive overload and technical barriers. In Serio, Ibáñez, and Delgado Kloos (2013) show empirically that the use of AR in visual arts subjects significantly increases students' motivation on the dimensions of attention, relevance, confidence, and satisfaction. Dunleavy, Dede, and Mitchell (2009) and Billingshurst and Duenser (2012) affirm that AR, when integrated with good instructional design, can enhance students' cognitive and emotional engagement through immersive and participatory simulations.

In the context of learning foreign languages, Hsu (2017) developed an AR application for learning English vocabulary and found that the use of AR increases students' motivation to learn with various learning styles, while improving learning outcomes. Chen and Hsu (2020) show that mobile AR-based foreign language learning systems help students build strong associations between word forms, pronunciation, and visual context, thereby strengthening retention and increasing motivation. Ibáñez and Delgado-Kloos (2018) in their systematic review of AR for STEM learning also touched on the potential of AR in language learning, especially in presenting authentic contexts and multimodality-rich learning environments.

If these findings are placed in the context of learning Arabic at MTs Azzaky Buaran Pekalongan, then AR has the potential to be a solution to the low interest in learning of students, especially in mufradāt materials and class expressions. Through AR, vocabulary that has only been displayed as a row of words in books can be visualized in the form of 3D objects, equipped with Arabic text in place, transliteration if needed, and audio pronunciation. Students can scan a card or page of a book with their smartphone to "bring to life" the vocabulary on the screen, making the learning experience more like a game (gamified) that blends in with the real world. This learning model is very much in tune with the characters of the Alpha generation who are used to interacting with screens and interactive digital content (McCrindle & Fell, 2018; Prensky, 2001).

In recent years, platforms such as Assemlr EDU have emerged as practical solutions that allow teachers to develop AR content without programming skills. Assemlr EDU (Assemlr Edu,

2023) allows users to upload images as markers, add 3D objects, text, audio, and links, and then share that content with students via class code or links. The relatively intuitive interface and availability of a library of 3D objects make this platform suitable for teachers in schools and madrassas who want to start experimenting with AR. This potential is the basis for the selection of the EDU Assemblr as a media development platform in this study.

By paying attention to what happened at MTs Azzaky Buaran Pekalongan, it is clear that there is a need as well as an opportunity to develop AR-based Arabic learning media that is specific to MTs grade VII students. The gap that arises is the absence of studies that systematically develop, validate, and test the implementation of AR media for Arabic language learning in MTs, especially with the theme of at-ta'aruf (introduction) which is an important part of Arabic language learning achievements.

Departing from this background, this research is directed at the development of augmented reality-based Arabic learning media using the Assemblr EDU application for grade VII students of MTs Azzaky Buaran Pekalongan. The specific purpose of the study is to describe the media development process with a 4D model, assess the feasibility of media through validation of media experts and subject matter experts, and examine the relevance of these media to the development of students' interest in learning Arabic. In this way, the research is expected to make a conceptual contribution to the development of Arabic language learning technology and a practical contribution in the form of AR media products that are ready to be used and replicated in other madrasahs.

Methods

Research Design

This research uses a research and development (R&D) approach, which is a research approach oriented to the development of educational products through a series of systematic steps that include preliminary studies, design, prototype development, trials, and product improvements (Borg & Gall, 1983; Sugiyono, 2017).

Research Procedures

The development model used is the 4D model introduced by Thiagarajan, Semmel, and Semmel (1974). This model consists of four stages, namely Define (define), Design (design), Develop (development), and Disseminate (disseminate). At the definition stage, the researcher conducted a needs analysis by reviewing the MTs Arabic curriculum, syllabus, textbooks, and observing Arabic language learning in grade VII MTs Azzaky Buaran Pekalongan. Observations were made at several meetings to obtain an overview of the learning methods used, the media used, the level of student participation, and the obstacles faced by teachers and students. In this stage, the researcher also conducted a semi-structured interview with the Arabic teacher of grade VII, Mr. Fuad Hadi, Lc., M.Pd., to explore his perception of students' learning interests and difficulties in learning Arabic.

