USING AUGMENTED REALITY (AR) TECHNOLOGY AS A LEARNING MEDIA TO IDENTIFY THINGS IN ENGLISH AROUND US

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ABSTRACT

Along with the vast development of information technology, people expect things to be more interesting, easy and instant. The education sector is expected to be aware of the information technology development. However, many of our teachers have not integrated technology to the implemented teaching methods and approaches. This research aims at developing learning media to identify things in English by using Augmented Reality Technology and analyzed its effectiveness of AR based learning.

Microsoft Solution Framework (MSF) would be employed as this research method with the waterfall system development method. To obtain the research data, observation and interview with teachers and the principal of the junior high school would be conducted. The seventh graders of junior high school would be administrated as this research participants. The questionaire was used as a tool gain data and to validate the effectiveness of AR based learning media, it would be quanitatively described.

The results of this research are, 1) AR learning based has 12 markers that can be downloaded by users in the application menu. The appearance of this application consists of pre-elemi nary page, marker page, information page and the theory page. The chapter theory can be designed for eight chapters. 2) The mean score of enthusiasm by implementing the AR learning based is 27,07. Meanwhile, the score of non-implementing the AR is 22,33. From this, it can be scientifically stated that the AR learning based is effective to increase students' enthusiasm to identify things all around in English.

Keywords: *Augmented Reality technology, learning media, effectiveness*

ABSTRAK

Perkembangan teknologi informasi yang sangat pesat, orang-orang berharap segala sesuatu menarik, mudah dan instan. Pada kenyataannya, masih banyak guru yang enggan mengubah strategi pengajaran lama kepada yang baru dan memanfaatkan teknologi dalam proses pembelajaran. Tidak sedikit siswa di sekolah menengah pertama menemui kesulitan dalam memahami kosakata karena pemahaman ini menuntut kemampuan visualisasi yang baik. Penelitian ini bertujuan untuk mengembangkan media pelajaran bahasa Inggris berbasis teknologi Augmented Reality kepada siswa kelas 7 sekolah menengah pertama.

Penelitian ini menggunakan Microsoft Solution Framework (MSF) dengan sistem waterfall sebagai metode pengembangannya dan Object Oriented development sebagai pendekatannya. Teknik pengumpulan data menggunakan observasi dan wawancara kepada guru. Kuesioner dibagikan kepada siswa dan dianalisis secara kuantitatif untuk mengukur pemahaman siswa terhadap kosakata. Tahapan dalam penelitian ini meliputi analisis kebutuhan, desain sistem dan perangkat lunak, implementasi dan uji coba.

Hasil penelitian menunjukkan bahwa media pembelajaran bahasa Inggris yaitu aplikasi English Lesson terdiri dari halaman awal, halaman marker, halaman informasi, dan halaman teori. Aplikasi ini terdiri dari 12 marker. Hasil uji coba penelitian menunjukkan nilai rerata peningkatan pemahaman kosakata pada kelas control adalah 22,33. Sementara itu, nilai rerata pemahaman kosakata pada kelas eksperimental cenderung lebih tinggi dari kelas control yaitu sebesar 27,07. Sehingga disimpulkan bahwa penggunaan media aplikasi English Lesson berbasis Augmented Reality efektif dalam peningkatan kemampuan pemahaman kosakata siswa.

kata kunci: teknologi Augmented-Reality, media pembelajaran, efektifitas

INTRODUCTION

English learning in Junior High School is intended to make students to have ability to: (1) develop communication competence both oral and written to gain functional literacy; (2) have consciousness on the essence and importance on English to develop national and global

competitiveness; and (3) develop students' understanding on the relationship between nation and culture. The development of students' potency would be focused on to make them able to have the communicative competence in the interpersonal, transactional and functional texts. The 2013 curriculum puts the priority on scientific approach (observing, questioning, gathering information, associating and communicating), it is supported by other innovative approaches such as problem-based learning, cooperative learning, explorative learning and so on. Activities in the process of English learning support students to be independent, active in all processes and cooperative with other students.

In the syllabus of English learning materials of the seventh graders of junior high school, the subject matters are people, animal or things around the house and school. Students are expected to have the abilities to describe, identify, criticize and assess people, animal and things from the characteristics. Meanwhile, the elements of language consist of statement and question related to the characters of people, things and animals that are presented in front of the students. Along with the development of technologies, the Augmented Reality (AR) appears to be one of facilities in the process of teaching and learning at school. The technology of AR is the direct and indirect perspectives from physical things by adding information that can be presented virtually. This technology is presented to support the related learning processes.

