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Report on the Creation of the "Sense of Vision" Application Using Android-Based Augmented Reality Technology

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A B S T R A C T

Making the "Sense of Sight" application using Android-based augmented reality technology is an innovation that was created as a means to help elementary school children understand natural sciences class IV (four) theme 5 material on the sense of sight more effectively and interactively. When viewed in terms of the theoretical benefits of research, this research was created in order to provide a new concept in the world of education and can be used as reference material for further similar research. Then, the practical benefit of this research is that researchers gain knowledge to apply a technology in learning in the form of an application and can be used by students so that learning will be more effective and enjoyable. The results of this study are in the form of visual sensory application products using Android based Augmented Reality technology, which teachers can use as one of the learning media on theme 5, namely the sense of sight.

A R T I C L E   I N F O

1. INTRODUCTION

In general, many schools, especially elementary schools, still apply learning by using book media to convey material (Muna et al., 2019). Including in the learning of Natural Sciences class IV theme 5 about the sense of vision which is very important to learn in order to know the parts and functions, as well as diseases that can attack the sense of vision. Most students are lazy to learn natural science related to the sense of vision because they find it difficult to understand the existing material and lack of shadows in understanding the material presented (Amalia et al., 2020). This tends to make students experience a sense of boredom to learn the sense of vision. Moreover, at this time it is not uncommon to find teachers who are still not creative in implementing learning in the classroom so that students find it difficult to explore and understand the science being taught (Firmansyah et al., 2021).

In this century, technology and information are very important (Astuti et al., 2021) and cannot be separated from daily life. This can be ascertained by the habit of a person starting from waking up until he will fall asleep again they cannot be separated from his cell phone. This is also in line with our world of education where in this era of globalization and technology students tend to be more interested in being able to learn using online media or their gadgets than using print media (Sudarmo, S., et al., 2021). Currently, many students are also more interested in their gadgets than reading textbooks (Widyatmojo and Muhtad, 2017). Many students prefer to play games rather than study (Firmansyah et al., 2021). However, many games played by children are games that have no learning function at all (Hartono et al., 2015). In this case, educators must work harder in order to create new innovations that can be used in learning to attract students' attention. The hope is that students can learn more optimally and the process of transferring knowledge can run smoothly and well.

In general, games are considered as something negative. However, nowadays games can play a good role in various fields, one of which is in the education sector (Suwarno and Eng, 2021). Games can make it easier for someone to learn things so that it is easier to understand them and learning will seem more interesting. Unity is an application program that can be used to develop multi-platform games in design so that it is easy to use (Prasetyo et al., 2021). Unity is a professional application program with an editor inside made with an uncomplicated user interface. In addition, nowadays various technologies emerge along with the times, such as Augmented Reality (AR). Augmented Reality (AR) is a technology that combines computer-generated objects, two-dimensional or three-dimensional, into the real environment around the user in real time.

Previous research by Rezende, W. J., et al. (2017) entitled " Use of Augmented Reality to Support Education", proves that learning by using Augmented Reality (AR) based applications is proven to help increase the interest of elementary school students in learning activities. In addition, research by Suwarno and Vincent (2021) entitled "Solar System Educational Games for Visual Reality-Based Elementary School Students", proved to be able to increase knowledge and stimulate the brain's thinking ability.

Thus, researchers found a new innovation that can be used in the world of education, especially in grade IV elementary school students in studying theme 5 on the material of the sense of vision by making Unity-assisted applications using android-based Augmented Reality (AR) technology. In this case the researcher made the research title "Making Sense of Vision Applications Using Android-Based Augmented Reality Technology". The purpose of making applications is to make it easier for students to learn the sense of vision material and can increase student interaction and help visualize the sense of vision material.

2. METHODS

2.1. Prototyping Method

Based on reference about prototyping method (Putri Sujana, A., et al., 2018), there are some steps to do the prototyping:

1. Gathering Needs

In this stage, researchers collect data needs by looking at online journals related to making applications and looking for references on YouTube to find sources of material related to the sense of vision. Not only that, we also look for sources of material through thematic books for class IV theme 5 regarding the sense of sight to see the content of the lessons in it.

2. Building the Prototype

In this stage, researchers create a program application design by making an initial design using Canva. The initial design consists of the main menu page, instructions page, information page, material page, and destination page. The image objects needed in the application are the application background, the sense of sight and its parts, as well as some other necessary forms such as arrows and home menus. Researchers also make flowcharts as the flow of the program in the application.

3. Prototype Evaluation

In the evaluation stage, the application design that the researcher has made will be assessed. The assessment includes deficiencies in the application. After being evaluated, the AR camera page is added.

4. Application Coding

At this stage, coding is carried out on each learning menu to the game and buttons in each menu based on the flow of the program according to the flowchart that has been made.

5. Application Testing

At this stage it is done using black box testing. This test is carried out by testing all displays in the program, from testing each button in the learning application to trying all existing menus. This is done to anticipate errors or errors, and ensure the application is as desired.

3. RESULTS AND DISCUSSION
3.1. Concept and Design

The application developed is an application made to support learning, in this case the material carried is the material of the sense of vision. The basic competencies taken are identifying the eye and recognizing disorders that occur in the sense of vision. Therefore, the design of this application will certainly involve materials related to eye parts and eye disorders. The application allows students to access several menus including application instructions, materials, objectives, information, developer profiles and AR products. The

application features are equipped with buttons/buttons, namely, start, back, forward, and home buttons.

