AUGMENTED REALITY (AR) FLASHCARDS AS A TOOL TO IMPROVE RURAL LOW ABILITY STUDENTS' VOCABULARY

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ABSTRACT

Issues concerning rural students' low vocabulary and lack of interest and motivation to learn English have been widely researched, yet the use of technology as a teaching tool is scarce. The purpose of this Action research was to examine the effectiveness of using Augmented Reality (AR) flashcards on low ability rural students' vocabulary. 10 Year 1 students were selected based on convenient sampling. Data were gathered using both qualitative and quantitative methods. Students' pre-test, post-test scores, semi-structured interview and observation were used in gathering the data. Methodological triangulation was adopted to ensure trustworthiness of the data analysis. The results indicated that all 10 students' vocabulary scores improved after being introduced to Augmented Reality (AR) flashcards. Results suggested that the Augmented Reality (AR) flashcards were effective in maintaining a high level of motivation and engagement among the students. Nonetheless, these findings provided useful insights towards the successful application of Augmented Reality (AR) in enhancing low proficiency students' vocabulary.

Keywords: flashcards, Augmented Reality, ELT, rural students, low ability, L2 vocabulary.

INTRODUCTION

In foreign language or second language learning, there is an urgent need to improve vocabulary instructions among ESL students. The importance of vocabulary in learning foreign language or second language has been highlighted by many EFL researchers (Mofareh, 2005; Sidek & Rahim, 2015; Folse, 2004; Mehring, 2005; Surina & Hariharan, 2015). Generally, vocabulary knowledge is often viewed as a critical tool for second language learners because limited vocabulary impedes successful communication (Mofareh, 2015). Sidek & Rahim (2015) revealed that vocabulary learning is dominant in language acquisition, whether the language is second or a foreign language (Folse, 2004; Mehring, 2005). Learners with limited vocabulary are found to face difficulties in conveying their messages to others in L2 (Surina Nayan & Hariharan, 2015).

Vocabulary is the foundation of English language learning (Harmer, 1991; Wang et al., 2015; McCarthy, 1990; Nation, 2011). Harmer (1991) claimed that, "If language structures make up the skeleton of language, then it is vocabulary that provides the vital organs and flesh" (as cited in Surina Nayan & Hariharan, 2015). In addition, McCarthy (1990) as cited in Surina Nayan & Hariharan (2015) also stated that, "No matter how well the student learns grammar, no matter how successful the sounds L2 are mastered, without words to express a wide range of meanings, communication in an L2 just cannot happen in any meaningful way" (page). As such, vocabulary does not only make the students understand about the meaning of the language, they can express their thinking and understand basic competence if they possess sufficient vocabulary of a language (Hatch and Brown, 1995).

Previous studies have shown that the usage of flashcards is a great way to improve students' vocabulary (Husaini et al., 2016; Mofareh, 2015). Husaini et al, (2016) explain that flashcards are sets of cards bearing information, as words or numbers, on either or both sides, used in classroom drills or private study. While according to Azabdaftari & Mozaheb (2012), flashcards refer to "a cardboard consisting of a word, a sentence, or a simple picture on it". According to Mofareh (2015), pictures connect students' prior knowledge to a new story, and in the process, help them learn new words better. While there are plenty of vocabularies that can be introduced by using illustrations

or pictures, and they are excellent means of making the meaning of unknown words clear, students found 2D flashcards to be boring and less attractive and digital flashcards were found to be more appealing (Azabdaftari & Mozaheb, 2012; Başoğlu & Akdemir, 2010). Digital 4D flashcards use the augmented reality ideas to enhance language learning whereby the ubiquity and convenience of digital flashcards seem to make them an appealing vocabulary learning method for students. Even though, digital 4D flashcards are widely researched, very few studies were conducted in the context of Malaysian primary schools. This paper shows how digital 4D flashcards can make a difference in teaching vocabulary to low proficiency primary school students using an action research approach.

PROBLEM STATEMENT

Ironically, despite the longer years spent on English language learning, the students in Malaysia still possess poor command of English (Hazita, 2016; Thang et al., 2011, Husaini et al., 2016). Thang (2011) indicated that Malaysian students display poor effort in learning English even though its importance is generally acknowledged. In addition, Husaini et al (2016) revealed that Malaysian students were found to have weak language skills, lack of confidence, and were unfamiliar with several English vocabularies. The problem was more prominent in the rural areas (Siti Sakinah & Melor, 2014) where the failure rate in the English language subject is rather high (Rahimah et al., 2004).

One of the contributing factors to students' low proficiency in English is motivation. Thang et al., (2011) indicated that attitudes and motivation of students towards learning English is said to be among the factors contributing to low proficiency and passing rates in rural schools. Motivation is found to be the force that pushes the learners towards developing and improving their knowledge and skills of the second language. Apart from that, there are many factors that cause students to be demotivated in learning the second language, and one of them is related to the teachers' teaching method and the teacher's enthusiasm (Nation, 1990; Wang et al., 2015). In line with this, teachers are expected to apply any teaching method that would improve students learning. More importantly, teaching students with limited

English proficiency requires teachers to try out effective methods that suit their learners' needs. While there are many teaching methods available in the market, the traditional way of teaching vocabulary is still widely practiced in the rural schools in Malaysia with teachers relying more on the textbook. Besides, the use of technology in many rural schools is still at the infancy stage. As such, more studies on the use of technology for vocabulary teaching using an action research approach are needed.