Identifying things around the house, school and public places should be presented well, this is because the seventh graders are more interested in things if they are displayed with interesting description or display. Students are more motivated to orally deliver the idea through technology. In this case, AR is used to help students describing things around them, since it is a technology which relates human to machine. In this case are the students of junior high school.

The purpose of learning English in the curriculum of 2013 is to develop competence on communication both oral and written to gain the functional literacy level. The process of it should include all abilities such as listening, speaking, writing and reading through the 21st strategy of learning. The ability or skill of speaking will support students to deliver idea and feeling in oral. To achieve that, it is needed to provide the learning media which is information and communication technological based for the seventh graders of junior high school. This research aims at developing seven graders' ability to speak English in the subject matter of describing things around by using the technology of AR since the correlation between the real physical world and the digital one takes more sophisticated objects into our daily lives and work contexts, this is what we called as Internet of Things (Quinnet, Sebastian, & Gorecky, 2015).

LITERATURE REVIEW

AR means a modern computer-assisted-learning-environment that combines the observed real-world phenomena with graphically added information or image (Divjak, 2003; Martin, Bohuslava, & Igor, 2018; Salmi, Kaasinen, & Kallunki, 2012). It is revealed by many previous research that high-tech learning based will not bring any significant expectation and goals if that technology does not promote critical thinking, meaning-making or meta-cognition (Saidin, Dayana, Halim, & Yahaya, 2015). It is expected that Augmented Reality features are able to engage students in learning processes and help improving their visualization skills. The challenge for teachers is to harness the power of Augmented Reality in ways that contribute to the ultimate growth of students, and that means supporting the development of students' higher order thinking skills (Bower, Howe, McCredie, Robinson, & Grover, 2014; Chiang, Yang, & Hwang, 2014). Besides that, AR will stimulate pupils to study autonomously since students that opt for studying engineering degree makes the practice laboratories over-crowded, worsening the teaching quality and reducing the

teachers' dedication to every student (Martín-gutiérrez, Fabiani, Benesova, Dolores, & Mora, 2015). By providing well-prepared AR teaching materials, the teaching and learning processes would be better conducted and students may get various benefits (Azida & Bilal, 2013; Liarokapis et al., 2004). To support that goal, implementing AR has the meaning that increasing efficiency and popularity in the teaching of technical subjects, specially focused on industrial automation (Martin et al., 2018). This AR has been mostly applied in higher education settings and compulsory levels of education for motivating students. Target groups like early childhood education and Vocational Training are potential for exploring in the future (Bacca, Baldiris, Fabregat, & Graf, 2014). However, a new approach or learning method does not always bring positive impacts. More than that, teachers should consider the challenges by implementing it to our classrooms. Students could be cognitively overloaded by large amount of information, multiple technological devices they are required to use, and the complex tasks they have to accomplish (Bitter, Ph, & Corral, 2014; Wu, Lee, Chang, & Liang, 2013). Moreover, to provide AR for the school community requires more money to put (Sigitov, Hinkenjann, & Roth, 2013). To guarantee the acceptance of AR to the teaching and learning circumstance, some key points should be carefully considered. They are curriculum, stability of the interaction, self-learning capability, parents' involvement, students' background, platform and social factors (Bacca, Baldiris, Fabregat, & Graf, 2015; Kadhim, Sunar, & Billinghurst, 2017; Souza-concilio & Pacheco, 2013).

Research on the role of integrating information technology to learn English has been conducted with the title of Analysis of the Effectiveness of Public Speaking Module Information-Technology (IT) Based (Endahati & Purwanto, 2016). It is stated that information and technology learning based is more valid, effective and practical when it is compared to the non-information and technology learning media based. The implementation of information and technology to the learning processes based on the students' needs will develop their interest on English. While the world is undoubtedly changing, we will grow and adapt along with it. In fact, if we have our way, we will be the ones on the forefront, pushing forward with new innovations and improvements for teaching and learning (Yuen, Johnson, & Johnson, 2011). A study to test the effectiveness of implementing the AR reveals us that students with adopted AR system have achieved better learning results than those who learned with the traditional 2D simulation system (Lin, Duh, Li, Wang, & Tsai, 2013). It needs for teachers to provide positive emotion and reach learning experiences, not just condensed as 'sightseeing', to stimulate students' active learning(Beck, 2019; Matcha, Rohaya, & Rambli, 2013). To achieve this, Eco-discovery AR-based learning system (EDALS) was introduced to improve learning outcomes and needs among learners (Elmqaddem, n.d.; Huang, Chen, & Chou, 2016).

