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Digital Augmented Reality (AR) Tahsin Development of *Makharijul-Huruf* Learning

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Abstract. The activity of reading the Al-Qur'an is an important lesson that must be understood by every Muslim because it is a guide in life and is of value in worship. The process of learning to read the Al-Qur'an is currently often ignored because it is covered by technological dynamics and is considered not too important with Latin readings. So this study is intended to present products in media development in learning makharijul than al-Qur'an letters with the Tahsin Digital Augmented Reality android application platform. This research goes through the stages of conducting research with the type of R&D and the Borg and Gall model. After going through several processions, it can be found in the results of this study that the media developed in the procession of learning makharijul letters in this Augmented Reality digital tahsin application can be accessed on the Play Store on the Android platform. Based on comments from experts, namely tahsin experts and experts in the field of technology, it has been shown that this application can be categorized as very valid and can be used in supporting the learning of makharijul letters, because of Augmented Reality technology which is unique in the delivery of each letter, then also equipped with animations and audio samples from scientifically verified experts. The Tahsin Digital Augmented Reality application can be used by anyone from basic education to higher education.

Keywords: Learning; Makharij al-Huruf; Digital Tahsin; Augmented Reality

Introduction

Al-Qur'an is the name of the holy book that was revealed to the Prophet Muhammad SAW by Allah SWT as one of the unmatched bounties for the entire universe. It contains gathered spiritual truths that act as direction and rules for our life.[1] For the benefit of anybody who reads, believes, and puts it into practice. The Qur'an is not only the most recent holy book revealed by Allah SWT, but it also contains all the key principles of Shari'a that were included in the earlier holy books. Therefore, everyone who accepts the Qur'an will develop a greater love for Allah SWT, the universe's inhabitants, and reading, remembering, comprehending, and studying it.[2]

Believer is obligated to study the Al-Qur'an in terms of Qira'ah al-Qur'an, Tafsir Al-Qur'an, Study of the Al-Qur'an, and Translation of the Al-Qur'an due to the relevance of the Al-Qur'an in their lives. Of course, memorizing the Al-Qur'an should be a top priority for scholars and students at Islamic tertiary institutions. Because of this, every state-run Islamic institution in Indonesia requires students to take Qira'ah al-Qur'an as one of its required courses. According to the Decree of the Director General of Islamic Education No. 102 of 2019, all students enrolled in general study programs at State Islamic Universities throughout Indonesia are required to take Qira'ah al-Qur'an as one of the courses offered there.[3] Thus, it is desired that students would graduate with the skills necessary to read and write the Al-Qur'an. In light of this, students must be able to read the Al-Qur'an accurately and in line with the principles of tajwid science.

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[1] Abu Ya'la Kurnaedi, *Tajwid Lengkap Assyafi'i*, (Jakarta: Pustaka Imam Syafi'i, 2013). hlm.6

[2] Muhammad Zaini, *Pengantar 'Ulumul Qur'an Dan 'Ulumul Hadis*. (Banda Aceh : Penerbit PeNA, 2016). hlm. 327.

[3] Keputusan Dirjen Pendis Nomor 102 Tahun 2019 Tentang Standar Keagamaan Pendidikan Tinggi Keagamaan Islam

In contrast to the reality encountered by State Islamic tertiary institutions generally, it is regrettable that many of their students' abilities to read the Al-Qur'an go against the guidelines based on excellent and accurate standardization of tajwid knowledge. This is a result of prior educational experiences, the surroundings, and even the infrequent decision to once again read and study the Qur'an. The results of the tests that the author administered during the course's teaching make it clear that many students are still misreading *Ta'awuz* and *Basmalah, Mad,* long and short readings that are incorrect according to lengths 2, 4, and 6, buzzing and not, and other passages. The hum still has no effect, and if you compare the thickness and thinness of the letters, you won't see any change either.