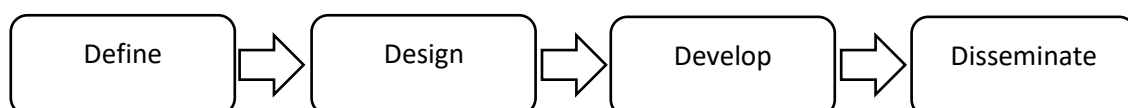


Figure 1. Stages of 4D Model Development (Thiagarajan, Semmel and Semmel, 1974)

The design stage is carried out after the needs are identified. The researcher focuses the development of the media on mufradāt material and simple expressions with the theme "التعارف" (at-ta'aruf) which became one of the initial themes in the Arabic textbook for grade VII. Learning objectives are formulated based on the KMA 183/2019 curriculum for Arabic MTs, especially basic competencies that require students to be able to recognize and use vocabulary and expressions related to their learning environment. Based on these objectives, the researcher compiled a list of vocabulary and expressions, then designed the form of AR representation to be created in the EDU Assembly, including specifying markers (picture cards or worksheet pages), 3D objects, Arabic text and audio pronunciation. At this stage, researchers also began to design scenarios for the use of media in the classroom, for example through card scanning activities by students, "guess vocabulary" games, joint pronunciation exercises, and simple dialogues that utilize vocabulary displayed through AR.

The development phase includes prototyping AR media on the Assemblr EDU platform and the preparation of research instruments. The prototype is developed by uploading a pre-designed image of the marker, connecting it to the relevant 3D object, and adding Arabic text along with audio pronunciation. Each marker when scanned on the smartphone screen will bring up 3D objects, text, and audio buttons. Some scenes are designed to present a more complete context of the classroom, such as a classroom display with desks, chairs, and whiteboards, so that students can relate vocabulary to the context as a whole.

At the same stage, research instruments are prepared for the purpose of validating and measuring students' learning interests. The media and material validation instruments were compiled in the form of a questionnaire with a four-point Likert scale, from 1 (not feasible) to 4 (very feasible). The preparation of the questionnaire is preceded by the determination of a blueprint that includes aspects, indicators, and the number of items per indicator, as recommended in the development of educational research instruments (Creswell, 2012; Sugiyono, 2017).

The media validation questionnaire grid contains four aspects, namely visual appearance, technical aspects, interactivity, and ease of use. Each aspect is outlined into indicators and statement items.

The total items in the media validation questionnaire are 20 items. Each item is graded using a scale of 1–4. The material validation questionnaire grid contains four aspects, namely the suitability of the material with the curriculum, the correctness of the language, the relevance of the material to the needs of students, and the integration of the material with AR media.

The total items in the material validation questionnaire are 18 items. In addition to the validation questionnaire, the researcher also compiled a questionnaire on students' interest in learning Arabic after the use of AR media. The interest questionnaire grid was compiled referring to the indicators of learning interest according to Slameto (2010) and Hidi and Renninger (2006), namely attention, pleasure, involvement, and desire to continue. Each indicator is represented by four statement items, making a total of 16 items.

Ensuring the content validity of the instrument is carried out through the study of concepts by material experts and media experts alike. They assess the conformity of items with indicators

and provide editorial improvement input if needed. This approach is in line with the recommendations of Creswell (2012) and Sugiyono (2017) that educational research instruments should pass expert assessments before being used in the field.

Data Collection Tenhnique (s)

The subjects of the media trial were 22 students of class VII A MTs Azzaky Buaran Pekalongan. The Arabic teacher, Mr. Fuad Hadi, Lc., M.Pd., played a role as a partner in the implementation of media in the classroom. Primary data on the study were obtained from observations of Arabic language learning activities before and after the use of AR media, interviews with teachers and several students, media and material validation questionnaires, and questionnaires of students' learning interests after the use of media. Secondary data was obtained from curriculum documents, syllabus, textbooks used at MTs Azzaky, as well as articles and books related to AR, learning media, and learning interests.

Data collection is carried out after AR media products go through the initial validation and revision stages. The media trial was carried out in several Arabic learning meetings with "التعارف" (at-ta'aruf). Students are asked to install the Assemblr EDU application on their smartphones, then the teacher introduces how to scan markers and access AR content. The learning process is observed with a focus on indicators of student interest and engagement. After several meetings, a learning interest questionnaire is distributed to be filled out individually.

