

Development of Augmented Reality Technology Applications Gadget Based

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Abstract

The development of augmented reality technology applications using gadget media can be used as a source of learning that occurs in cyberspace to become real. As for the purpose of the study is to determine the feasibility test and student response to the development of gadget-based augmented reality technology applications. The method in this research is a development approach or Research and Development (R&D). The subject of product validation was carried out by several experts, namely media experts, material experts and practitioners (science teachers). Furthermore, the subject of product testing was carried out by students of SMA Muhammadiyah Kota Langsa consisting of 20 science class students.

Keywords

applications augmented reality, gadgets



I. Introduction

The development of the times when the development of technology using communication tools is increasingly sophisticated and makes it easier for people to communicate and get various information quickly as well as entertainment such as music, videos, games and others. One of the most developed communication tools today is the gadget. According to Fathoni's opinion (2017), Gadgets are a very popular technology today, not only for adults but still children using gadgets. Gadget is an electronic device that is used as a medium of information, learning media and as entertainment (Warisyah, 2015).

In the opinion of Wulan Patria Saroinsong (2016), who revealed that the use of gadgets will have a detrimental effect on every interpersonal skill and children rely more on gadgets than on their abilities. The use of gadgets can also shape the character of students in carrying out the learning process. Gadget is also defined as a term in English which means a small electronic device with various special functions (Chusna, 2017).

This gadget media also functions in using augmented reality technology applications. Augmented reality in the opinion of Saputro (2015) who concluded that the application of Augmented Reality is able to realize the virtual world into the real world, can display 2D image objects into 3D objects, so that learning is not monotonous and children are encouraged to find out more, such as knowing shape and visualization of animal names that resemble the original. Relevant to the opinion of Andre (2017) which explains that Augmented Reality or in Indonesian is translated into additional reality is a technique that combines two-dimensional and three-dimensional virtual objects into a three-dimensional real scope and then projects these virtual objects in real time.

The development of technology, communication and information, especially the internet has become a demand for teachers in Indonesia to be able to use it as a source of positive learning media in supporting teaching and learning processes. The use of technology media provides benefits for teachers and students to access learning materials and interact directly in learning in the classroom, and also outside the classroom through online media (Prasasti, 2019). Simanjuntak et al (2019) stated that learning media is one of the most important communication components in delivering a material that is delivered by the communicator (teacher) to the communicant (students) to be able to provide the same stimulation, equalize experiences and lead to the same perception in learning activities teaching to achieve learning objectives or it can be said that learning media is a series of processes or learning activities, where students are active in learning the subject matter delivered by the teacher so as to achieve a good learning goal

Learning media that uses Augmented Reality technology can easily improve student understanding because 3D objects, text, images, videos, audio can be displayed to students in real time. Wang (2017) AR is a technology that combines the real environment and virtual objects with the help of computers. The results of Marzouk's (2013) research show that the implementation of Biology learning using AR with game techniques can provide more fun, collaborative, and attractive learning in learning about human anatomy.

The AR application was also revealed from the results of Nurdianti's research (2017) which concluded that learning with AR media was very effective with an effectiveness level of 89% towards students' KKM achievements on the concept of human excretion. Sedana with Andriyadi's opinion (2011) states that augmented reality (AR) is a combination of virtual objects and real objects. According to Ronald T. Azuma's definition in the quote (Utami, 2015), the first is that augmented reality is a combination of the real and virtual worlds, the second is augmented reality runs interactively in real time and the third is that there is an integration between objects in three dimensions namely virtual objects integrated in the real world.

Fajarini (2014: 128), namely character is inner standards that are implemented in various forms of self-quality. In accordance with the opinion of Arif (2017: 138) states that the term character literally comes from the Latin "character", which among other things means: character, character, psychological traits, character, personality or morals. Relevant Kurniawan (2014: 22) argues that the importance of character education from early childhood or what psychologists call the golden age, according to him, at this age is proven to greatly determine the ability of children to develop their potential.

In connection with the above opinion regarding learning using gadgets as a learning medium which is a government policy to oblige every school to learn online. Thus the aim of the research is to determine the application of gadget media can affect the character value of students.

II. Research Methods

The method in this study examines the development approach or Research and Development (R&D) by adopting the Akker model (2009) which consists of four stages, namely the preliminary research stage, the prototype stage (Prototyping Stage), the summative evaluation stage (Summative Evaluation).) as well as systematic reflection and documentation (Systematic Reflection and Documentation). Meanwhile, according to Sugiyono (2013) provides an opinion on research and development, namely the type of research used to produce certain products and test the effectiveness of these products.

The subjects used in the study consisted of a product validation subject and a product trial subject. The subject of product validation was carried out by several experts, namely media experts, material experts and practitioners (science teachers). Furthermore, the subject of product testing was carried out by students of SMA Muhammadiyah Kota Langsa consisting of 20 science class students. While data collection was carried out with a character questionnaire on the use of the media and an expert validation questionnaire. The data analysis in this research is the feasibility data analysis (media expert, material expert, practitioner expert) and student response data analysis.

