APPLICATION DEVELOPMENT OF AUGMENTED REALITY FOR ELEMENTARY ENGLISH TEACHING

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Abstract: When children learn English, they have a limited capacity for long-term attention, which necessitates learning English to be more creative, interactive, and innovative. Furthermore, smartphone technology provides these advantages, one of which is the augmented reality application, a novel issue in English teaching. The purpose of this research is to explain how to design Augmented Reality applications. The research design is the multimedia development life cycle (MDLC), and the research method is descriptive qualitative. It was explained that the augmented reality application could be used with the image distance and the augmented display up to 30 cm and that it could be used by teachers without the assistance of a computer technician using the six cycles of MDLC: concept, design, collecting material, assembly, testing, and distribution. The findings show that Augmented Reality can be used as a creative, interactive, and innovative media to help students learn English.
Keywords: *Augmented Reality; elementary school; English teaching process.*

INTRODUCTION

Given the phenomenon that children have difficulty learning English while also having limited capacity to pay attention for long periods of time and understand things outside their background, it is safe to say thata more appealing and meaningful teaching process for them is required. Furthermore, mobile device technologies have become an increasingly important part of today's generation's activities, resulting in increased educational access around the world. In line with this, this research is an attempt to design English teaching for children using a mobiledevice application known as Augmented Reality. This choice is based on the fact that children are very close to technology, allowing them to easily adapt to the use of this application. Furthermore, augmented reality, which can represent things in real life, encourages children to learn concrete things in English.

The most recent technological advancement in augmented reality design is a novel issue that can be applied to language learning and teaching. At the primary level, education must not only focus on brain development, but also on learning media that can generate motivation and creativity in children (Xue & Wang, 2021). When augmented reality is used in teaching andlearning, it has the potential to increase students' attention and creativity (Chatzopoulos, 2017). The use of Augmented Reality in the teaching and learning process has been confirmed since 2010 (Jamrus & Razali, 2021), and the current descriptionindicates the importance of this technology for allowing learners to admittance everywhere (Yim, 2017), which adheres to the importance of encouraging the growth of digital literacy as an important skill of the twenty-first century. Augmented reality is a technological advancement that is frequentlyused in teaching and learning (Zainuddin *et al*., 2016). Augmented reality is recognized as a new teaching model that can be used in primary school education to provide students with interactive learning opportunities with the material being taught (Arunsirot, 2020). Using this software, student teaching and learning can be optimized, making the learning environment more enjoyable.

The latest research reveals that AR technology in educational setting has well-affected the process of learning (Karagozlu & Ozdamli, 2017; Kirikkaya & Basgul, 2019; Madanipour & Cohrssen, 2020; Xue & Wang,2021). Augmented reality application afford students' effective learning situation with abundant content media belong to students' need (Jing & Jing, 2018). AR apps decreases comprehensible amount while process of learning. The cognitive load is reduced by AR Application while process of learning. Likewise, one of the case studies from schoolof art, it was examined that AR significantly build autonomous reasoning, critical and creative analysis of the students. Another literature review

of Augmented Reality analysis that observed 25 different studies which has been published in reputable journals classified the AR Apps positive effects in 14 different groups and "build up the motivation" in top list rank (Rodríguez-Vizzuett, 2019). Another study that comparing AR student learning versus non - Augmented reality exposed the positive impact, such: an increasing of understanding content, structures of spatial learning, associations of language, and the retention of long – term (Hussain, 2021). In a another research explained the participation description between teachers and students in the use of AR simulation and they discovered the ability of AR in creating hybrid environment in learning process, increasing critical thinking development (Parmaxi & Demetriou, 2020). Meanwhile other research revealed that AR application gave positive result such as high academic achievement in math (Hsieh & Chen, 2019), in astronomy subject (Yen *et al*., 2013), and for students in architecture department (Fonseca *et al*., 2014), self-efficacy and essentially higher motivation (Liu *et al*., 2021). Higher level of participationand motivation in preschool (Oranç & Küntay, 2019), effectiveness, usefulness and practicality have been caused by learning material used AR in engineering class (Dou, 2021), higher levels of interaction, better comprehension with positive feedback and content toward the use of AR application in classes of physics (Sudirman *et al*., 2020), the increasing of collaboration and interest in courses among students in secondary school (Tzima *et al*., 2019).

From the literature review mentioned, there is no article related to how augmented reality effect EFL learners yet. In line with the research gap, this study delivers a research question: how to design Augmented Reality based – English teaching. This article aims to show how the design of an Augmented realityapplication was developed for teaching English to elementary school children. This application is expected to be an alternative learning media for elementary schoolchildren in learning English to motivate and foster creativity among them when studying English material which consists of vocabulary and simple expressions used in conversation. This augmented reality application was developed using the Multimedia Development Life Cycle (MDLC) method. The result of this research is an augmented reality application that can be used by teachers and students in elementary schools.