Data Analysis Technique

Data analysis was carried out descriptively, qualitatively, and quantitatively. Qualitative data from observations and interviews were analyzed through the process of reduction, display, and drawing conclusions as stated by Miles, Huberman, and Saldaña (2014). Quantitative data from the expert validation questionnaire was calculated by adding up the score of each item, then percentaged by the formula: eligibility percentage = (maximum score/score) $\times$ 100%. The percentage is then interpreted with criteria adapted from Sugiyono (2017), where the percentage above 81% is categorized as very feasible. The data of the learning interest questionnaire was analyzed by calculating the average score of each indicator and the general average, then categorized as low, medium, or high based on the score range that had been set.

The validity of the findings is maintained through triangulation of techniques and sources by comparing the results of observations, interviews, and questionnaires. Expert validation of products and instruments is another form of validity checking, in accordance with the principle of development research which emphasizes that products must pass expert tests before being field-tested (Plomp, 2013; Sugiyono, 2017).

Results and Discussion

The results of this study include a description of the process of developing augmented reality-based Arabic learning media, the results of media and material validation tests, and the relevance of these media to the development of Arabic learning interest in grade VII students of MTs Azzaky Buaran Pekalongan.

Define

The media development process that follows the 4D model starts from the definition stage. At this stage, observation of Arabic learning shows that the teacher, Mr. Fuad Hadi, Lc., M.Pd., delivers mufradāt material and class expressions by reading from books and asking students to repeat them orally or in writing. Some students seem less enthusiastic; They are easily distracted by gadgets that are often hidden under the desk, and only a few students actively ask questions. The use of visual media such as picture cards is only occasionally carried out and is not systematic. Interviews with teachers revealed that she realizes the importance of engaging media to arouse students' interest, but limited time and technological skills are a barrier to developing more sophisticated digital-based media.

The results of the analysis of the Arabic textbook for Grade VII students show that the theme "التعارف" (at-ta'aruf) is one of the important themes, because it is the basis for daily interaction in the madrasah. The mufradāt covered in this theme is also relatively concrete, such as getting to know oneself, others, greetings, asking how things are going, etc., so it is very suitable to be visualized in the form of 3D objects through AR. This consideration is in line with the principle of multimedia learning Mayer (2009) which states that learning will be more effective when verbal information is combined with relevant visual representations.

Design

At the design stage, the researcher compiles a list of mufradāt and expressions to be entered into the AR media, then designs a form of representation for each item. For example, a hiwār (conversation) is represented by the object of two people asking each other how they are doing, and appears above a marker when scanned through a smartphone camera. Next to the 3D object, Arabic text is displayed and an audio button that when touched will play the pronunciation of the word. Thus, students can hear pronunciation, see the shape of objects, and read text simultaneously. This kind of design is expected to facilitate the process of association and dual coding between visual and verbal information, which according to Mayer (2009) and Chen and Hsu (2020) contributes to increased retention and comprehension.



Develop

The main menu consists of a material menu, a learning objective menu, a practice question menu, and a developer profile menu, all of which can be clicked to the next scene. The background used is also made more attractive to students by having building objects, student and teacher objects, parks, and backsound. In addition, in the material scene, a conversation between azam and naufal is presented which is represented in interesting 3d objects. Hiwār material is inserted into the annotated text, when the annotation is clicked it will appear a conversation display in Arabic, as seen in figure 4.



Figure 4. Hiwār Material Menu Display

Media expert, Ahmad Faridh Ricky Fahmy, M.Pd., examined media prototypes in terms of appearance, technical aspects, interactivity, and ease of use based on the grids in Table 1. He filled out the questionnaire by giving a score of 1-4 on each item. The results of the score calculation show that the total score obtained is 70 out of a maximum score of 80, so the percentage of media feasibility can be calculated as 87.5%. The recapitulation of the results of media validation per aspect is shown in Table 1.

