



## DESIGNING A CHILDREN'S IQRA BOOK USING AUGMENTED REALITY TECHNOLOGY IN HIJAIYAH LETTERS

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**Abstract**--The whole world is struggling to save itself from the effects of the COVID-19 pandemic. So that teaching and learning activities, both at the elementary school to tertiary levels, are disrupted. Slowly the progress of distance learning began to cause various problems, one of which was the difficulty for elementary schools and PAUD in carrying out practical learning, such as practical learning of the Koran such as Iqra'. And the enthusiasm of students becomes slack due to a lack of enthusiasm compared to face-to-face learning as usual. By using Augmented Reality as an alternative learning media, it is hoped that a learning activity can be more interesting for children. Another benefit obtained is a more advanced learning media by utilizing current technological developments. The design of the Iqra book which contains hijaiyah letters is designed with pictures and guides on how to write hijaiyah letters that are easy to understand and child-friendly color compositions, this book is also related to the interests of educational institutions, because of its function as a reference in the field of information and computer technology as well as visual design. Knowledge enrichment indirectly helps improve the competence of educators and students.

**Keywords:** *Iqra' book; Augmented Reality; Hijaiyah; Covid-19*

### INTRODUCTION

21st century learning implies the integration of scientific literacy skills, knowledge skills, skills and attitudes, and mastery of technology (Kholiq, 2020). The 21st century is also marked by very rapid technological developments, so that science and technology become one of the important foundations in nation building. 21st century learning is process-oriented learning (Maulana Arifin, Pujiastuti and Sudiana, 2020).

Along with the times and lifestyles in Indonesian society, there has been a shift in behavior patterns, especially in learning interactions where now in learning the community has become digital and the existing learning system is often less of a concern for the community, giving rise to several phenomena including online learning, the widespread use of online learning. online learning application. On the other hand, with the development of technology and information media today, people tend to be closer to a mobile lifestyle, especially in large urban communities in Indonesia. Almost 75% of the activities they do are for entertainment, either for taking pictures, listening to music, or playing games.

In 2019, the world was shocked by the pandemic known as COVID-19. And this outbreak spread in Indonesia in early 2020. This COVID-19 pandemic destroyed the world economy, including Indonesia (Hardilawati, 2020). The whole world is struggling to save itself from the effects of the COVID-19 pandemic. So that teaching and learning activities, both at the elementary school to university levels, are disrupted, as a result of the lockdown and PSBB at the provincial to city levels, especially Medan.

All parties starting from teachers, parents and school students must be ready to live this new life (new normal) through a learning approach using information technology and electronic media (Ningsih and Mahyuddin, 2021). Thus the speed and ease of presenting information as a learning resource is obtained easily. For this reason, early childhood education needs to prepare innovative technology-based media or teaching materials that can be used anywhere and anytime.



Both in online learning, offline or face-to-face learning. The Iqra Hijaiyah book with the application of augmented reality technology is one of the media or learning materials that supports learning using the use of information technology.

The learning process ideally includes several aspects such as fun, challenging, providing motivation and a great place for students to develop their abilities and independence, according to the talents and interests of students. And also students are asked to play an active role, teachers can create new learning models to encourage students to be more active in learning. Fun learning is triggered by several variables, for example, the selection of media for learning that is used can attract students to learn, be interactive when used, and does not reduce the essence of the material to be conveyed.

Augmented Reality is a technology that is able to bring new education (Angga Ramandani, no date) so that it can help students develop better thinking and understanding of concepts in learning. Also, augmented reality allows students to learn with the method of three-dimensional shapes and geometric objects (Suciliyana and Rahman, 2020), which is very difficult to understand through books. Augmented reality combines digital information into a virtual world and electronic form (Daud, Abd Raman and Abd Jalil, 2020), in various digital formats and not only visual and graphic media but also text, audio and video which has great research potential in the world of education.

Design is a procedure that forms the basis for making a product such as a book in accordance with the goals desired by the designer. Design also plays a very important role in communicating information to readers from its creators with various visual strengths such as topography, illustrations, colors, lines, layout and so on with the help of technology. Thus, the use of the design on the iqra letter hijaiyah book in learning can help teachers or educators provide information to users or early childhood as a target for book design in an appropriate and interesting manner.