Also, according to the findings of Abdul Aziz's study, numerous campuses in Indonesia scored the lowest on the index of students' Al-Qur'an reading and writing skills among 14 sample campuses. Only 1.86 and 1.90 respectively make up the Al-Qur'an Reading and Writing Ability Indexes. The average index, which varies from 3.19 for the reading ability to 3.20 for writing ability, is even lower than this number. Arskal Salim, the director of the Islamic Higher Education Directorate General of Islamic Education and the invited speaker explained this by saying he was surprised by three UINs, namely UIN Ar Raniry Banda Aceh, UIN Mataram, and UIN Sultan Syarif Kasim Pekanbaru, whose students were at a lower level in terms of their ability to read and write the Al-Qur'an.[4]

This demonstrates how crucial it is for students to read and write the Al-Qur'an, particularly at Indonesia's state-run Islamic colleges. Particularly in light of the current Covid-19 outbreak, which has made the off-campus study more popular. Making it incredibly challenging to apply what has been learned about Qira'ah al-Qur'an, making the previously anticipated graduation standard into a new assignment for lecturers.

Through education and training, development is an endeavor to enhance technical, theoretical, conceptual, and moral talents under

[4]https://kemenag.go.id/read/indeks-kemampuan-baca-al-quran-mahasiswa uin-malang-tertinggi-amg0v. Di akses pada 10 Oktober 2022 pukul 17.14 WIB.

demands. Development is the process of rationally and methodically planning to learn so that everything that will be done throughout the course of learning activities is decided upon while taking into consideration the potential and competency of students.[5]

The link between the elements of learning techniques, learning materials, and learning assessment is described in learning development, a systematic learning system design process. Because both offer the chance to conduct needs analysis, reflection, and revision at each stage of learning in line with the implementation of the writing process through the stages of planning, implementing, and evaluating, they are both used to develop a learning model that is operationally modified using a process approach. Additionally, it must satisfy the requirements set forth by the lecturer or teacher to construct learning models and write student or student descriptions.[6]

Instead of merely being educational idealism that is impossible to implement in the real world, learning is developing more virtually. The goal of learning development is to raise the standard of the learning process in terms of both content and techniques as well as replacement. The term "materially" refers to the element of teaching materials that are tailored to the growth of knowledge, while the term "methodologically" refers to the creation of learning techniques that are relevant to both theories and practice.[7]

Development research is a procedure or set of activities that may be taken to create a new product or enhance an already existing one. The creation of new products is the goal of this study. According to the definition of development given, development is the process of transforming potential into something useful and better, whereas research and development are the steps taken to develop a product or enhance an existing product into a product that can be held

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[5] Abdul Majid, *Perencanaan Pembelajaran*, (Bandung: Remaja Rosdakarya, 2005), hlm.24.

[6] Mohammad Siddik, *Pengembangan Model Pembelajaran Menulis Deskripsi*, (Malang:Tunggal Mandiri Publishing, 2018), hlm. 65

[7] Hamdani Hamid, *Pengembangan Sistem Pendidikan di Indonesia,* (Bandung : Pustaka Setia,2013), hlm. 125.

accountable.

However, as information grows, this issue gives a variety of solutions and approaches to problems in an all-online future. To ensure effective information transmission from teacher to student and lecturer to student across a variety of contexts and settings, the phenomena of learning to read the Al-Qur'an was also established utilizing a variety of ways and procedures. Gadgets are one of the supporting elements in this argument that can't be separated from the hands of modern students.

A little electronic device with a specific purpose is referred to as a gadget in English. The aspect of "novelty" is one feature that sets gadgets apart from other electronic equipment. That is, new devices constantly arise by showcasing the most cutting-edge technology that makes human existence more useful. To keep users engaged in the capabilities offered by these smartphones, gadgets are equipped with a wide range of amusing functions and apps.[8]

Of course, academics also employ increasingly intriguing features-adorned gadgets for educational purposes. As a result, science will advance more broadly. The popularity of augmented reality as a feature is now quite high. (AR). Virtual Environment (VE), also known as Virtual Reality (VR) or Augmented Reality (AR), is a subset of VE. The user of virtual reality technology is truly placed in a synthetic environment and is unable to perceive his immediate surroundings while using it. In contrast, augmented reality overlays digital or computer-generated information in a real-time environment, including pictures, audio, video, touch, and haptic sensations.[9]

Muslims use the Qur'an as their way of life and as a manual for serving Allah. Therefore, every Muslim must relate to the Qur'an on their terms and at their levels. starting with learning about it and