Table 1. Results of Media Expert Validation of AR-Based Arabic Learning Media

Aspects	Maximum Score	Scores Obtained	Percentage (%)	Category
Visual display	20	17	85,0	Highly feasible
Technical aspects	20	18	90,0	Highly feasible
Interactivity	20	17	85,0	Highly feasible
Ease of use	20	18	90,0	Highly feasible
Total	80	70	87,5	Highly feasible

Descriptively, the media expert assessed that the visual appearance of the media was attractive and in accordance with the character of MTs students. In terms of technical aspects, the media is considered quite stable when tested on several devices, the marker scanning process runs smoothly, and the audio pronunciation sounds clear. Interactivity is considered adequate because students can touch objects, play audio, and switch between scenes easily. Ease of use is also highly rated, as the steps of use can be quickly understood by teachers and students who are using Assemblr EDU for the first time. Some of the suggestions for improvements proposed, such as the addition of a short instruction page at the beginning and the simplification of some icons, were then accommodated by the researchers in the revision of the prototype.

Material expert, Dr. Muhamad Jaeni, M.Pd., M.Ag., assessed Arabic content in the media based on the grid in Table 2. He gave a score on each item of the questionnaire which included the suitability of the material with the curriculum, correctness of the language, relevance of the material

to the needs of students, and integration of the material with the AR format. The results of the calculation showed that the total score obtained was 67 out of a maximum score of 72, so that the percentage of material feasibility was 93.1%. The recapitulation of the results of the material validation per aspect is shown in Table 2.

Table 2. Results of Material Expert Validation of Arabic Language Materials in AR Media

Aspects	Maximum Score	Scores Obtained	Percentage (%)	Category
Compatibility with the curriculum	16	15	93,8	Highly feasible
Language correctness	20	19	95,0	Highly feasible
Relevance of the material	20	18	90,0	Highly feasible
Integration with AR media	16	15	93,8	Highly feasible
Total	72	67	93,1	Highly feasible

From his qualitative comments, the material expert stated that the selection of mufradāt and expressions was in harmony with the basic competencies of Arabic class VII. The vocabulary chosen is a vocabulary that is often found in the classroom and school environment, so it is relevant for students. The language structure used in the example of expression is also considered simple and communicative, according to the level of ability of novice students. Some minor corrections related to imprecise meanings in some words and translation adjustments to certain terms were immediately corrected by the researcher. The integration between content and AR media is considered good; 3D visual representations help clarify the meaning of vocabulary and provide a strong context.

The results of validation of media and material experts that show the overall "very feasible" category are in line with the eligibility criteria for educational products in development research (Sugiyono, 2017; Plomp, 2013). Thus, the AR media developed in this study is not only technically feasible and substantive, but also in line with the quality standards used in similar studies.



Figure 5. Question Menu Display in Scene 3

Disseminate

After the media was revised based on expert input, the limited implementation stage was carried out in class VII A MTs Azzaky Buaran Pekalongan. In several learning meetings with the theme "التعارف" (at-ta'aruf), teachers use AR media as the center of learning activities. Students seemed enthusiastic when asked to install and open the Assemblr EDU application, then scanned the marker cards that were distributed. Observations show that when a 3D object appears on the screen accompanied by Arabic text and audio, many students show expressions of awe and spontaneously mimic the pronunciation of the spoken vocabulary.

The classroom atmosphere that is usually relatively passive has turned into more dynamic. Students discuss with their peers how to operate the app, show each other displays on each other's screens, and help each other when someone has technical difficulties. The teacher plays the role of directing activities, for example by asking students to show certain objects in class using Arabic, or by holding a game of "who finds and names the three vocabulary words shown by the teacher" game. In the context of motivation and interest theory, this high level of physical and social involvement can be understood as an indication of increased situational interest, as explained by Hidi and Renninger (2006) and Dunleavy et al. (2009).

After several meetings, a learning interest questionnaire was distributed to 22 students to fill out. The scores obtained on each item were then processed to obtain an average on each indicator, namely attention, pleasure, involvement, and desire to continue. The results of the average calculation are presented in Table 3.