At this time, many methods or technologies have been used to attract children to be active in the learning process. starting from the use of picture books and interactive videos. However, this method is currently considered too common and the technology is not the most up-to-date technology (Sumit Patel *et al.*, 2020). This is because the development of multimedia technology is growing rapidly, the variety of learning methods and media is also increasing. One example is learning media using the latest technology, namely Augmented Reality. The use of the latest multimedia technology as an example of Augmented Reality is considered to be more interactive and can stimulate children's imagination so that it can attract early childhood interest in learning.

Augmented reality has the advantage of providing experiences and knowledge that are easily understood by early childhood. Can also be implemented to provide information to users. Augmented reality can be used as an interesting and interactive learning method. Based on these advantages, we are motivated to develop augmented reality applications to provide children with a different learning process on understanding Arabic letters in the Qur'an. In addition, it can also stimulate children to be more active in learning hijaiyah letters through the use of technology. In learning Iqra ', early childhood tends to experience fatigue and boredom. Therefore, a solution is needed to overcome this problem so that children are not easily bored and bored during the learning period.

By utilizing Augmented reality as a choice of learning tools in education, it is more interesting for students. The function that can be taken is a learning model that is superior at this time by utilizing technology. and can also grow new interests for students or parents who want to learn about Iqra 'with a new and fun model for children without having to worry about the pandemic that is still endemic in Indonesia. So that it can reduce social interaction by utilizing technology for teaching and learning Iqra 'can be done at home.



## RESEARCH METHOD

This research is a research and development in producing a product, namely the Iqra letter hijaiyah book with the use of 3D-based augmented reality technology for early childhood. In this study, the development model used is the ADDIE model which uses five stages, namely Analysis, Design, Development, Implementation, and Evaluation (ADDIE) proposed by (Branch, 2019). The reason the researcher uses the ADDIE model is that the stages of development are considered simpler than the development of other models, the stages are systematically structured from the first stage to the fifth stage.

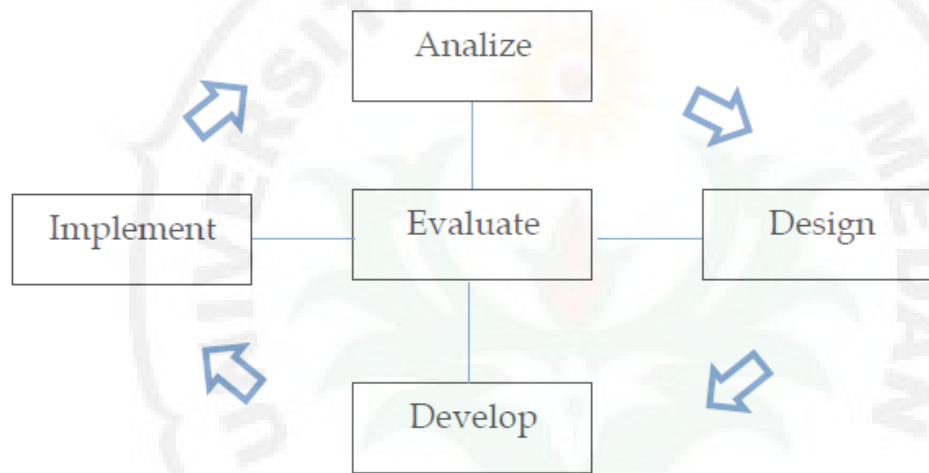


Figure 1 ADDIE Modelling

### Interactive Media and Innovation

Media comes from the Greek *medius* which means intermediary, introduction, or middle (Rivi Hamdani, 2020). Media in Arabic is an intermediary or messenger from one party to the recipient. Media at the time of learning can be interpreted as a tool, graphic or digital that can be used to process, organize and capture information. Interactive media is a means of delivering media to display videos using digital tools to an audience who hears and watches with audio, and provides action and speed and presentation determined by the respondent. Interactive media that has sound and image elements is called two-way because the user response is directly involved in designing.

### Arabic Hijaiyah Letter

When writing the paper please remember to use either British, or US, spelling but not a mix of the two, i.e., if you choose British spelling it would be colour not color; behaviour (behavioural) not behavior; [school] programme not program; [he] practises not practices; centre not center; organization not organisation; analyse not analyze, etc.