[8] Anton Breva Yunanda, Dampak Penggunaan Gadget Pada Anak, *Jurnal Abdikarya : Jurnal Karya Pengabdian Dosen dan Mahasiswa, Vol 01 No 02. Desember 2018,* hlm. 182

[9] Merve Yavuz, et.al, Augmented reality technology adoption: Case of a mobile application in Turkey, *Journal Technology In Society* 66 (2021) 101598.

comprehending it, then putting it into daily practice. Reading it correctly is the first thing to do in this situation. While the science of Tajwid and the science of Tahsin, are used in conjunction with Tajwid to study the right and accurate recitation in reading the Al-Qur'an.[10]

Every reader of the Qur'an must adhere to the farther 'ain law of reading the Qur'an with a minimal degree of tajwid to avoid altering the sentence structure or impairing its meaning. It is required for individuals who are knowledgeable in the Science of Tajweed to read the Qur'an while abiding by all Tajwid regulations. While this is going on, fardhu kifayah is studying the science of Tajwid in deep.[11] The issues in this field of study include the *makharijul huruf* (locations for entering and leaving letters), the *shifatul huruf* (pronunciation of letters), the *ahkamul huruf* (relationships between letters), the *ahkamul maddi wal qasr* (long and short utterances), and the *ahkamul waqaf wal ibtida* (start and stop reading).

Anything that can transmit messages from the sender to the recipient is considered media, whether it takes the form of hardware or software. According to Djamarah & Zain, the word "media" is derived from the Latin word "medium," which means "intermediary or introduction," and is the plural version of that word. As a result, the media serves as a means of spreading knowledge or messages.[12]

One example of an external component that may be employed to increase learning effectiveness is learning media. Learning media can overcome a variety of barriers, such as those relating to communication, classroom space constraints, passive student attitudes, less consistent student observations, less specific learning

[10] Santri Jagad, *Tajwid Praktis,* (tkp: Jagad Press, 2017) hlm. 3

[11] *Ibid,.*hlm. 4

[12]Ahmad Fujiyanto, et.al, Penggunaan Media Audio Visual Untuk Meningkatkan Hasil Belajar Siswa Pada Materi Hubungan Antarmakhluk Hidup, *Jurnal Pena Ilmiah: Vol. 1, No, 1 (2016).*

objects that make studying without media impossible, remote learning locations, and so forth.[13]

According to Merve Yavuz, Virtual Reality (VR), also known as Virtual Environment (VE), is a subset of augmented reality (AR). The user of virtual reality technology is placed inside a synthetic environment and is unable to view his immediate surroundings while using it. In contrast, augmented reality overlays digital or computer-generated information in a real-time environment, including pictures, audio, video, touch, and haptic sensations. [14]

Even if there are numerous instances of digitally improved media available today, not all of them can be considered "augmented" realities. Not AR, but a 2D overlay created in Photoshop or another program. Also excluded are motion pictures and television. For instance, in movies like "Jurassic Park" and "Avatar," lifelike virtual items that smoothly integrate with actual settings in 3D are there, but they are not interactive and hence not augmented reality. Contrarily, although a film is meticulously produced, recorded, and edited, augmented reality (AR) combines live feed and a computer to display virtual lines of football practice in real-time on a screen. Particularly in mobile contexts, "visual search" and augmented reality are occasionally conflated. Visual search is the active search for a certain item or feature among other objects or features in the visual environment.[15]

For more than three decades, user perception has been used to study technology. The technology acceptance idea has been the foundation of much construction. Several researchers are looking into how the development of information technology over the last two decades has affected remote health care. Aside from survey-based

[13]Purba Asmara, Pengembangan Media Pembelajaran Berbasis Audio Visual Tentang Pembuatan Koloid Anjar Purba Asmara, *Jurnal Ilmiah Didaktika* Vol. 15, No. 2, Februari 2015

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[15] *Ibid.*

investigations, approaches for expert judgment were also employed.[16] Education, emerging nations, and cutting-edge technologies like smart glasses are among other significant areas where this issue is being researched.[17]