Table 3. Average Students' Arabic Learning Interest Score after Using AR Media

Indicator	Average Score (1–4)	Category
Attention	3,45	High
Sense of pleasure	3,60	High
Involvement	3,40	High
The desire continues	3,55	High
General average	3,50	High

The interpretation of the categories is based on the average score range, where a score of 3.26–4.00 is categorized as high interest, 2.51–3.25 as moderate interest, and 1.00–2.50 as low interest. Table 3 shows that all four indicators of interest are in the high category, with an overall average score of 3.50. The indicator of happiness obtained the highest score, which was 3.60, followed by the desire to continue with a score of 3.55. This shows that students feel happy when learning Arabic using AR media and have a desire to use the same media in other materials. The attention and engagement indicators also showed high scores (3.45 and 3.40), indicating that during learning with AR, students tend to focus on participating in activities and being actively engaged. In a brief interview after filling out the questionnaire, some students stated that *"they were more excited when they knew that learning Arabic would use AR"*. They feel that learning by "scanning" cards and seeing objects appear on the screen is much more interesting than just reading a book. Some students admitted that it was easier to remember vocabulary because they could see objects

and hear pronunciation while reading Arabic writing. One of the students said that he was usually lazy to memorize mufradāt, but with this medium, he felt like he was playing a game and did not realize that he was actually learning.

Arabic teacher, Mr. Fuad Hadi, also reflected that AR media has shifted the role of teachers from just conveying information to being facilitators who direct students' exploration activities. He acknowledged that the classroom atmosphere has become more lively and requires good classroom management to keep activities directed, as also noted by Akçayır and Akçayır (2017) about the challenges of using AR in the classroom. However, in general, he assessed that AR has a positive influence on students' attitudes and interest in Arabic.

Within the framework of Hidi and Renninger's (2006) theory of learning interest, the above data shows that AR media has succeeded in triggering situational interest which is characterized by increased students' attention and curiosity towards the material being studied. A learning experience that is fun, relevant to their digital lives, and involves active exploration through gadgets acts as a trigger for this interest. If this kind of experience is pursued repeatedly and consistently across a variety of themes, a nurtured situational interest has the potential to develop into an individual interest in a more stable and profound Arabic language.

The findings of this study are in line with the results of international research on the use of AR in learning. Di Serio et al. (2013) reported that the use of AR in art lessons significantly increased student motivation compared to traditional approaches. Bacca et al. (2014) in their systematic review concluded that AR is consistently associated with increased student motivation, engagement, and positive attitudes. Radu (2014) also showed that the advantages of AR over non-AR media are most prominent in terms of motivation and attitude. In the context of language learning, Hsu (2017) and Chen and Hsu (2020) show that AR helps students learn vocabulary in a more engaging and meaningful way, thereby improving motivation and learning outcomes. AR can be seen as a further development that not only presents text, images, and sounds in a flat screen, but also integrates that content with the real environment through immersive experiences. The results of this study reinforce the assumption that when the principles of instructional design and characteristics of the Alpha generation are taken into account, AR can be a very effective medium for fostering interest in learning Arabic in MTs.

Conclusion

This research has developed and tested augmented reality-based Arabic language learning media using the Assemblr EDU application for grade VII students of Madrasah Tsanawiyah Azzaky Buaran Pekalongan. Media development follows a 4D model that includes the stages of definition, design, development, and dissemination. At the definition stage, it was found that Arabic learning at MTs Azzaky is still dominated by traditional methods, while students as the Alpha generation have strong learning preferences for interactive and visual digital media. The design stage produced an AR media concept that focused on mufradāt material and phrases themed "التعارف" (at-ta'aruf), with 3D object representations, Arabic texts, and audio pronunciation that can be accessed through marker scanning using a smartphone.

The development stage produces a media prototype which is then validated by media experts and subject matter experts using a questionnaire with a clear grid. The validation results

showed that the media had a very high level of eligibility, with a feasibility percentage of 87.5% from the media point of view and 93.1% from the material point of view. The aspects of appearance, technicality, interactivity, and ease of use are considered very good, as well as aspects of conformity with the curriculum, correctness of language, relevance of the material, and integration with the AR format. Therefore, the AR-based Arabic learning media developed is stated to be very feasible for use in learning Arabic at MTs.