Hijaiyah letters are letters that have existed for a long time and are used by Arabs and Muslims everywhere as a language for reading the Koran. The number of commonly known hijaiyah letters is 28 letters, namely (Fadli and Ishaq, 2019)

ي ي ه و ن م ل ل ق ع ع ظ ظ ض ض ص ص ز ز ذ ذ ح ح ث ت ب ا

ي ي ه

Makhārij has the root word from the verb *kharaja* which means to come out. The origin of this word is made into the form of isim eating (which indicates a place), so that it becomes *makhrāj* which means a place to go out. While *makhārij* is the plural form of *makhrāj*.



### Augmented Reality

Augmented Reality is an additional reality that can be said as a technique that combines 2D or 3D objects into 3D form and then changes the virtual object in real time (Sagnier *et al.*, 2020). AR technology provides information into the device and provides information into the output with the help of a camera, PC, smartphone, or google glass. users are not able to see objects directly, so object identification requires assistance in the form of a PC or smartphone that will add objects to the real world (Tussyadiah, Jung and tom Dieck, 2018). There are two techniques used in AR: Marker Based Tracking and Markerless Augmented Reality

### FINDINGS AND DISCUSSION

This design is aimed at the problem of learning the Iqra letter hijaiyah book by utilizing 3D augmented reality technology as a learning medium for early childhood, so that sometimes there are still many people who are sometimes lazy to learn using conventional methods. So, a learning media is made that is supported by the use of augmented reality technology so as to support the appearance of the Iqra letter hijaiyah book for early childhood so that interest in learning is getting better and this media is also designed to provide an alternative form of teaching to early childhood in learning hijaiyah letters by utilizing 3D based augmented reality technology.

In a creative strategy there are two elements, namely the method of approach and the stage of implementation (execution). In terms of how to approach has a relationship with opinion. The approaches used are the emotional approach and the creativity-humor approach. The emotional approach conveys messages based on the affective (social-emotional) dimension, while the creativity-humor approach serves to package messages and how to deliver messages that can be received by the audience, the message is spiced up by interesting things that are entertaining so that the condition of the audience becomes relaxed in receiving the message. .

The main media created is an Iqra book containing colored hijaiyah letters that are designed and designed for the learning needs of early childhood, where the design of the book design is given additional use of augmented reality technology, where with this technology teachers and parents can provide ways new learning to their children by displaying the 3D shape of each of the hijaiyah letters by using a smartphone device. Users scan the images contained in the iqra hijaiyah book with a smartphone device to bring up a 3D model of each letter.

ج	ث	ت	ب	ا
ر	ذ	د	خ	ح
ض	ص	ش	س	ز
ف	غ	ع	ظ	ط
ن	م	ل	ك	ق
ي	ء	لا	ه	و

Figure 2 Hijaiyah letter font made in 3D



## Design

At this design stage, determine the framework of the book material to be designed, set the final goals to be achieved in the design of this iqra book and after finishing using the hijaiyah letter iqra book with the use of augmented reality, set the goal of specification capabilities that support the final goal with the use of information technology in the book. iqra. Furthermore, at the stage of describing the iqra book with hijaiyah letters, the researcher uses a simple structure or framework according to the needs in designing the iqra book.

The application of colors and images in the Iqra Hijaiyah book is based on the user who wants to build it. The use of bright colors and children's characters to create an upbeat and cheerful atmosphere in the book, colors are applied to the Iqra Hijaiyah book which is the basis of the image with bright color shading then the writing is given line guidelines as practical assistance in doing writing and drawings related to hijaiyah letters. which is on that page.

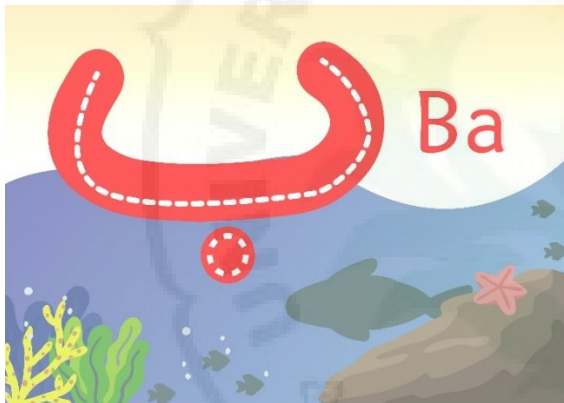


Figure 3 Hijaiyah Ba . letter design form

In making background illustrations related to the arrangement of user displays and features in books that have important points, namely simplicity, clarity, and can be directly reached because the essence of children's books demands simplicity of images and attractive color combinations. Thus, the display made is described as simple as possible but still blends with the essence of education and the theme. The use of color in this book follows natural color theory, where color follows the color of the object.