The use of computer modeling and simulation to enable interaction with a manufactured three-dimensional (3-D) visual or other sensory world is known as augmented reality, according to the Encyclopedia Britannica. The two main benefits of augmented reality (AR) over virtual reality (VR) are a greater feeling of realism and improved engagement. actual and virtual worlds are organically integrated with AR technology, improving the sensation of realism, while VR technology duplicates the actual world in a computer environment and offers consumers an immersive feeling. In other words, whereas virtual reality technology immerses the user in a simulated environment, augmented reality technology enriches real life.[18]

The phrase "Reality-Virtuality continuity" refers to the variety of substance classes that are available in any given situation. It stretches from "Real Environment" to "Virtual Environment" on the left and right, respectively. Only genuine items may be seen in the environment depicted on the left, which also comprises images of the real environment captured by traditional video display systems. The world shown exclusively by virtual objects, such as when emulating traditional computer graphics, is shown on the right. Augmented reality's goal is to improve how people see and learn about the actual environment. Attaching digital knowledge that is appropriate for the setting will help you reach this aim. This information is often visual, but it may also be audible and tactile. With smart glasses, headsets,

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[18] L. Madden, *Professional Augmented Reality Browsers for Smartphones*: Programming for Junaio, Layar and Wikitude, John Wiley & Sons, 2011.

video projectors, and mobile devices like cell phones and tablets, users in most AR applications envision a virtual image/model, etc.[19]

Mobile and stationary augmented reality are the two primary categories. There are several different kinds of augmented reality (AR) systems, including helmets (as in Marvel's Iron Man), head-up display smart glasses (like Google Glass), projectors, and specialties. Additionally, wearable (contact lenses, helmets) and non-wearable (glasses) AR devices are separated. (smartphones, PCs).[20]

Although all five senses can potentially be improved by augmented reality, visual applications are now the most widespread. In contrast to Virtual Reality, Augmented Reality enables users to view the actual environment while having virtual things overlay or mixed in. AR, therefore, enhances reality rather than replacing it entirely. The concept of augmented reality may be viewed as a mixture, or "middle ground," between the entirely artificial and the entirely genuine.[21]

Learning Qira'ah al-Qur'an is a crucial component and a needed improvement in this age of technology. With technology playing a significant role in modern education, the creation of Augmented Reality will facilitate the application of learned Qira'ah al-Qur'anic knowledge. A gauge and standard for students' Qira'ah al-Qur'an will be the existence of augmented reality in the gadget feature. Using this function, you may check if you're reading the Mad accurately. Other reading laws include Qalqalah, bold thin, and buzz reading. The Augmented Reality device will automatically verify that the reading is accurate once students have recorded the prescribed reading of the Al-Qur'an. The creation of learning Qira'ah al-Qur'an using an Android or smartphone that uses augmented reality is a revitalization of Al-Qur'anic study in the modern day.

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[19] B. Arnaldi, P. Guitton, G. Moreau, *Virtual Reality and Augmented Reality: Myths and Realities*, John Wiley & Sons, 2018.

[20] J. Peddie, Augmented Reality: *Where We Will All Live*, Springer, 2017.

[21] *Ibid,*

A. Theoretical Review

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B. Research methods

The R&D (Research & Development) method, which is a research technique whose aim is to manufacture specific goods and assess the efficacy of these items, is the sort of research that is employed. Research and development is the process of creating specific items and evaluating their efficacy.[36]

Research that is used to analyze demands is used to manufacture some items and to assess the efficacy of such products so that they can work. research and development that results in Augmented Reality-based solutions for use in goods (AR). Learning tahsin al-Qur'an involves more than just describing how things relate to the present; it also entails looking at developments and/or changes that take place throughout time. Therefore, every issue should be better examined and planned for while conducting a study on the teaching and learning of the Qur'an. This study does not seek to prove anything; rather, it seeks to observe and present data that are pertinent to the issues under investigation using established theoretical principles, followed by analysis and inference to create a new theory using predetermined data analysis techniques.

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[34] B. Arnaldi, P. Guitton, G. Moreau, *Virtual Reality and Augmented Reality: Myths and Realities*, John Wiley & Sons, 2018.

[35] J. Peddie, Augmented Reality: *Where We Will All Live*, Springer, 2017.

[36]Sugiyono. *Metode Penelitian Kuantitatif Kualitatif dan R&D. (*Bandung: Alfabeta, 2010), hlm. 297

The creation of an Android application for studying the Al-Qur'an using augmented reality (AR) is based on the Borg and Gall research and development methodology, which represents their conceptual research stages. In this study, data were gathered using a variety of methods, including documentation, trials (experiments), interviews, expert evaluations, and testing.

