Utilization of the Cube as a Medium for the Introduction of the English Alphabet for Preschoolers

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Abstract. Awareness of the importance of mastering English now raises efforts to introduce and teach children about English as early as possible, such as preschool education or children aged 3-6 years. Constraints that are often faced are usually in the form of lack of enthusiasm of children to learn this. This is evidenced by the difficulty of children in memorizing and pronouncing letters in English. The choice of instructional media also greatly influences the level of students' understanding of the material. Considering that preschool age is a time when children will be very interested in interactive multimedia content, this problem can be applied augmented reality technology. The learning concept used is based on student centers. So that the affective and psychomotor scope of students can be achieved. This instructional media in the form of a cube which contains a letter marker forming pieces. Students will scan from the cube containing letter markers. The scan results are a 3D view of the object marker. 3D objects will display the basic words beginning with the selected alphabet. Besides that, the application will also display the way of spelling the word accompanied by sound. The aim is to make it easier for children to remember words and letters in English. There is also a quiz feature as a material for evaluating students' understanding of the material. From the results of the trial regarding the appropriateness of the application conducted at TK Dharma Wanita Unity the data obtained were obtained from the questionnaire given to the accompanying teacher, as many as 5.71% said the application was quite helpful, then as much as 42.86% said they agreed, and as much as 51.43% said strongly agreed that the application can help students' level of understanding of the alphabet in English.

Keyword: Alphabet, Augmented Reality, English Language Learning, Cube

1. Introduction

Awareness of the importance of mastery of English raises efforts to learn and master the language as early as possible. Therefore, English is expected to be introduced in formal educational institutions for early childhood. When a foreign language is introduced to early childhood, special knowledge about how children acquire and learn languages is necessary, so that an appropriate learning method can be well formulated [1]. Getting to know the environment is a basic thing that must be taught to young children so they can adapt, interact, and communicate well with their...
surroundings. Letters of the alphabet are important to be learned by children as an initial step to learn how to communicate. Knowing the type of alphabet is the main skill that must be learned in the early years of learning in school. Children with kinesthetic intelligence get bored more quickly with learning styles that just sit still and listen to lessons [2]. Children with kinesthetic intelligence like learning styles using objects, doing experiments and repetitive physical tasks.

In the process of introducing surrounding objects in English, we need an instructional media and innovative and interactive learning methods that are expected to be more attractive to children to learn. One learning method that can be used is to take advantage of technological advances, namely Augmented Reality technology that is packaged into an android application and accompanied by 3-dimensional objects [3]. Using multimedia in learning and teaching systems can enable students to think critically, become problem solvers, be more inclined to search for information, and be more motivated in the learning process.

To support the learning process, we use instructional media with cube / cube in order to practice their motor skills to search for letters that match the names of the objects around them. So it is hoped that this learning application can attract students’ interest in learning the names of objects around in English, and it is hoped that children can learn to recognize the alphabet through interactive media with visualization and interesting topics for the development of their imagination, not just learning know the alphabet [4].

2. Designing Augmented Reality for Learning Media

2.1. Flow Chart Diagram

The system flow of the English learning application that will be built is shown in the following flowchart figure:

![Flow Chart Diagram](image)

If the user chooses the Learn menu, then the application will direct the user to a display with 3 menu choices namely learning the alphabet, nouns, and the camera for scanning markers. Each learning menu is accompanied by supporting audio that accompanies the material. On the Quiz menu, the user
will be directed to the quiz page as a material to evaluate the user's understanding of the material. The application will display some questions related to the material on the random learning menu. There is a score from the quiz results that have been done. In the help menu, the system will display a popup that contains procedures or assistance in using the application. Like the use of each button contained in the application, it aims to facilitate beginners when operating the features of the application. In the information menu, the system will display a popup containing information about the application as well as a glance at the application maker information.

2.2. Interface

2.2.1. Mock Up

The application User-Interface design is used by the developer as a first step in making this application which is then implemented in Unity. In its design, there are several user interface pages, namely:

![Figure 3 Main Menu Design](image1)

![Figure 4 Learn Menu Design](image2)

![Figure 5 Learn Alphabet Design](image3)

![Figure 6 Learn Object Design](image4)

![Figure 7 Design AR Camera](image5)

![Figure 8 Object 3D Design](image6)

![Figure 9 Guess Alphabet Design](image7)

![Figure 10 Guess Object Design](image8)