Limited implementation in class VII A MTs Azzaky shows that AR media contributes positively to students' interest in learning Arabic. The learning interest questionnaire showed that all four indicators of attention, pleasure, engagement, and desire continued in the high category, with an overall average score of 3.50 on a scale of 4. Observation and interview data corroborated that students appeared more enthusiastic, focused, and active when learning to use AR media, and expressed a desire to use similar media in other materials. These findings are consistent with learning interest theory and various international studies that confirm that AR can increase motivation and learning engagement.

Thus, it can be concluded that augmented reality-based Arabic learning media developed using Assemblr EDU has proven to be feasible and relevant in increasing the interest in learning Arabic for grade VII students of MTs Azzaky Buaran Pekalongan. It combines the power of multimodal representation (3D visuals, text, audio) with interactive experiences that fit the characteristics of the Alpha generation. This research makes an important contribution to the development of Arabic language learning technology in Indonesia, as well as providing a practical example of how AR can be integrated into learning in madrasas.

References

- Akçayır, M., & Akçayır, G. (2017). Advantages and challenges associated with augmented reality for education: A systematic review of the literature. *Educational Research Review*, 20, 1–11. <https://doi.org/10.1016/j.edurev.2016.11.002>
- Arsyad, A. (2014). *Media pembelajaran* (Revisi). RajaGrafindo Persada.
- Assemblr Edu. (2023). *Assemblr EDU* [Mobile application software]. Assemblr. <https://edu.assemblrworld.com>
- Azuma, R. T. (1997). A survey of augmented reality. *Presence: Teleoperators & Virtual Environments*, 6(4), 355–385.
- Bacca, J., Baldiris, S., Fabregat, R., Graf, S., & Kinshuk. (2014). Augmented reality trends in education: A systematic review of research and applications. *Educational Technology & Society*, 17(4), 133–149.
- Billinghurst, M., & Duenser, A. (2012). Augmented reality in the classroom. *Computer*, 45(7), 56–63. <https://doi.org/10.1109/MC.2012.111>
- Borg, W. R., & Gall, M. D. (1983). *Educational research: An introduction* (4th ed.). Longman.
- Bower, M., Howe, C., McCredie, N., Robinson, A., & Grover, D. (2014). Augmented reality in education – Cases, places and potentials. *Educational Media International*, 51(1), 1–15. <https://doi.org/10.1080/09523987.2014.889400>

