The Development of Learning Materials for Introduction of Animals in Early Childhood Using Augmented Reality

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Abstract. Give the definition of work *Augmented Reality* (AR) and see how the learning process can be arranged outside the classroom with mobile learning. Classify major components (device technology, models of instructional design, media types, and activities/outcomes study). Discuss constraints technical and pedagogical presented by AR, before looking at how that can be used for learning. AR can be used in mobile learning. The important contribution of the two fields can be seen in a discussion of the underlying teaching techniques related to the use of AR; and taxonomy which classifies the various aspects of mobile AR to study in a variety of situations. AR as an alternative medium of learning in the future. In the past, the limitations of AR technology are only used in one place cannot be moved around. However, the development of AR continues to do so has been obtained AR a portable or can be taken anywhere. Utilization of AR in the world of education to the introduction of animals to early childhood through *smartphone* devices and cards.

Keywords: Augmented reality · Smartphone · Mobile · Childhood

1 Introduction

The process of efficiency in the utilization of space and time encourages people to continue to develop various technologies. The developed technology is expected to be able to bridge the human needs in their daily activities, especially related to the efficiency of space and time [1]. Knowledge management is very important for human resource management, one of them related to the development of multipurpose technology for present the best service quality [2, 3].

The role of information technology in learning can be seen through the utilization of augmented reality (AR) the AR function which is to give information in the form of a 2D or 3D images from a mobile device or a laptop. Utilization of AR which originally could only be used on an HP device only and could not be moved is evolving into an AR can be used not only on HP but can be used with a laptop through the application website and its utilization can be switch.

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The use and utilization of AR and mobile learning in accordance with the needs that occur this time viewed from the characteristics of learners who are happy with pictures than read the writing. But these characteristics are more tolerated by children-early childhood than adulthood. Utilization of AR in the process of learning affect interest learners to explore material that is taught through images of 2D or 3D. Utilization of AR also reduces the use of classroom space for props. Tools used by *mobile phone* as reader and cards contained objects 3D images that can be printed or can be stored on laptops in the form of soft file.

Learners and educators must have a mobile phone that is capable of in terms of image resolution and long-lasting battery. A cognitive perspective of digital information with AR can enrich the imagination of learners to accelerate understanding of the material presented. When compared to giving the theory or explanation only in class then the learners more difficult to understand the material. Therefore, very important when content is created educators used for provided the material to students with not only theory but can display images that correspond to reality.

Learners can use the technology of AR in the learning process. By using this technology learners can learn independently although it may be a bit large costs in terms of use of the device. Utilization of AR to introduce the animal to early childhood with 3D images, audio and written into the goal to be achieved in the writing of this. In addition, the development of learning materials may increase, eases and accelerates the understanding of the material presented by educators in the learning process.

2 Literature Review

Reality is added, sometimes known by the acronym English AR (augmented reality), is a technology that combines the two dimensional and virtual objects or three dimensions into a real three-dimensional environment and then projecting the virtual objects in real time. Unlike virtual reality which completely replace the fact, the reality of added simply add or complement a reality. Maya objects display information that cannot be accepted by the user with its own sensory. This makes the reality of the added match as a tool to help users with perceptions and interactions of the real world. Information displayed by the Mayan objects helps the user to carry out activities in the real world. The reality of the added can be applied to all the senses, including hearing, touch, and smell. In addition to use in areas such as health care, military, manufacturing industry, the reality of added has also been applied in devices that people use a lot, such as on a mobile phone.

There are several methods that can be used in augmented reality i.e. one is Marker Based Tracking. This marker is usually a square black and white illustration with black background and a thick background who is white. On your computer can recognize the position and orientation of the marker object and creates a 3D virtual world that is the point (0, 0, 0) and axis consisting of the X, Y and z. Marker Based Tracking this long developed since the 1980s and began developed in the use of Augmented Reality.

In addition, the methods used in Augmented Reality that until nowadays is to use the method of Markerless Augmented Reality, with this method, users no longer need to use a marker to display elements Digital.

A variety of techniques that can be used by using the Markerless Tracking that is as follows:

a. Face Tracking: By using the techniques that they develop algorithms, the computer can also recognize a human face in General by way of recognizing the position of the eyes, nose and mouth. It will then ignore the other surrounding objects such as trees, houses and other objects.
b. 3D Object Tracking: Unlike the face tracking which only recognize a human face. By using the technique of 3D Object Tracking can identify all objects exist such as cars, motorcycles, a desk, TV and others.
c. Motion Tracking: This computer technique can capture movement or Motion Tracking that has been started is used extensively to produce a film that simulates on the movements of the body. For example, in the film James Cameron's avatar, which used this technique to make the film look like more real-time.