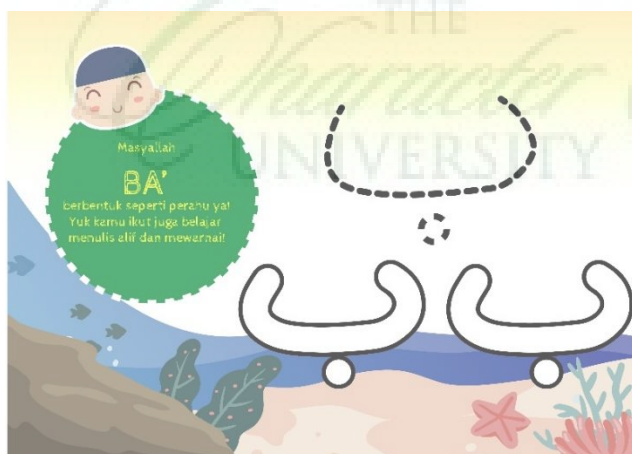


Figure 4 forms of education related to hijaiyah letters



## Development

The e-module was developed with the Unity app. is a type of game engine developed by a video game development company called Unity Technologies. The Unity engine allows developers to create 2D and 3D games. Currently only supports the C# programming language. Unity supports Direct3D, OpenGL, OpenGL ES, Metal, Vulkan, and proprietary APIs. Since 2016, Unity offers services in the cloud. Unity is supported on Windows and macOS, as well as 27 other platforms. In 2016 Unity went from a one-time purchase to a subscription model. There is currently one free and three paid license options: Personal (Free), Plus, Pro, Enterprise. Unity has a strong collection of official tutorials to help familiarize new developers with the engine. In addition, it has thorough documentation that is updated to be accurate with each new Unity release. The tutorials and documentation take advantage of the pre-built assets available in the default Unity program. Developers can use this instead of being forced to write all their code from scratch.

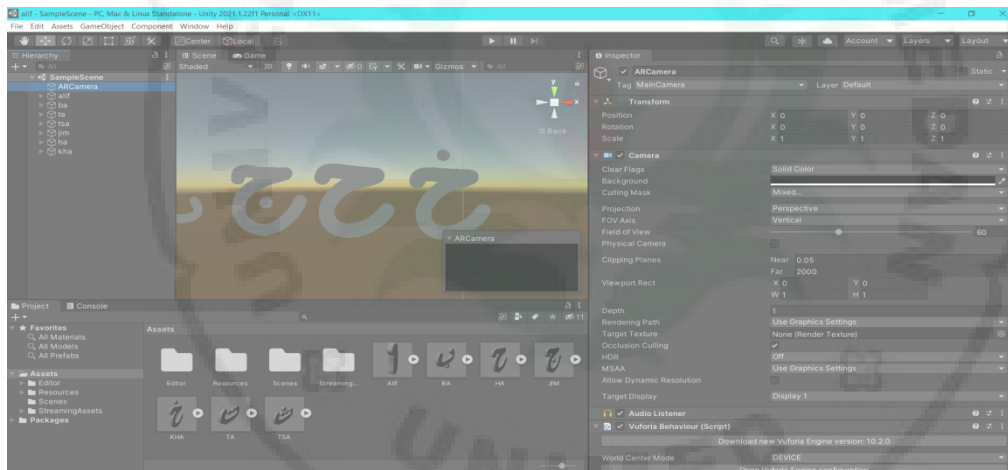


Figure 5 Unity for augmented reality

The next stage is the use of augmented reality technology in the Iqra hijaiyah book for early childhood so that it creates a 3D image on a smartphone device when scanning the hijaiyah image which is used as the scan target object. Augmented Reality testing is a technology test on image objects in the iqra letter hijaiyah book to test the components that have been designed and implemented into the book. This process is also the merging of 3-dimensional objects that are divided into several parts in the book.