As a result, numerous related studies focusing on the use of augmented reality have been conducted. The majority of themconcentrated on science education, such as physics and math. As a result, research on how augmented reality contributes to the development of English learning is still limited. As a result, my research aims to create augmented reality-based English teaching tools.

METHOD

The research methodology used in this studyis a qualitative method with a research design adopting a development system from the Multimedia Development Life Cycles. The research design uses the development method from the Multimedia development life cycle introduced by Luther which was later developed by Sutopo which consists of6 steps called: concept, design, collecting material, assembly, testing, and distribution.

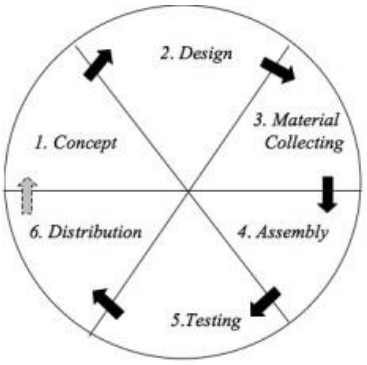

Figure 1. *Multimedia development life cycle*

Concept. The purpose of the concept stage is to identify the purpose of the program and who the program users are (identification audience), types of applications, application objectives,and general specifications. The basic design rules, such as application size, target, and so on, are also established at this stage.

Design. Design is the process of creating detailed specifications for application architecture, style, appearance, and material/materialrequirements. The specifications are detailed enough that no new decisions are required in thenext stage, which is collecting and assembling materials, but instead use what was determinedduring the design stage. However, it is common for additional materials or application parts to be added, removed, or changed at the start of a project.

Material collecting. Material gathering is the process of gathering materials based on the needs being addressed. Clip art images, photos, animations, videos, audio, and other materials can be obtained for free or by ordering from third parties based on the design. This stage can be

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completed concurrently with the assembly stage.

Assembly. The assembly stage is where all multimedia objects or materials are created. Making applications based on design-stage storyboards,flow charts, and navigation structures.

Testing. After the application has been created, it is timeto test its capabilities and performance to ensure that they are as expected. Here, we recompile (recompile) to ensure that all links, buttons, andother features work properly.

Distribution. The application will be saved in a storage medium at this stage, which can also bereferred to as the evaluation stage for the development of finished products to improve them. The results of this evaluation can be used as input for the next product's concept stage. The data collection procedure is based on the Multimedia Development Life Cycle (MDLC), and it consists of several steps beginning with a literature review, creating a concept, designing the application, collecting materials, assembling, testing the application, and distributing.

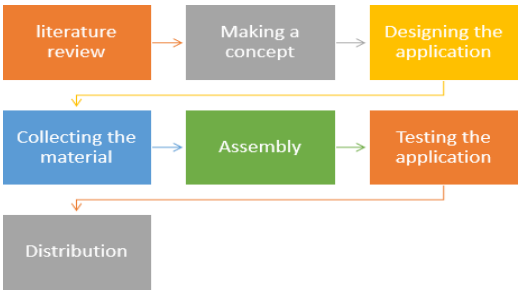

Figure 2. *Data collection procedure*

RESULTS AND DISCUSSION

The end result of this research will be an English learning media for elementary school children packaged in the form of augmented reality. after using the Multimedia Development Life Cycle, the stages of creating this learning media.

Review of literature

During the literature review stage, the researcher attempted to find the concept of augmented reality in various published Scopus articles, employing bibliometric analysis and the VOS viewer to locate articles related to augmented reality. As a result, from 1993 to 2020, there are 301 articles relating to Augmented Reality applications.

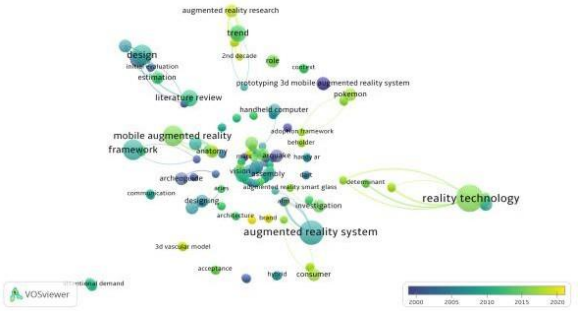

Figure 3. *Bibliometric analysis*

The following references emerged from the bibliometric analysis:

Augmented reality system is the largest cluster in AR research, and this research is focused on developing its own application. This topic is related to academicperformance, interactivity, the previous decade, reality technology, and recommendation.

Another major area of bibliometric analysis is how reality technology affects e- commerce, academic performance, early childhood, effective tools, interactivity, and student profiles.