2.2.2. Rule-Based System

The design of the system flow is done to define rules or benchmarks in the application flow. So that the conditions created can produce as expected.
| Information       | Condition (Rule)    | Results (Conclusions)                                                                 |
|-------------------|---------------------|--------------------------------------------------------------------------------------|
| Marker letter A   | AR camera detected  | The marker projects the 3-dimensional object of apple along with supporting audio.    |
| Marker letter B   | AR camera detected  | Markers project a 3-dimensional ball object along with supporting audio.             |
| Marker letter C   | AR camera detected  | Markers project a 3-dimensional chair object along with supporting audio.            |
| The letter marker D | AR camera detected  | The marker projects the 3-dimensional object donuts along with supporting audio.      |
| The letter E marker | AR camera detected | Markers project a 3-dimensional eraser object along with supporting audio.           |
| The letter marker F | AR camera detected | Markers project a 3-dimensional object flag along with supporting audio.             |
| The letter marker G | AR camera detected | Markers project a 3-dimensional glass object along with supporting audio.            |
| Letterer H        | AR camera detected  | The marker projects the 3-dimensional object hat along with supporting audio.         |
| Marker letter I   | AR camera detected  | The marker projects the 3-dimensional object of ice cream along with supporting audio. |
| The letter marker J | AR camera detected | Markers project a 3-dimensional object with juice along with supporting audio.       |
| The letter K      | AR camera detected  | Marker projects the 3-dimensional object kite along with supporting audio.           |
| The letter marker L | AR camera detected | The marker projects the 3-dimensional object lamp along with supporting audio.       |
| The letter M marker | AR camera detected | Marker projects a 3-dimensional mushroom object along with supporting audio.         |
| The letter N marker | AR camera detected | The marker projects the 3-dimensional object of the notebook along with supporting audio. |
| The letter O      | AR camera detected  | Markers project an orange 3-dimensional object along with supporting audio.          |
| The letter marker P | AR camera detected | Markers project a 3-dimensional pencil object along with supporting audio.           |
| The letter Q      | AR camera detected  | Markers project a 3-dimensional queen object along with supporting audio.            |
| Marker letter R   | AR camera detected  | Markers project a 3-dimensional rocket object along with supporting audio.           |
| The letter S      | AR camera detected  | Markers project a 3-dimensional sofa object along with supporting audio.             |
| The letter marker T | AR camera detected | Markers project a 3-dimensional table object along with supporting audio.            |
| U-letter markers  | AR camera detected  | Markers project an umbrella 3-dimensional object along with supporting audio.        |
| The letter V markers | AR camera detected | Markers project a 3-dimensional vase object along with supporting audio.            |
| The letter marker W | AR camera detected | Markers project a 3-dimensional watermelon object along with supporting audio.      |
| The letter X marker | AR camera detected | The marker projects the 3-dimensional xylophone object along with supporting audio. |
| The letter Y marker | AR camera detected | Markers project the yoyo 3-dimensional object along with supporting audio.          |
| The letter Z marker | AR camera detected | Markers project a zero-dimensional 3-dimensional object along with supporting audio. |
3. Result and Discussion

3.1. Implementasi Marker

The marker used in this application is a cube, but one marker is not only on one side of the cube, but is divided into 4 different sides of the cube. So to form one whole marker, it takes 4 cubes with the appropriate combination to form a single marker [5]. Markers are created using Photoshop CS3 software. Markers that have been created will be entered into the Vuforia database.

![Figure 11 Marker Implementation](image1)

3.2. Implementasi User Interface

Interface implementation is a display of the application being built. Here are the interfaces contained in the application in accordance with the design that was built in the previous chapter.

![Figure 12 Interface Learn Menu](image2)
![Figure 13 Interface Play Menu](image3)
![Figure 14 Interface Learn Alphabet](image4)
![Figure 16 Interface Scan AR](image5)
![Figure 15 Interface Learn Object](image6)

3.3. Augmented Reality Testing
Augmented reality scan test results are performed to determine the results of 3-dimensional objects from all markers that have been scanned by the device. This test needs to pay attention to aspects so that 3-dimensional objects can be displayed perfectly, because the device can read markers well under certain conditions, such as consideration of light, distance, and tilt angle range.

Figure 18 Result Augmented Reality

4. Conclusion
The author distributes questionnaire sheets to the accompanying teacher who accompanies students when using the application. From the results of questionnaire data collection collected from 5 users, the final result is 5.71% said that it is enough. Then 42.86% said they agreed, and 51.43% said they strongly agreed. Analysis of the trial results of this application is that this application runs quite well and the user can also run this application well. The appearance of the application is interesting and easy to understand and the available content is also in accordance with the students' material needs. Assistive devices and cubes also greatly assist students in the learning process, where students can become more active when learning. This application can also increase student interest in learning.

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