A method of analyzing data after performing research is called a data analysis methodology. Examining all data from multiple sources, including documentation, trials, and interviews, is the first step in the data analysis process. The research and development project's analytical approach can help with the accomplishment of the goals and activities of the project.

The study was conducted using a phasing process, which involved reducing the amount of data, presenting empirical facts, developing conclusions, and confirming. Data that is still unfinished from numerous field notes is abstracted and transformed as part of the reduction process. It is hoped that at this level, the data may be categorized, directed, and discarded to make room for the information that is required. Presentation is the act of presenting condensed facts in the form of information arranged through synopses, charts, diagrams, and some text. This approach aims to develop conceptual conclusions and can assist in compiling the appropriate analysis. It is the purpose of the steps of interpretation and verification to determine the significance of the data.

C. Results and Discussion

Tahsin is used to improve and adorn the readings of the Al-Qur'an per tajwid legislation. This is following what Allah SWT has spoken. In other words, the advice included in QS's remarks is to make the reciting of the Al-Qur'an more attractive. Verse 4 of Al-Muzammil (73)

﴿ اَوْ زِدْ عَلَيْهِ وَرَتِّلِ الْقُرْاٰنَ تَرْتِيْلًاۗ ٤ ﴾

"Or more than (half of) that. Read the Qur'an slowly ". (QS. Al-Muzammil (73) Verse: 4)

The best way to learn tahsin of the Qur'an is decided upon by the teachers to accomplish the predetermined objectives. To teach and study the Qur'an and be able to read and see the Qur'an, there is a step or road that must be traveled that is called the Qur'an learning technique. The process utilized in the Al-Qur'an tahsin activity is a development approach for the addition of makharijul letters to the Tahsin Digital Augmented Reality application platform on the PlayStore.

Tahsin Digital Augmented Reality is a type of tahsin learning medium that combines attractively presented imagery, audio, and animation. This effort is designed to help students avoid getting bored when learning online with tools like Zoom, Google Meet, Google Class Room, and others.

The outcomes of the creation of makharij al-Huruf learning using digital augmented reality (AR) tahsin can be observed as follows after going through numerous flowchart and design phases as well as thorough modulation:

Access Links

Page to open: Tahsin Digital TDAR

Support

Cover Page Design

Figure 1. Opening Display

Download Marker page

Figure 2. Download Marker

Article Material Visualization

Figure 3. Visualization of Article Material

Visualization of Material Makharijul Huruf

Figure 4. Visualization of Material Makharijul Huruf

Audio Visualization and Character Animation

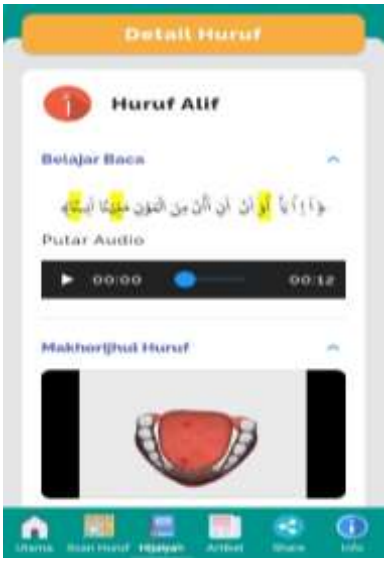

Figure 6. Audio Visualization and Letter Animation

Augmented Reality Visualization

Figure 7. Visualization of Augmented Reality

Validity of Augmented Reality-Based Tahsin Al-Qur'an Development

A learning media evaluation questionnaire based on the Augmented Reality approach is given to technology professionals and learning media specialists to validate the Al-Qur'an tahsin learning media based on the Android Augmented Reality application. This is to test the viability of using the Augmented Reality-based Al-Qur'an tahsin learning material. The file contains a list of the people who validated the Augmented Reality-based Al-Qur'an tahsin learning materials. The findings of evaluations made by professionals in technology and educational materials are shown below.

a. Tech Expert

Technological validator I, validator II, and validator III evaluated the creation of Al-Qur'an tahsin learning media based

on the Augmented Reality approach using a questionnaire instrument. The following table shows the findings from the media development validation data.