According to the visible bibliometric analysis, augmented reality research is indeeddominated by how the design of AR is applied in learning, but most of the learning is related to AR application in physics, mathematics, and natural sciences.

Creating a concept

The concept stage is the stage in which the goals and program users are determined (audience identification). In addition to determining the type of application (presentations, interactive, etc.) and the purposes of the application (entertainment, training, learning, and others). Table 1 contains the concept details for this study.

Table 1. *Concept description*

Concept Category	Concept Description
Title	Designing Augmented Reality Based – Teaching of English
Kinds of Application	Augmented reality created by aurasma
Purposes	Creating interactive concepts using augmented reality markers with aurasma application. the material in the augmented reality application uses English material for elementary school students, especially 4th grade on the topic of vocabularies things at schools and classrooms. This application is expected to help the interactive activities of students and teachers in the classroom in memorizing the vocabularies of things at school and classroom.
Target	Teachers in elementary school and

audience	students of fourth grade of elementary.
Audio	Backsound, dubbing, and audio effect with mp3 format
Video	Motion graphic pictures with mp4 format
Pictures	Using 2D and 3D pictures

The type of this application is called AR (Augmented Reality), and it is used by 4th grade Elementary students aged 11-12 yearsand English teachers, and the contents have been adjusted to their level. The images in this software are in JPG and PNG file formats, derived from internet animation, and the audios and videos are in MP4 format.

Creating the application

The design process began with the creation of a marker design and an animation layout design, both of which were used as Augmented Reality Content. Marked Augmented reality connects a cell phone or personal computer to information, usually on a website, using a two-dimensional barcode. The researchers modified an image of the character that they downloaded for free from the internet. The marker was edited with the Windows Paint application and printed on media in the form of a flash card.

Figure 4. *Marker design*

The animation layout included the image of the English words, the picture, and the words. Each animation included apronunciation sound. The end result of the development process was in the MP4 format.

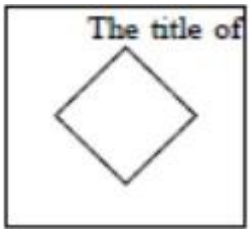

Figure 5. *Animation layout design*

Gathering the materials

The materials for this application were obtained from various sources on the internet, with some modifications. The images used inthis application were obtained for free from the internet, with some parts modified to meetthe requirements.

Figure 6. *The characters*

From this picture, the video was created such as follow:

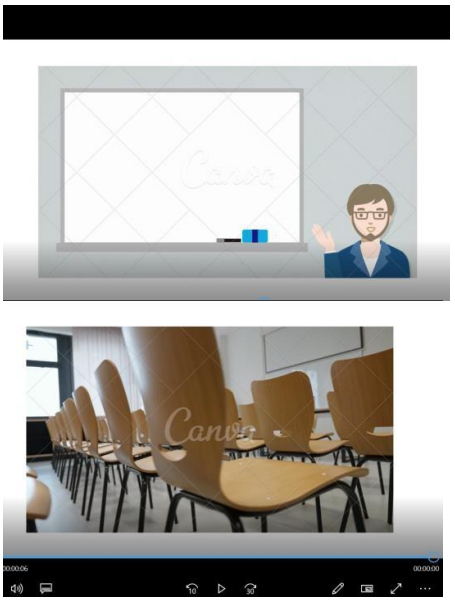

Figure 7. *The animation videos*

Assembly

The character used as a marker was created using free screen capture from the internet, and the video was created using video from Canva, which was also free from the internet. Chad's application creation could be accomplished by following the steps outlined: (1) Adding the marker to the Chad web-based studio. (2) Adding the overlay or animation that was used as Chad's Augmented Reality content. (3) Making the name of AR content available to make it easier to find later in Chad AR application. (4) Making Chad content available to otherusers.your results or findings and the previous publications by other researchers.

Testing

The test was carried out to ensure that the application was functioning properly in accordance with the previous design. The testwas carried out against a marker created usingmobile devices. The results of the tests revealed that each of the markers was capable of displaying Augmented Reality content satisfactorily. The distance tests yielded goodresults in the 5-20 cm

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range with normal lighting indoors.

Table 2. *Distance test results*

No.	Distance	Status
1	5 cm	AR content appeared
2	10 cm	AR content appeared
3	15 cm	AR content appeared
4	20 cm	AR content appeared
5	25 cm	Sometimes appeared, sometimes did not
6	30 cm	AR could not appear

Distribution

The augmented reality application material was then printed on paper as flashcards. Because flashcards were simpler than books orother learning media, they aided in thelearning process.

CONCLUSION

According to the research findings,learning media using Augmented Reality Technology can be used as an alternative media to aid in the English learning process, and learning media using Augmented Reality Technology can provide children with more understanding and attention when practicing English.

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