Research on "The Role of Technology in Teachers'Creativity Development in English Teaching Practices", observed the teachers' perspectives on the role of technology in developing their teaching creativity (Fitriah, 2018). From this, it can be stated that technology to learn English is highly influenced by teachers' willingness to keep studying and practicing, students' participation, interaction frequency and cooperativeness. Multi-disciplinary research projects are required to enhance content and environments; educators must work with researchers to develop augmented reality interfaces (Kesim & Ozarslan, 2012). It is stated that there are benefits of integrating information technology to the English learning (Floris & Editor, 2014). Teachers and students have abundant access to the updated science and information, the teachers and students' creativity is well developed as well as the students' motivation to participate in discussion sessions. This statement has been written in an article by Floris in "Using Information and Communication

Technology (ICT) to Enhance Language Teaching and Learning: Interview with Dr. A GumawangJati".

Research entitled "Using Augmented Reality Technology for the Learning Media on Object Identification of the Web based Geometry in the Elementary School" has generated a learning media that explains Geometric Objects that can be used for the elementary students. An element that should be developed is that object of 3D on the plane geometry is still too simple and less interesting (Wardani & Sari, 2016).

There are 4 skills in language that are expected to develop, they are speaking, listening, writing and reading. The use of these basic skills is explained by research entitled "The importance of Four Skills, Reading, Speaking, Writing, Listening in a Lesson Hour" (Sadiku, 2015). It is explained that teacher and students collaboratively employ and implement the learning approach by considering the language skill that is being developed or learned. It is supported by Richards (Richards, 1973) in his book entitled "Competence and Performance in Language Teaching". Some language proficiencies are the ability to understand texts accurately, provide the language model, maintain the fluency, provide model or examples, monitor the target language fluency, and provide time to practice. It is clearly stated in the curriculum of English study that has been nationally implemented; the language skills are provided and developed integrative. This integrated language fluency development pushes teachers to change their conventional learning approaches to the ones which are updated and technology based. This technological implementation has been proven to be developing students' level of proficiencies on productive and receptive. As such this Augmented Reality technology, there have been a lot of educators' uses this implementation to develop students' achievement on learning.

AR is a novel form of interaction between human and machine which leads to a new experience and perspective. The prominence of AR is that it creates computer animated objects in the real perspective. It uses webcam to detect marker that has been previously designed and project the combination between real and animated objects. The webcam is used as 'eyes' from the technology of AR to detect marker and then process it to generate virtual interaction appears on screen. By implementing the AR technology in learning, it creates effective learning atmosphere which provides us the picture of the real world. The essence is it combines real world situation and virtual objects aims at overcoming problems and understanding learning materials and processes. By implementing it, students have chance to create own understanding and discuss with classmates the teaching materials which implementing the AR in the process.

RESEARCH METHOD

Microsoft Solution Framework by using Object Oriented Development was employed as the research method; it is defined as developing software based on the real-world object abstracting. The research phase is envisioning, planning, developing, stabilizing and deploying. The research gains data from observation and interview. This is a Qualitative and quantitative techniques research in which the qualitative data were gained from observation and interview in the beginning step of the research. The quantitative data are from the result of the test of experiment and control classes.

FINDING AND DISCUSSION
    1.   The Description of Learning Media Development

There are 2 vital things in the application of android based learning media using Augmented Reality technology, they are marker and image display. Marker is an important component in the

application of learning media to study English; it is used to display the objects of Augmented Reality in every chapter. It is expected that every user who employs learning media of English lesson to have marker first in which it can be downloaded from the menu of the application. The application has 12 markers in chapter 1, 2, 4, and 7. Each of them has 1 marker. Moreover, chapter 3 has 3 markers, 2 markers in chapter 5 and 2 in chapter 6. Chapter 8 does not have marker since it presents song for the users. Below is the example of marker in chapter 3.