Table 1

Technology Expert Validation Results

No	Criteria	Indicators	Score	Max Score	Validation Score	Category
1	Technical Requirements	Opening View Design	22	30	73,33	Valid
		Color Match	52	60	86,67	Strongly Valid
		Display Conformity	35	45	77,78	Valid
		Ease of Instructions	25	30	83,33	Strongly Valid
		View Layout	24	30	80	Valid
		Display Size	26	30	86,67	Strongly Valid
2	Message Submission	Media Use	28	30	93,33	Strongly Valid
		Material Presentation	40	45	88,89	Strongly Valid
		Sentence and language accuracy	27	30	90	Strongly Valid

Total	**279**	**330**	
Optimal Percentage			**84,55%**
Criteria			**Strongly Valid**

According to the calculation table, the aggregate percentage of the evaluations from the three technical experts is quite valid, ranging from 80% to 100%. This indicates that Augmented Reality-based learning resources are quite valid.

b. **Learning Materials Expert**

The attachment shows the findings of the assessment of each component by validator I, validator II, and validator III learning material experts on audio-visual tahsin al-Qur'an learning media based on the Augmented Reality approach using a questionnaire instrument. While the appendix shows the distribution and computation of expert data on learning materials. The outcomes of validation by learning material specialists are as follows.

Table 2

Material Expert Validation Findings

No	Criteria	Indicators	Score	Max Score	Validation Score	Category
1	Content Quality	Material coverage precision	58	60	96.67	Strongly Valid
		The standard of	42	45	93,33	Strongly

		practice questions				Valid
		Correct use of language	13	15	86,67	Strongly Valid
2	Learning Quality	Clarity of learning goals	29	30	96,67	Strongly Valid
		The flow of learning clarity	60	60	100	Strongly Valid
		increased learning interest and motivation (in articles)	39	45	87,67	Strongly Valid
		Compatibility of media with online learning models	57	60	95	Strongly Valid
		Feedback precision	13	15	86,67	Strongly Valid
3	Interaction Quality	Capability to allow direct user-media interaction	27	30	90	Strongly Valid

		Text and animation readability	30	30	100	Strongly Valid
Total			**338**	**360**		
Optimal Percentage					**93,89%**	
Criteria					**Strongly Valid**	

According to the calculation table, the total percentage of the assessments from the three learning material specialists looks to be quite valid, ranging from 80% to 100%. This signifies that the Augmented Reality-based AR digital tahsin learning medium is legitimate.

a. C. Overall Information (Technologists and Materials Experts)

The data validity of Tahsin Digital AR-based learning media based on the Augmented Reality technique is evaluated by summing the findings of technology experts' and learning material experts' assessments and then dividing them by two, as shown in the table below.

Table 3
Data Validity Test Results Calculation

No.	Media Validity Variables	Score	Max Score	Percentage
1	Tech Expert	279	330	84,55%
2	Material Expert	338	360	93,89%
Total				**178,44**
Average				**89.22%**
Category				**Strongly Valid**

According to the calculation table, the aggregate percentage of the three technology and learning material specialists is 89.22%, which is a highly legitimate category because it falls between 80% and 100%. This indicates that the Tahsin Digital AR learning media is extremely genuine and may be evaluated, but recommendations and opinions from professionals are utilized as a material for development in completing this Application-based media.

Conclusion

Tahsin is used to improve and beautify the reading of the Al-Qur'an according to the law of tajwid. The media produced in the process of studying tahsin al-Qur'an, notably in learning makharijul letters, is termed the Tahsin Digital Augmented Reality application. This software is available on the Android Playstore platform. This application is equipped with a variety of interesting features and content for learning and recognizing makharijul letters, ranging from articles that motivate learning the Qur'an, the introduction of hijaiyah letters starting from the shape of the letters with Augmented Reality, audio learning letters, animated letters, and properties. letter. This program also includes a download marker page, which serves as a terminal in Augmented Reality. The development of the learning model demonstrates that this application is capable of supporting tahsin learning in a variety of settings, though there are some suggestions and criticisms from experts that will be used as revision improvements to improve Android application-based media in the future.

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