III. Result and Discussion

The concept of the research results obtained with the development of augmented reality learning media consists of four stages as shown below.

3.1 Preliminary Research

At this stage the research team conducted a survey of the research location to find out the problems that occurred in school as a research location. The research team also conducted outreach and discussed with curriculum representatives and biology and physics subject teachers to determine a schedule for research activities and determine research samples.

3.2 Prototype Stage

The process at the prototype stage begins with conducting a needs assessment (need assessmet), then carried out by developing a prototype learning media for Biology and Physics using gadget-based AR technology. For more details at this stage can be seen in the image below.

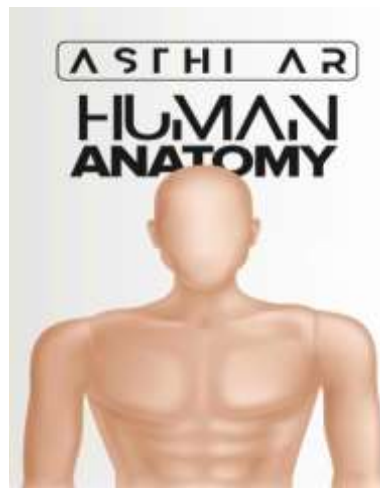


Figure 1. Initial stage of AR application

The results on the image display are for the beginning to go to the menu of the human body anatomy material contained in the AR application and explain the structural and functional parts of the image.

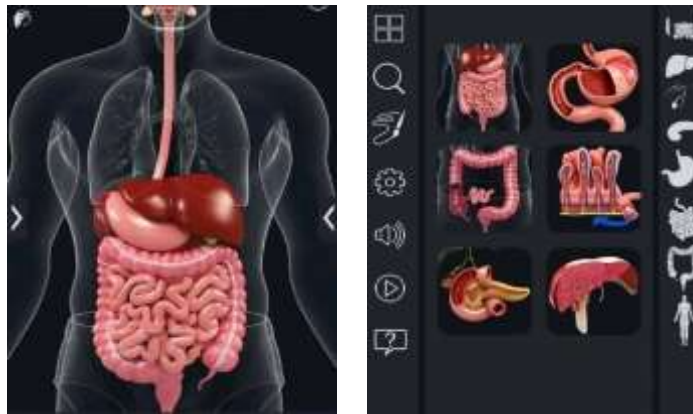


Figure 2. *Second Stage AR Application Menu*

The results of the menu material section on the application are used as material that is presented as a biology subject. Whereas in physics subject, it can be in the AR application below.

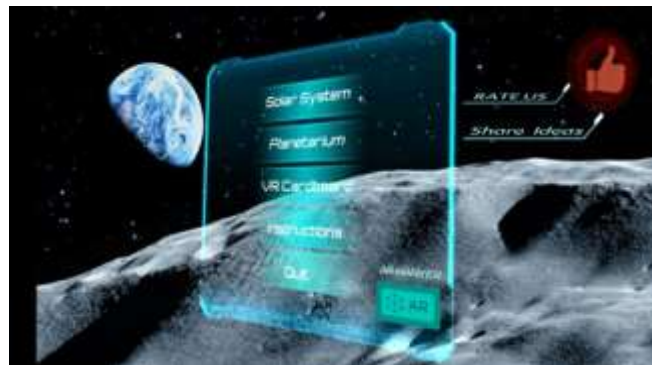


Figure 3. *Initial Stage on the AR Application of Physics Materials*

At this stage using the AR application on physics material, which shows several menus of the material that will be taught to students.

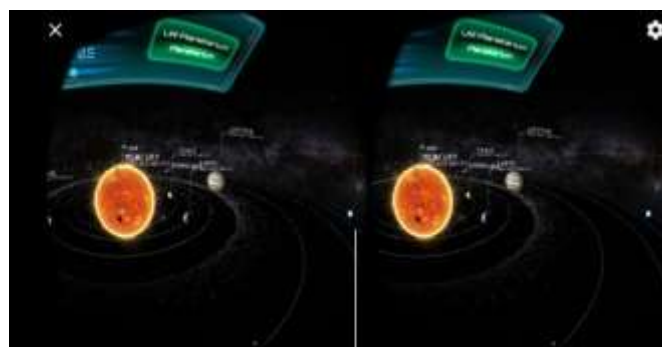


Figure 4. *The Stage of Using the AR Application of Physics Materials*

Based on the picture above, using the Biology learning media using AR technology that has been made, then a feasibility assessment is carried out by involving three competent experts in the fields of media, material content, and pedagogy. The results of expert assessments of Biology learning media using AR technology are presented in the following figure.