| Object [QR] on of a clock | Object representation of sun | Object representation of watch |
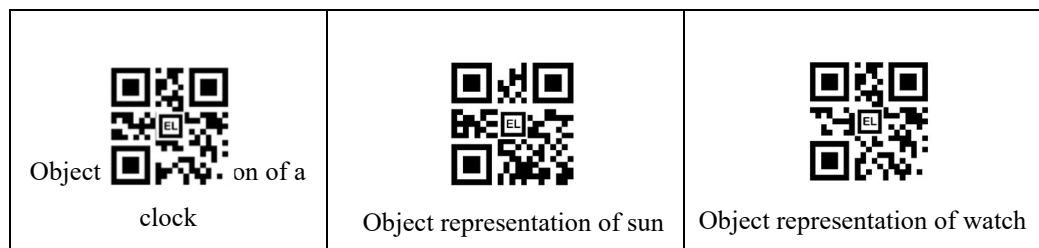
Picture: Marker on chapter 3

The display of the application on this English lesson is presented in the first page as a way for users. There is picture provided in the left or right side of the first page. There are 4 menu buttons, they are the button of theory, marker, information and exit. The first button is for connecting the theory to the chapter. The marker button is for connecting the page marker. The information button connects the information on the writers. The last one, exit button is for exiting the program. This application has 8 chapters which helps students to study English from the text books. The theme is adjusted to the text book. Below are the developed 3D objects:

Table. The chapter themes

Chapter	Title	3D Object
1	Good morning, How Are You?	2 students
2	This Is Me!	A student
3	What Time Is It?	A clock, sun and a watch
4	This Is My World	Living room
5	It's A Beautiful Day	House and school building
6	We Love What We Do	A cat, a doctor and a deer
7	I'm Proud of Indonesia	A student
8	That's What Friends Are Supposed to Do	No 3D marker

2. Quantitative Data Description

The analysis of product effectiveness is conducted through these hypotheses. The effect of the Augmented Reality technology based for learning media towards the students' enthusiasm. Ho: there is no significant differences on students' enthusiasm between the class which are taught by employing English Lesson media. Ha: There is significant difference on students' enthusiasm on

using English Lesson media. Before testing hypothesis is over, it needs to conduct pre-requisite testing, the normality and the homogeneity testing.

a. Normality testing

The following table is the result of normality testing.

Tests of Normality

Media		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	Df	Sig.	Statistic	df	Sig.
Tot al	non TIK	,229	30	,000	,902	30	,009
	TIK	,185	30	,010	,946	30	,128

a. Lilliefors Significance Correction

Based on the above table, it reveals that the score of Sig. (2-tailed) on the data of students' enthusiasm using non-English Lesson media has significance < 0,05, so that the Ho is acceptable. This means the data is not normal distributed. Furthermore, the data of students' enthusiasm using English Lesson media application has significant < 0,05, meaning that Ho is acceptable and data is not normal distributed.

b. Homogeneity Testing

The following table is the result of homogeneity testing

Test of Homogeneity of Variances

Total

Levene Statistic	df1	df2	Sig.
,683	1	58	,412

Based on the above table, the significant score on students' enthusiasm is above 0,05, that is 0,412. It can be concluded that in the level of significant 5%, group that is employed in this research is the homogeny group.

c. Hypothesis testing

The following table represents the summary on output Mann-Whitney students' enthusiasm on the class which implements the English Lesson Application.

Test Statistics[a]

	Total
Mann-Whitney U	2,000
Wilcoxon W	467,000
Z	-6,678
Asymp. Sig. (2-tailed)	,000

Based on the above illustration, it can be revealed that the achievement significant score is 0,000. The score is <0,05 which leads Ho is refused. There is difference between class which implements the AR based English Lesson with the one which does not.

d. Mean Testing

Report

Total

Media	Mean	N	Std. Deviation
Non-AR	19,29	30	1,093
AR	26,18	30	1,413
Total	22,73	60	2,695

Based on quantitative descriptive analysis, it can be concluded that mean enthusiasm by employing AR technology based for English Lesson media is 26,18. Meanwhile, the score of enthusiasm by using non–media application English Lesson is 19,29. It can be concluded that using application English Lesson media based on AR is effective to develop students' enthusiasm to study and learn identifying things around using English.

CONCLUSION

This research generates learning media, namely the application of English Lesson, consists of 8 chapters. The display of the application consists of first page, marker page, information page and the theory page of the chapter. The users can use this media need to download the 12 markers. Mean enthusiasm by using non-English Lesson media application is 19,29. The score of enthusiasm by implementing the application of English Lesson is 26,18. It leads to a conclusion that AR is effective to develop students' enthusiasm to study things around in English.

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