3.2 App View

3.2.1 Main Page View

Figure 1 is the main page display; on this main page a start button is displayed to start the application to the next page.

Figure 1. Main page view

3.2.2 Learning Menu Page Display

Figure 2 is a display of the learning menu page, on this page there are buttons that will direct to the pages listed, namely the instructions menu, material, objectives, information, profile, and exit menu.

Figure 2. Learning menu page display

3.2.3 Instructions Page Display

Figure 3 is a picture display of instructions for using the application. In this display, the functions of the buttons in the application are explained, namely the start button, back button, forward button, and home button.
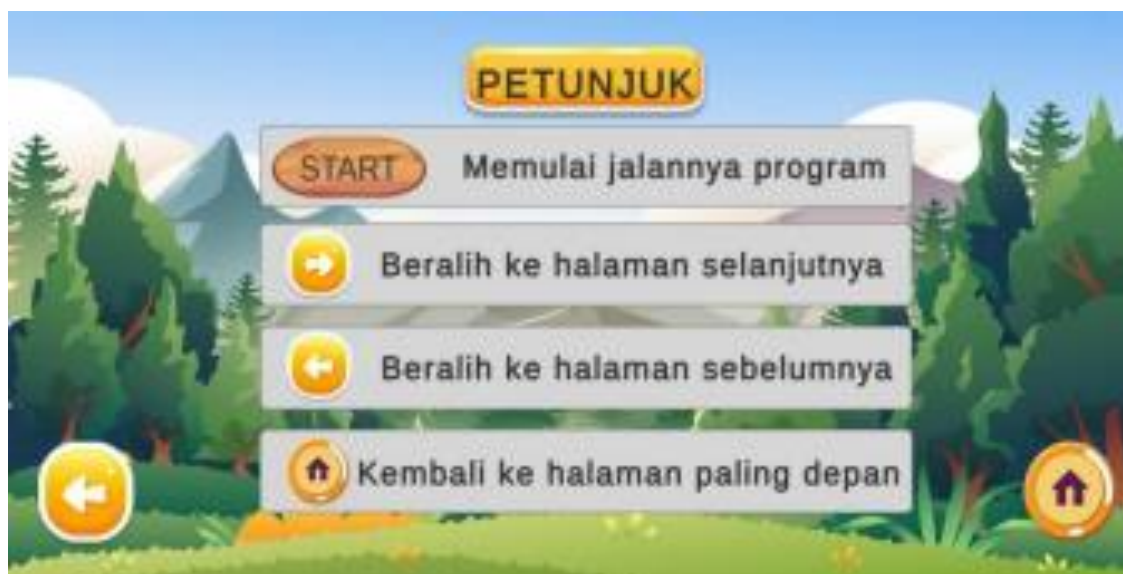
Figure 3. Instructions page display

3.2.4 Material Page Display

Figure 4 shows the material page which contains the titles of several sub-materials, namely parts of the eye, how the eye works, abnormalities or disorders. Each of them when selected will display the material according to the title. the following material content is shown in Figure 5, Figure 6, Figure 7.

Figure 4. Material Page Display

Figure 5. Material Display of Parts of the Eye

Figure 6. 'How the Eye Works' Material Display

Figure 7. Display Material of Eye Disorders or Abnormalities

3.2.5 Information Page Display

Figure 8 is an information page display containing information on the basic competencies used, and the indicators to be achieved. In this display, you can choose

whether you want to see the basic competency page according to Figure 9 first or the indicators according to Figure 10 first.

Figure 8. Information Display

Figure 9. Basic Competency Display

Figure 10. Indicator Page Display

3.2.6 Developer Profile Page Display

Figure 11 displays the names of the app developers along with a photo of each developer.

Figure 11. Developer Profile View

3.3 Black Box Testing Results

Based on the testing that your group has done using the black box testing or behavioural testing method, the results obtained if the visual sense learning application that our group made runs according to the flow of the program. Black box testing or behavioural testing itself is a test that is carried out to observe the input and output results of the software without knowing the code structure of the software (Rony, 2021).

3.4 User Satisfaction Testing Results

In addition to testing using the black box testing method, our group also conducted customer satisfaction testing by experimenting with 5 elementary school students. Our group gave access to the five students to use and explore the "Sense of Vision" application that we have made, after which they will provide comments on the "Sense of Vision" application. Through this experiment, we found that four of the five students were interested and happy to use the app as a learning tool, while the other one felt bored when using the app. So, it can be concluded if the "Sense of Vision" Learning Application can help students or learners obtain sense of vision material through application media.

4. CONCLUSION

The conclusions of the research related to the making of this application are as follows.
1. The "Sense of Vision" application was successfully designed and built using Unity and exported in the form of an .apk file extension.
2. This media has the main components, namely the main menu page, instructions page, information page, material page, destination page, and AR camera page.
3. Based on the results of testing with black-box, all functions in the application have successfully run and in accordance with their respective functions.
4. The theoretical benefits of this research are that it can provide new concepts in the world of education and can be used as reference material for further similar research.

5. The practical benefit of this research is that researchers gain knowledge to apply a technology in learning in the form of applications and can be used by students so that learning will be more effective and fun.

5. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. Authors confirmed that the paper was free of plagiarism.

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