The Development of Augmented Reality-Based Learning Media to the Introduction of Computer Course in Curriculum and Educational Technology, Faculty of Education, Universitas Negeri Padang

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Abstract-Education is one of the solutions to increase human capabilities in science and technology. Yet, there has been a contradiction in its implementation where the learning process is still delivered through manual books so the process cannot reach its optimum learning goal maximally. This is caused by the lack of supportive learning media and facilities. Besides, the limited time of learning process in the classroom creates another barrier, such as the lack of students' understanding towards practice materials which show many types of physical objects cannot be seen over the class session. This research aims to develop augmented reality-based learning media alternatives. This study applies research and development method with the 4D approach. The result will develop a learning media based on augmented reality to the Introduction of Computer Course which is a kind of application that combines virtual objects, such as text, images, and animation into reality.

Keywords*: Learning Media, Information Technology and Communication, Augmented Reality*

I.   INTRODUCTION

Education is one way to improve human capabilities in the field of science and technology but in its application is very contradictory, where the learning process still uses many textbooks, as a result, many learning processes are not conveyed optimally because of the lack of supporting media and learning tools. the limitation of the teaching and learning process in the class makes students not understand the lessons outside the lecture hours because of the limited ability of the textbook to explain the lesson especially in the field of practice which shows the physical objects that may not be found outside the lesson hours. learning media in the form of augmented reality which is an application that can combine virtual objects in the form, text, images, and animations into the real world

Augmented reality is a technology that gets a lot of attention by people today because its ability to combine text and image media into the real world, augmented reality can make users explore objects from different perspectives viewed from these advantages, augmented reality can help the learning process especially lessons that must display the tools in a more detailed perspective unlike in a picture in the textbook.

Computer basics are courses that introduce a lot of devices on computers but college time is very limited Students cannot see the device in detail outside of class if they do not have a computer, outside the lecture hours the textbook cannot describe the tools in detail so that many students cannot understand the functions of the tools on the computer.

Gerlach & Ely (1971) in Arsyad (2011: 3) says that "media, when understood broadly, is human, material, or event that builds conditions that make students able to obtain knowledge, skills or attitudes". In this sense, lecturers, texts, and the campus environment are media. More specifically, the notion of media in the teaching and learning process tends to be interpreted as graphical, photographic, or electronic tools to capture, process, and reconstruct visual or verbal information.

The National Education Association (NEA) has a different view from the above opinions. The NEA argues that "media are forms of communication both printed and audio-visual and their equipment. Media Should be manipulated, can be seen, heard and read (Sadiman, et.al, 2011: 7)

Based on several opinions on the notion of learning media it can be concluded that learning media is everything that can be the intermediary of the sender of the message to the recipient of the message from the simplest tool to the most sophisticated tool. If exemplified by the present day, the simplest tool is a message from the mouth to the most sophisticated tool today is a teleconference.

1. *Augmented Reality*

    Tazuma (1979) explains that augmented reality technology that combines the real world and virtual world, runs interactively, real-time, and 3-dimensional animation. Development was made to be able to build a system that can combine the information in the real world with digital information, technology in augmented reality was developed using detection of an image called a marker or marker,

    The development of augmented reality is currently very widespread not only in the field of technology but also health, military, property and manufacturing industry, in the world of e-commerce augmented reality is widely used to describe the suitability of goods ordered with their original form so as to reduce the impact of risk ordered through the internet with real goods.

2. Merker *augmented reality*

    there are several components needed in the augmented reality, namely input and output, inputs from augmented reality can be in the form of 2d / 3d objects that are used as markers or markers, then the camera is used as an intermediary tool for input and output, while the output can be a monitor and cellphone screen

    One of the augmented reality methods that can be used is by applying the markerless augmented reality method. According to Rizki, the application of markerless augmented reality on mobile devices, especially Android will be more efficient, practical, interesting, and commonly used whenever and wherever anyone needs to print a marker

3. Computer Basics

    Computer basics is a course that studies devices on computers, including software, hardware, and operating systems, in computer basics, it is explained how a computer can work from a hardware device to display and operate into software through the operating system as a liaison, on a computer basics course there will be a lot of explanations of the devices on the computer and the functions of each of these devices, and how the impact if the device is damaged.

II. METHOD

This type of research is development research known as Research and Development (R & D). The development model that will be used in the development of media based on augmented reality learning for Computer Basics subjects in the UNP FIP is 4D namely Define, Design, Develop, Dissemination.

This development research uses a 4D development model (Four D) consisting of four main stages, namely:

1. *Define*
2. *Design*
3. *Develop*
4. *Disseminate*

a. Define
1. Curriculum Analysis

    Curriculum Analysis is used to find out what indicators students must achieve in learning so that competency standards and basic competencies can be achieved. The curriculum used in the Department KTP FIP UNP is the 2013 curriculum.