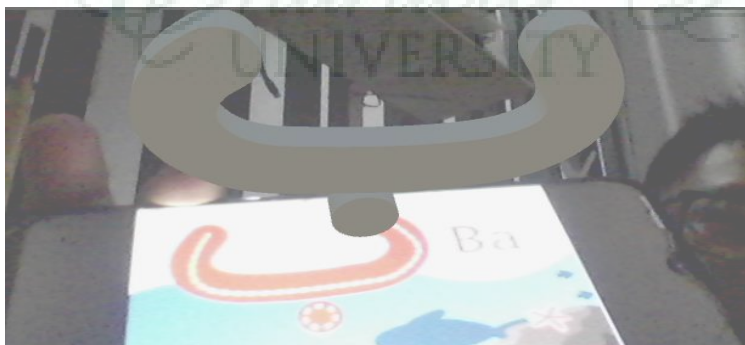


Figure 6 3D shape of the letter hijaiyah Ba



## Implementation

Implementation is the stage of using the iqra hijaiyah book with augmented reality technology. After a limited trial was carried out and it was declared feasible by the designer, then the Iqra Hijaiyah book was tried directly on early childhood. However, due to the pandemic conditions and the policy of the Medan City Government, North Sumatra which imposed a large-scale temporary restriction of level 4 so that at this implementation stage only 20 early childhood children consisting of 10 boys and 7 girls and three parents were involved. . Before using the iqra hijaiyah book based on augmented reality technology, it is certain that the user is a child who already knows the hijaiyah letter and is Muslim. This is done to ensure that users can actually use the application properly.

User testing is used to determine whether the iqra letter hijaiyah book with the use of augmented reality technology can provide benefits to its users. The hijaiyah letter iqra book is introduced to early childhood for use in learning. The test uses a questionnaire method given to 20 students consisting of 6 questions. Users are required to answer a questionnaire after using the book to determine the level of assessment of the Iqra book that utilizes augmented reality technology in learning for early childhood. The percentage of questionnaire results can be calculated by the above formula, for each category can be obtained as follows:

$$1.P_{\text{Very Good}} = (53 / 120) * 100\% = 44.16\%$$

$$2.P_{\text{Good}} = (57 / 120) * 75\% = 35.62\%$$

$$3.P_{\text{Quite Good}} = (10/120) * 50\% = 4.16\%$$

$$4.P_{\text{Bad}} = (0 / 120) * 25\% = 0.00\%$$

Total percentage = P very good + P good + P quite good + P bad, so that a score of 83.32% is obtained, which is a good category.

## Evaluation

The design of the hijaiyah iqra book using augmented reality technology is designed using the 3D-based Unity application, so that it looks interesting and can increase interest in early childhood. Furthermore, the Iqra book is converted into an Android-based application using the Unity software so that it can be accessed with smartphone devices. This application is used to display 3D images when the smartphone device camera is pointed at the target of the hijaiyah letter iqra book and is able to produce interactive media, learning media, and is able to create animations so as to make the hijaiyah letter iqra book more interesting.



Figure 7 Iqra book of letter hijaiyah

In addition, it can help foster a desire to learn in early childhood to introduce hijaiyah letters in Arabic. This is one of the new innovations in the world of education. Because, so far, there is still a lack of similar books or digital teaching materials based on augmented reality technology.

## CONCLUSION

Learning media was developed with the design of the Iqra book that utilizes augmented reality technology as a new type of learning media to facilitate the process of introducing hijaiyah letters more clearly, without losing the essence of learning. It's just that the researchers did not test the effectiveness and did not carry out the implementation stage due to time and cost limitations. And also the iqra hijaiyah book using augmented reality technology is highly recommended for early childhood because it has educational value, has attractive visuals, and can persuade children to do positive things. The recommendation for the next research is to enrich the design by using other media besides books.

## ACKNOWLEDGEMENTS

The author would like to thank P3M Medan State Polytechnic who has been willing to fund this research so that it can be used as teaching material for early childhood education. The researcher would also like to thank all the research teams who were able to cooperate in completing this research on time and according to the planned target.

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