

# **PROTOTYPING EDUCATIVE FLASH CARD FOR KIDS USING AUGMENTED REALITY**

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## **ABSTRACT**

The use of digital media in education is a necessity nowadays. Although there is a stigma that digital media has an unfavorable impact on the children learning process, technological developments also support creative concepts that can be used at the educational level. Based on these conditions, the idea emerged to develop an educational media based in a form of flashcard to provide a learning process especially for children. In this study, researchers chose a general topic as the basis for the content for the flashcard which is about learning the alphabets. This topic was chosen considering the need for children to learn about alphabets in a different way than before and hope that it will help them to have interaction with their parents. The research method in finding content is to find learning intention especially about alphabets and combine it with smartphone which now became a necessity for adult. While the design development uses qualitative methods as the basis for its creative process. In this development, the resulting prototype is a combination of designs on paper and the use of smartphones in the explanation process using Augmented Reality technology. It is hoped that this prototype can become a design that help children to learning about alphabets in more interesting way

*Keyword : Augmented Reality, flash card, educative game*

## **INTRODUCTION**

The process of transferring knowledge that had generally occurred in the classroom with face-to-face activities between teachers and students and some condition also with parents, became changed with the technological advancement nowadays. However, Kusnandar's(2021) writing on the portal of the Data and Information Technology Center of the Ministry of Education and Culture stated that there are many innovations in the learning process for students in schools. Some innovations such as learning by utilizing certain LMS (Learning Management System) based applications, asynchronous use of social media, learning with a blended approach, involvement of parents of students, the application of innovative learning models, and learning oriented to student needs.

Various forms of learning are also directed to learning so that students remain motivated in a fun way so that the educational process can still run during a pandemic. Furthermore, Kusnandar wrote the importance of innovation as a basis in solving a problem in general. Innovation is built from the process of creative thinking and proper problem analysis so that the educational process can still run well (Kusnandar, 2021). In the context of discussions about the educational process, in general, people have become accustomed to various media platforms to find and absorb information. In general, social understanding, today's society is a mediated society. Visual imagery that appears on a wide variety of media, becomes part of the visual routine. Various visual imagery and text on media, can be a source of information and education for the community.

Learning and playing is not a new concept in the world of education. In children's education, the term playing sambil learning or vice versa, is an activity recommended by

experts in the field of child development. As in Lev Vygotsky (1962) who wrote that play is a major process in development in children. In the process of play, many attributes that can appear and have significance for the growth of children for example actions that are voluntary or develop motivation to act something (Amory, 1999). In the process of playing this, Huizinga (1950) well defines that play is part of human cultural activity. Because human must live their time as children, the culture to play has become a natural thing. The study of Simpson, report the integration of tablet technologies into literacy lessons of seven and eight-year-old children living in Canada and Australia. Their findings show that students tend to share ideas when working with tablets, by modelling their actions to each other. This is considered as evidence of interaction, collaborative and participatory learning in literacy education with tablets. (Simpson, Walsh, & Roswell, 2014). In this digital era, its became a problem for a parent, educator as well as children in terms of technological advancement. Nowadays its become very common to see children or even toddler quite familiar with using of smartphone. In terms of censorship it will be difficult to do because using of smartphone means interacting with internet. It doesn't mean that smartphone and internet are bad things but we have to understand the curiosity of kids and we have to try make a good things for that curiosity. Play activities, offering organizational functions based on cognitive, social, and cultural levels. For example, a child who tries to imitate playing at home or playing in cars, is trying to repeat the experience or create an experience based on cultural activities that he has felt.

Through the imitation process, there is a learning process that individuals do either from setting strategies, trying the process of reconstructing events or solving certain problems with critical thinking processes (Rieber, 1996). On that matter what we want to achieve is a different approach according to relation between technology and children learning process. Our objective is to create a different perspective on how to use smartphone for children especially for their learning process. For this matter, what we want to do is to do some research about what kind of learning process that children needs on certain age and from that matter, we will try to create a certain system by using smartphones to help children learning something. That system will include values and activities that can be seen on smartphones with some interaction between children and those system.