- Chen, C.-M., & Hsu, C.-L. (2020). An innovative augmented reality-based mobile learning system for improving vocabulary learning performance and motivation of EFL students. *Interactive Learning Environments*, 28(6), 695–711. <https://doi.org/10.1080/10494820.2018.1546748>
- Creswell, J. W. (2012). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (4th ed.). Pearson.
- Deci, E. L., & Ryan, R. M. (2000). The “what” and “why” of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, 11(4), 227–268.
- Di Serio, Á., Ibáñez, M. B., & Delgado Kloos, C. (2013). Impact of an augmented reality system on students’ motivation for a visual art course. *Computers & Education*, 68, 586–596. <https://doi.org/10.1016/j.compedu.2012.03.002>
- Dunleavy, M., Dede, C., & Mitchell, R. (2009). Affordances and limitations of immersive participatory augmented reality simulations for teaching and learning. *Journal of Science Education and Technology*, 18(1), 7–22. <https://doi.org/10.1007/s10956-008-9119-1>
- Eccles, J. S., & Wigfield, A. (2002). Motivational beliefs, values, and goals. *Annual Review of Psychology*, 53, 109–132. <https://doi.org/10.1146/annurev.psych.53.100901.135153>
- Hania, I., Baroroh, R. U., Rahmatan, M., Imawan, Y., & others. (2022). DEVELOPMENT OF CEFR-BASED QOWA’ID LEARNING EVALUATION TOOL WITH THE HELP OF WORDWALL INTERACTIVE GAMESTO IDENTIFY STUDENTS’UNDERSTANDING. *Alsinatuna*, 8(1), 65–83.
- Heinich, R., Molenda, M., Russell, J. D., & Smaldino, S. E. (2002). *Instructional media and technologies for learning* (7th ed.). Merrill Prentice Hall.
- Hidi, S., & Renninger, K. A. (2006). The four-phase model of interest development. *Educational Psychologist*, 41(2), 111–127. https://doi.org/10.1207/s15326985ep4102_4
- Hijriyah, U., Aridan, M., Mizan, A. N., Dealintang, A., & Yuniarti, L. (2022). Development of Digital Comic Media for Learning Qira’ah for Fifth Grade Students of Madrasah Ibtidaiyah. *Arabiyatuna: Jurnal Bahasa Arab*, 6(2 November), 693–710.
- Hsu, T.-C. (2017). Learning English with augmented reality: Do learning styles matter? *Computers & Education*, 106, 137–149. <https://doi.org/10.1016/j.compedu.2016.12.007>
- Huda, K. (2016). Tatw\=ir Mādah Mahārat Al-Kalām ‘Alā āsās Tandur f\=i Markaz Tarq\=iyati al-Lughah bijāmi ‘ah Sulṭān Shar\=if Qāsim Al-Islām\=iyah Al-Hukūm\=iyah Riau. *Alsinatuna*, 1(2), 138–149.
- Ibáñez, M. B., & Delgado-Kloos, C. (2018). Augmented reality for STEM learning: A systematic review. *Computers & Education*, 123, 109–123. <https://doi.org/10.1016/j.compedu.2018.05.002>
- Keller, J. M. (2010). *Motivational design for learning and performance: The ARCS model approach*. Springer.
- Krapp, A. (2002). Structural and dynamic aspects of interest development: Theoretical considerations from an ontogenetic perspective. *Learning and Instruction*, 12(4), 383–409. [https://doi.org/10.1016/S0959-4752\(01\)00011-1](https://doi.org/10.1016/S0959-4752(01)00011-1)
- Mayer, R. E. (2009). *Multimedia learning* (2nd ed.). Cambridge University Press.
- McCrindle, M., & Fell, A. (2018). *Generation Alpha: Understanding our children and helping them thrive*. Hachette.

- Miles, M. B., Huberman, A. M., & Saldaña, J. (2014). *Qualitative data analysis: A methods sourcebook* (3rd ed.). SAGE.
- Plomp, T. (2013). Educational design research: An introduction. In T. Plomp & N. Nieveen (Eds.), *Educational design research - Part A: An introduction* (pp. 11–50). SLO.
- Prensky, M. (2001). Digital natives, digital immigrants. *On the Horizon*, 9(5), 1–6. <https://doi.org/10.1108/10748120110424816>
- Radu, I. (2014). Augmented reality in education: A meta-review and cross-media analysis. *Personal and Ubiquitous Computing*, 18(6), 1533–1543. <https://doi.org/10.1007/s00779-013-0747-y>
- Sadiman, A. S., Rahardjo, R., Haryono, A., & Rahardjito. (2010). *Media pendidikan: Pengertian, pengembangan, dan pemanfaatannya* (Revisi). RajaGrafindo Persada.
- Schiefele, U. (1991). Interest, learning, and motivation. *Educational Psychologist*, 26(3–4), 299–323. <https://doi.org/10.1080/00461520.1991.9653136>
- Slameto. (2010). *Belajar dan faktor-faktor yang mempengaruhinya* (Revisi). Rineka Cipta.
- Sugiyono. (2017). *Metode penelitian pendidikan: Pendekatan kuantitatif, kualitatif, dan R&D*. Alfabeta.
- Sya'bani, M. Z., & Anwar, K. (2023). Development of a Learning Management System Using Moodle in the Arabic Language Education Study Program/Pengembangan Learning Management System menggunakan Moodle pada Program Studi Pendidikan Bahasa Arab. *Loghat Arabi: Jurnal Bahasa Arab Dan Pendidikan Bahasa Arab*, 4(2), 245–266.
- Thiagarajan, S., Semmel, D. S., & Semmel, M. I. (1974). *Instructional development for training teachers of exceptional children: A sourcebook*. Indiana University.
- Wu, H.-K., Lee, S. W.-Y., Chang, H.-Y., & Liang, J.-C. (2013). Current status, opportunities and challenges of augmented reality in education. *Computers & Education*, 62, 41–49. <https://doi.org/10.1016/j.compedu.2012.10.024>