2. Student Analysis

    Student analysis is a study of the characteristics of students in accordance with the design and development of augmented reality-based teaching materials. In this study researchers found several problems, including computer basics, is a subject that introduces many devices in computers but lecture hours are very limited students cannot seeing the device in detail outside of lecture hours if it does not have a computer, outside the lecture hours the textbook cannot describe the tools in detail so that many students cannot understand the functions of these tools.

3. Media Analysis

    Media analysis was conducted to determine the extent to which augmented reality-based teaching materials in computer basics can improve students' abilities, interests and motivations, and student learning outcomes.

b. Design

Product design needs to be done in designing the appearance of teaching materials so that they are easy to use and attractive to students and able to motivate students in learning. The design of teaching materials is made in the form of flowcharts and storyboards. At this stage, the design of teaching materials is carried out starting from Menbuat markers for augmented reality, designing the appearance of instructional materials, inputting materials and evaluations.

c. *Develop*

1) Validation stage

    a) Expert Validation

    Validation was carried out by two media experts, namely 1 FIP UNP KTP lecturer and 1 Puskom employee at UNP as Media validator and a lecturer in computer basics as a material validator.

    b) Revision

    The revision is carried out according to the input from the media validator and material validator. Revisions are made before product testing. The revision results are validated initial products, this needs to be done so that the initial product can be called suitable for use by students when entering the trial phase.

2) Practical Stage

This media is said to have practicality if it is practical, easy to use, easy to check and complete, and clear instructions. At this stage, an assessment of augmented reality-based teaching material is carried out on the Basic School-Computer course of the UNP FIP KTP students with a total of 115. In this trial, the researcher introduced Augmented reality-based teaching materials to students and afterward spread questionnaires to determine the extent of assessment of the appearance, material, and practicality of student-based augmented reality teaching material.

3) effectiveness stage

To measure the effectiveness, a pretest and posttest are performed so that the product produced is effective or not

III. RESULTS AND DISCUSSION

Augmented Reality-based teaching materials are expected to be able to make the learning process more interactive and can help students understand computer equipment through independent learning. Active learning by students will actively be able to develop all of their potential so that students are able to optimize learning outcomes.

According to Miarso (2011: 267) "there are two possibilities for implementing the principle of independent learning, namely (1) used learning programs that contain instructions for self-learning by students with minimal teacher assistance, and (2) involving students in planning and carrying out activities". Teaching materials based on augmented reality can be a learning tool for students even though they are not in lab laboratories with the advantages possessed by augmented reality teaching materials that can describe objects more realistically. They are also expected to help Teachers because students already have a prior understanding at home before the learning process.

Computer basics courses are theoretical and practical subjects besides computer basics are learning that have many aspects, both hardware devices on computers to software that supports the running of computers other than that computer basics are courses that support the knowledge of IT both Network, Multimedia and solving damage to the Computer

At present the Learning Process of the basics of computers is still not maximally limited while the aspects of the lesson that need to be discussed very much besides that the learning of computer basics shows a lot of devices that support a computer can run while the device can not be seen on outside of lecture hours not only are other supporting learning facilities such as books and handouts still limited, so students cannot repeat theoretical lessons at home

The limited number of teaching aids for computer devices also made many students not understand because they had to jostle to see devices on computers while there were only a few basic computer lecture hours, there were still many students who did not know how to repair computers even after completing computer basics.

Development of Augmented Reality-Based Learning Media for Subjects Computer Basics In the Department of Curriculum and Technology Education the Faculty of Education UNP is expected to overcome the existing problems, the advantages of Augmented reality that can combine media text images and animation into the real world so that handouts on development media based on augmented reality can be a problem solving both theory and visual description of computer devices in the form of 3-dimensional objects

Discussion

The use of interactive media in learning is important because the process of transformation of knowledge can have an influence on a person & behavior because it contains attention, retention, production, and motivation which will ultimately give a person the effect of inhibition on the behavior (Badura, 1985 in Gledler (2011). The advantages of augmented reality-based media supported by similar research entitled Development of Augmented Reality-Based Learning Media (Mustaqim and Kurniawan, 2017) suggests that Augmented Reality can replace learning modules that do not yet exist in virtual or virtual forms. Students can still see and use modules like the original module but in virtual form. Through this new breakthrough, more and more variations of learning media can be built to support learning activities in schools, especially vocational schools that require practical learning modules. Research (Wahyudi, Wibawanta, and Herdyanto: 2017) entitled Development of Educational Media Based on Augmented Reality for Interior and Exterior Design concludes that learning media based on augmented reality can improve students' abstraction power. And Effective Augmented Reality for use in learning. Effectiveness can be seen from the increase in the learning outcomes of the experimental class higher than the control class

Conclusion

Development of Augmented Reality-Based Learning Media for Computer Basics Courses in the Curriculum and Technology Department of Education UNP Faculty of Education is needed to support the learning process in subjects Computer basics that still have many limitations both in terms of the time of learning tools and means of supporting philosophy. The development model used in the development of Augmented Reality-based learning media can be done through the 4D model development approach, Define, Design Develop, Dissemination with the model approach is expected to produce a valid, practical, and effective learning media.

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