## **METHOD AND DESIGN THINKING PROCESS**

### **a. Design Methods and Concepts**

This research study adopts the qualitative descriptive method in the process of searching for data. The purpose of this study is to try to explore certain phenomena that are then translated and rebuilt to bring up certain descriptions of a condition. In conducting this study, the research team tried to dig up literature data about children learning process and then clustered the existing data to formulate the concept of presenting it. These descriptive formulations will be used as a basis in the design of learning activities for children.

The data are analyzed by using interpretative phenomenological analysis perspective. It is started with description of data, interpretation, (narrative) quotation and theoretical elaboration (Merriam, 2009). Concept Design a. Basic Idea The basis of the idea is the need to create a media that has a function to be an educational media. In the design of this prototype, the topic of the introduction of Alphabets became a focus by looking at the development of today's children who are accustomed to the daily use of technology. With a design that prioritizes the value of fun through flash card activities and combines with the use of technology such as Augmented Reality, it is hoped that this prototype concept is more in line with learning process for children.

### **b. Educational Content**

Contents of this prototype uses Alphabets learning for ideas. This is because in early stages of child development, learning of alphabets and try to speak for that alphabets are critical. In our prototype we used A, B, C, D, E, and F as basis for our flash card and AR Development. In order to make interesting flash card for children, our team try to make visual which can be pronounced with the alphabets in that flash card. This part is our step when we did “emphaty” on our design thinking process. This content is part of the problemes also part of answer where children can learn something useful by using AR as our product.

**c. Using Unity Software**

The main reason of using Unity Software is because the capabilities for creating a final produk as an .apk extension file. Another reason for our usage of Unity is that it can corporate with a third-party engine which is the Vuforia Engine. Vuforia Engine allows a better setup for Augmented Reality build in Unity. Starting from setting up target image database which collects the target image that the camera can detect, and to building up cameras and integrating the database to Unity.

**d. Design Method**

After finished our content, which content for the flash card and augmented reality system, we started to gather the references for the prototype. Since the target market is Children and their parents, the card style should be interesting with bright colors and fun design. Therefore the team created 6 card of alphabet with the animal started with A to F . The process of creating the card started with create sketches for each illustration in the card. After the sketching process done each of the card will be illustrated, the illustration will be use for the animation.

Therefore the illustration need to be an art assets with the layer separated. For the animation the team use after effect to animate each of the animal illustration. The team animated the character as funny as possible so the movement were exaggerated not based on the animal actual movement. The card layout will be done after the illustration done, the card will have two sides, the front for the illustration and the back is for alphabet and the animal name. after done with the card and animation, the team will imported the assets into the unity for the AR. The card image will be the marker for the AR animation. Last but not least the team also created 3D prototype to visualize the overall card and packaging. The 3D modeling, texturing and rendering, done using Blender 3D software.

## **FINDINGS AND DISCUSSION**

**a. Reason of picking the Alphabets**

Flash card is used for learning and memorizing, we choose the alphabet. Since alphabet is the foundation of written language. By learning the alphabet children will have the ability to write and spell words. The understanding of alphabet will strengthen the children communication skills, reading, and writing skills. Therefore memorizing the alphabet with flash card will help children memorize faster and increase their memorizing ability with entertaining card.

**b. Visualization Concept. From sketch to final drawing**

To ensure ideas and functionality of the flash card, first we had some sketches for visualization on the flash card.

## Sketches



Figure 1. Sketches for visualization

## Character illustration

After done with sketches, we use software to color and enhanced its visualization like using lighting and shadowing.



Figure 2. Character Illustration

### c. Final Visualization prototype for flash card

This is our design for flash card. We made it simple because it also served as mapping for Augmented Reality visualization. So, it has to keep it simple for basis of its mapping.





Figure 3. Flash card design

The design for alphabets here using concept that must using fonts that have high level of readability because it will be used as learning materials. So, children on this case can learn to read also. We chose fonts that have simple yet quite fun and dynamic anatomy. We hope that it well enhanced reading experiences.