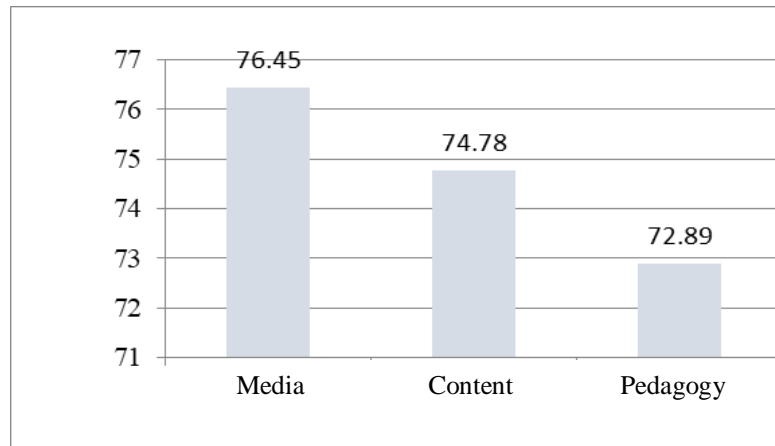


Figure 5. *Validation Results of Feasibility Assessment of Science Learning Media Using Technology*

Based on the picture above shows that according to the expert judgment, the prototype of science learning media using gadget-based AR technology that has been developed fulfills the criteria as a suitable (valid) media.

3.3 Summative Evaluation

At this stage, it is carried out by implementing the use of AR media technology with science material. This stage is also carried out through giving tests to students before and after the application of AR technology media. The test was carried out by giving questionnaires to students to find out the effectiveness of the work response on the AR technology media. The summative evaluation stage is part of the implementation of the use of media widely in biology learning. Summative evaluation is carried out through giving tests to determine the students' mastery of concepts on the material being studied as well as knowing the level of effectiveness of the Biology learning media using the AR technology developed, besides that students are given a questionnaire to find out the response to the implementation of the use of AR technology media.

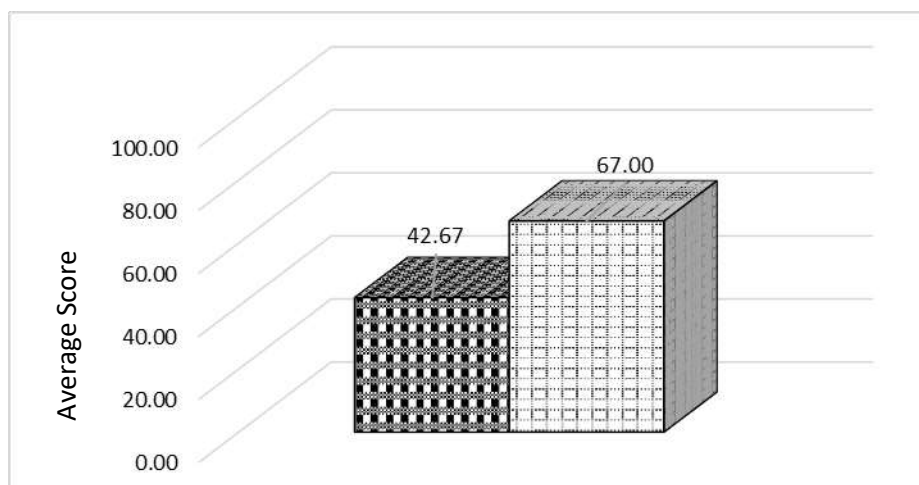


Figure 6. *Student's Average Score against Augmented Reality Media*

Based on the results obtained, it is shown in the picture above regarding the student's response before with a value of 42.67% which is stated to be sufficient, while after implementing augmented reality learning media with a value of 67.00% it is stated good.

3.4 Systematic Reflection and Documentation

The process of implementing research activities at this stage contains reflection and documentation of research activities as well as how the appearance of the media developed. At this stage it is also explained in general to students by socializing how to work procedures for AR applications to be used as learning media. The term social class is used as a shorthand term for differences for between people which are associated with differences in social prestige, wealth, and education (Ramlan, 2018). First, students are given a guide to the AR technology media learning process. Furthermore, students will be in monitoring the work system both before and after.

The results obtained in this study are in accordance with the opinion of Saputro (2015) who concluded that the application of Augmented Reality is able to realize the virtual world into the real world, can display 2D image objects into 3D objects, so that learning is not monotonous and children are encouraged to know further, such as knowing the shape and visualization of animal names that resemble the original. Through the results of his research (Nurlifa, 2016) states that the results of his research on augmented reality eye organs have a high level of satisfaction regarding the results of display, understanding in learning and user interest in studying eye organs using augmented reality. Another research conducted (Mauludin, 2017) discusses the application of augmented reality to the digestive system.

IV. Conclusion

The results of the conclusions obtained in research activities are related to the explanation of the research results as follows.

1. The results of the feasibility of the augmented reality learning media which were assessed by a team of media expert validators with a value of 76.45% were declared good, content with a value of 74.78% was categorized as good, while the pedagogical value of 72.89 was declared good, it can be concluded that the learning media augmented reality is declared valid can be implemented to students.
2. The response to research implementation with the development of augmented reality learning media before and after there was an increase in the value category of 24.33%, there was an increase in using augmented reality media.

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