Precise digital documentation using a different scanner laser technology as 3D scanning device [10]. Augmented reality is one of the technologies that dramatically shifts the time and location of the study. How AR can apply to study media, and potential impact towards the future [11].

Most of the innovative device offers the opportunity to integrate augmented reality on mobile applications, enabling the combination of virtual information with the real world. This feature can be very useful to improve the informal and formal didactic action based on the collaboration of students [12] (Table 1).

Table 1. Taxonomies are used in the AR project mobile learning, showing how it can be used to categorize various aspects of research

In project	The device or technology	Mode interaction/learning design	Method sensory feedback	Personal/together experience	Static fixed or portable experience	Learning activities or the results of the research
Zapp [4]	Smartphone	Exploration Illustration Understanding Reflection	Visual display: text labels	Personal and shared (small groups)	Portable	Interpreting the geological landscapes of the countryside through the investigation lies and collaboration
Out there, in here [5]	Laptop, tablet devices, smartphones	Exploration Illustration Understanding Reflection Collaboration	A mixture of: visual, auditory, text	Together (small groups)	Portable	Collaboration-based inquiry learning to enable data sharing, development hypothesis, access to resources/information etc. among students in the field and those in the laboratory
Contsens [6]	PDA (Personal Digital Assistants), cell phone	Illustration Understanding Reflection Collaboration	A mixture of: visuals (3D wireframe model), video	Private and shared between 2 users	Portable	Archaeological and architectural survey of the ruins of the monastery; give different visual perspective on mobile devices

(*continued*)

Table 1. (*continued*)

In project	The device or technology	Mode interaction/learning design	Method sensory feedback	Personal/together experience	Static fixed or portable experience	Learning activities or the results of the research
An increase in the visitors experience [7]	PDAs, mobile phones, tablet devices, headup display (HUD)	Exploration Understanding Reflection Collaboration	A mixture of: visual, audio, text, video	Private and shared among users 2–3	Static and portable	Compare different engineering technology to provide information about a view to visitors relaxed; the resulting student criteria is focused on usability and sustainability
History unwired [8]	Smartphone, PDA (Pocket PC) + headphones	Exploration Understanding Reflection performance (by the author)	A mixture of: audio, video	Private and shared	Portable	Informal learning about Venice's Castello region through walking tours using locals to describe the experience of local arts and crafts, history and folklore, public space and private
Mudlarking in Deptford [9]	PDA + headphones	Exploration Understanding Reflection Collaboration	A mixture of: text, audio, visual	Together (small groups+pairs)	Portable	Students act as associates of the designers to create a local tour guide on a mobile device, using multimedia related to the local area and their observations

3 Results

As for the introduction of products for animal's results in early childhood by using AR like the image below (Fig. 1):

Fig. 1. Object card

This card serves to keep or put pictures of animal's objects to be created images in 3D form. So, when reader (mobile) are brought near or on the scan to the card will eject the image as follows (Fig. 2):

Fig. 2. The card has been scanned

To display the 3D image is needed as a mobile reader. Then there is an application that must be installed prior to reading the card so that it could look more real. The following image is the application (Fig. 3):

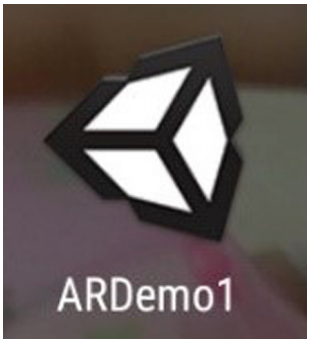

Fig. 3. Application of AR

Application of AR can be installed on the operating system Android. The application used is still in demo version so that the results in the form of new pictures get has not been able to produce sounds and writings. AR was developed by the author for easier to educators in delivering material regarding the introduction of the animals to the learners.

4 Conclusion

The technology of AR can be used as an alternate to develop modern materials at this time. AR or augmented reality can be used to support the learning process of learners and to improve the thinking ability of students to understand materials especially the introduction of the animals. Learners and educators must have a mobile phone to run applications as well as scan objects contained on the card. Objects that are generated at the card can strengthen the imagination of learners in knowing and understanding the content of the material presented. The use of the AR this can give freedom to students in learning independently. AR use to be static or could not be moved now into a product that is in great demand mainly to increase interest in reading learners by displaying objects that look real.

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