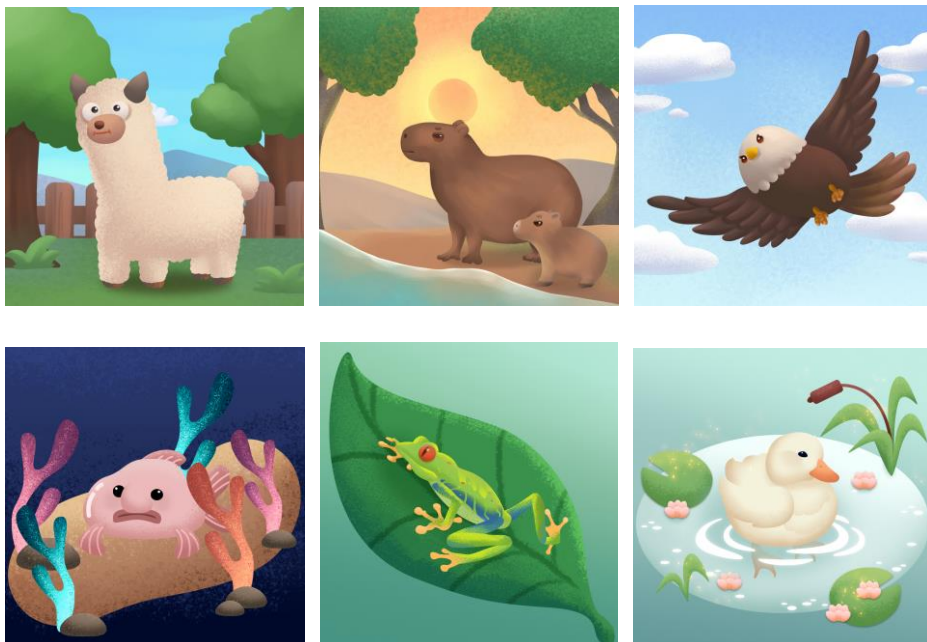


Figure 4. Illustration for Augmented Reality

This is our final illustration which will be shown up as part of our Augmented Reality system. This visualization will pop up after the smartphone do some scanning on basis map which is our flash card that consists of alphabets from A to F.

#### d. Animation process in Unity

The animation is made using Adobe After Effect by utilizing the puppet tool. The initial concept of the animation is made to be fun and entertaining for children. After the animation for all prototype, later on would be exported as PNG Sequence. As to why it would be exported in PNG Sequence will have to do something in Unity.

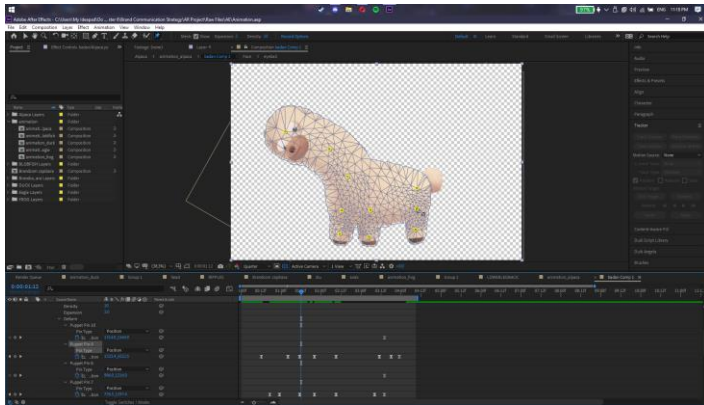


Figure 5. Animation Process

Before imported through Unity, there would be some third-party assistance. Using Vuforia Engine, we have made an target image database which is our illustration of animals that is used as the target scan for the AR. Vuforia Engine is easier to deal with as it already offers a simple database collection that could be imported to Unity. After managing the target database, it can be downloaded and can be imported to Unity and it would read the database and the target collection.

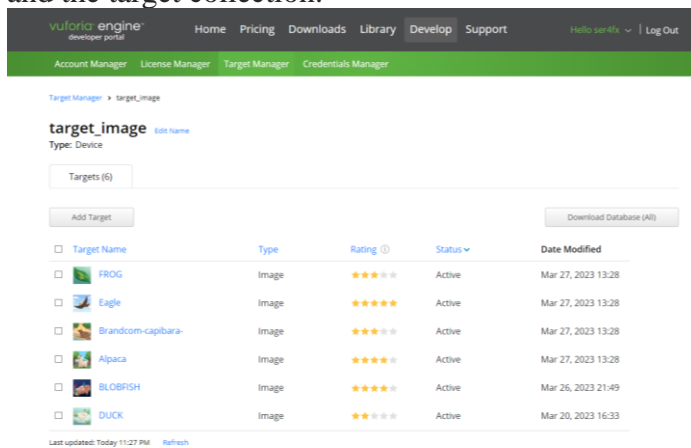


Figure 6. Vivura Engine Screenshot

In Unity, we imported our animation as sprite animation which in Unity, is easier to insert our animation as a sprite rather than a video format. Before that, importing our illustration in Unity is a must as it is our base target for the AR. After our illustration is up, we would import the database that is downloaded from Vuforia. This is one of the reasons we use Vuforia as Vuforia sets up the AR builds in Unity in a pretty simple and effective way. This speeds up the process of AR making. But before we could use the Vuforia Engine, it requires us to get a license before using it. Nonetheless, it is easy to obtain a short license which already requires us to make the prototype.



Figure 7. Screenshot of Augmented Reality Process

One of the reason we chose Unity is as the final product of our AR is for Android and Unity allows us to build our program in an APK format. After completing the process of inserting our database and importing our animations, the final process is to set up the build and export it in an .apk format. The building does not require a lot of time since we already adjusted our resolution in our animation. The .apk final product later on can be installed in an Android device and it already does the job.

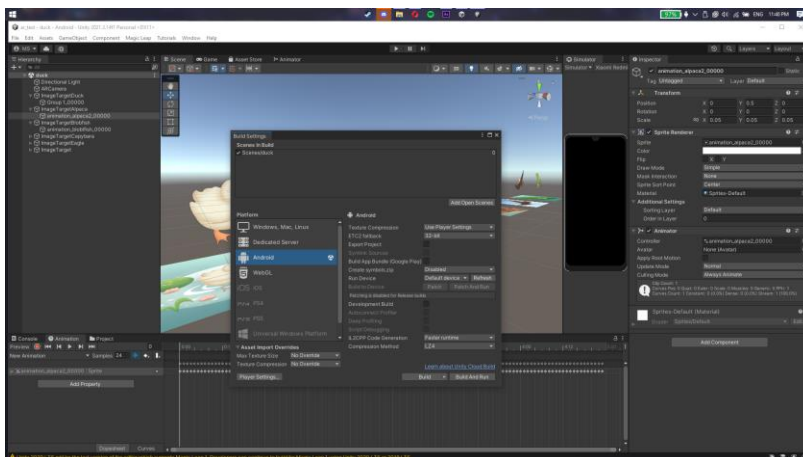


Figure 8. Exporting Process to .apk format

**e. Screenshot on trial using smartphone**

This is our trial process using smartphone and then trying to make sure that Augmented reality system implemented perfectly and make sure the animation is doing well too.



Figure 9. Implementation of AR system in flash card.

## CONCLUSION

Our research begin with a question, “Can smartpone and children went well together?” because even we can find a lot of “kids app” in google play or apple store some ads that inside those there is a small chances that children can be targeted with ads that we cant control it. Disney created some children books that help children and their parents read together while using Augmented Reality to offer different experiences for them. We took that inspiration and try to do on our own by exploring this condition. In terms of design thinking process, we usually called is a “empahty”. This is a step where researchers will try to find any problems that occurred before design or visualization.

Quoting from Wirawan's writing, the pattern and learning process has begun to change from the teaching era as a source to an interactive process where learners or information targets become participants in the teaching process (Wirawan, 2022, p. 45). This prototype can work well as long as the design process is correct. As well as this prototype can work well, we can say that our objective is complete. But this research is not perfect and we will try to complete it on alphabets and illustration. This research is not designed as perfect solution but maybe an alternative solution for future learning method and process.

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