While vocabulary seems to be the most important skills to be mastered by ESL students, vocabulary teaching is not given much attention in the second language classroom. Earlier studies have provided evidence that vocabulary teaching is being neglected (Kaur, 2013; Fauziah and Nita, 2002; Tan & Goh, 2017). In Malaysia, it is stated in Year 1 syllabus, known as *DSKP of KSSR Semakan*, there is an emphasis on the teaching of vocabulary in three ways: by topic, by category and alphabetically. Pupils are not expected to learn these words by heart, or to spell all of them with 100% accuracy, as complete accuracy in spelling is above pre A1 targets in the Common European Framework of Reference (CEFR). However, students who master sufficient number of vocabularies may have a great chance to improve their writing, reading, speaking and listening skill (Arisandi, 2015). Thus, vocabulary learning should not be neglected in the language teaching.

Kaur (2013) argued that despite its key position in developing language proficiency, vocabulary instruction somewhat tends to take a backseat in ESL teaching priorities. She added, in many teacher's instructional approaches, focus on structural signals and grammatical patterns of the language seemed to override vocabulary and learners were expected to pick up vocabulary on their own, with little or no guidance. In addition, Fauziah and Nita (2002), found vocabulary exercises to rank forth out of nine language activities investigated on the frequency of use in ESL lessons, and students have listed vocabulary learning as the lowest rank in students' list. One of the reasons why vocabulary teaching is not given as much attention as any other language skills may be attributed to the fact that it is not tested in the exam. The exam-oriented education environment of primary and secondary schools particularly in Malaysia exacerbates the situation particularly for the aural/oral aspects of the language because the focus in the teaching and learning tends to be concentrated on the written language (Tan &

Goh, 2017). As such, it is less emphasized in the instructional process in the classroom. Hence, this study is conducted to see the use of Augmented Reality (AR) flashcards in learning vocabulary among low ability students in a rural school. In short, researchers want to find out if these low ability students can improve their vocabulary acquisition with the use of Augmented Reality (AR) flashcards.

This study addressed three research objectives as follows:

1.   To examine the effectiveness of using Augmented Reality (AR) flashcards in helping students to improve vocabulary.
2.   To explore students' perceptions on the use of Augmented Reality (AR) flashcards.
3.   To identify teachers' challenges and perceptions towards the use of Augmented Reality (AR) flashcards.

As this is a part of a bigger project, this paper will only discuss the findings derived from the first and the second research questions. Teachers' challenges and perceptions will not be included in this paper.

LITERATURE REVIEW

Augmented Reality (AR) has become a popular tool to be used in education due to its possible benefits to teaching and learning. By using Augmented Reality (AR), students can interact with a mix of two and three-dimensional objects overlaid onto a target image or background in the real world (Wu et. al, 2013). According to Azuma (1997), Augmented Reality (AR) refers to the seamless integration of virtual objects and real environments or when a computer-generated information is placed in the world as if it co-exists with real objects. This is parallel with Wu et al.'s (2013) contention that augmented reality is "coexistence of virtual objects and real environments". In other words, it is a combination of virtual objects such as video, image, and 3D or 4D animations that imitate the real world through the use of applications such as tablets or mobile phone.

To "augment reality" is to "intensify" or "expand" reality itself. So, Augmented Reality has been used to describe the technology behind the

expansion or intensification of the real world. Schmalstieg, Langlotz, & Billinghurst (2011, p. 13) confirmed that the first Augmented Reality experience was developed over 40 years ago by Sutherland in (1968) and early AR applications ran on stationary desktop computers and required the user to wear bulky head mounted displays. Some researchers have proposed different definitions of Augmented Reality. However, all these definitions are based on one of the features of AR that is the possibility of superimposing virtual information to real objects. AR is a variation of Virtual Reality (VR). VR technology completely immerses users within a synthetic environment where users cannot see the real world around him, whereas AR allows the user to see the real world, with virtual objects superimposed upon or composited with the real world. AR supplements reality, rather than completely replacing it (Azuma, 1997). AR is more interesting to use compared to VR. Users can still be in their surrounding with some additional 3D models with movement and sound, and perhaps to interact with it. This is also supported by Cascales, Pérez-López & Contero (2013, p. 421) who asserted that AR is a technology which introduces virtual contents such as 3D computer-generated objects, texts and sounds, onto real images and video all in live time. Bonsor (2001) said that Augmented Reality is a new technology that allows the users to see, hear, feel, and smell the computer-generated objects, which are integrated in the real world. Miyosawa, Kahane, Hara and Shinohara (2014, p. 278) also clarify that AR is the ability to superimpose digital media on the real world through the screen of a device such as a personal computer or a smart phone, to create a world full of information. Although AR has been around for quite some time, in the Malaysian context, it is still new and many studies on augmented reality flashcards for vocabulary learning is still scarce and limited.

Augmented Reality in Teaching and Learning

Augmented Reality applications can be a complement of a standard curriculum taught in schools. Text, graphics, video and audio can be superimposed into a student's real time environment. Textbooks, flashcards and other educational reading material can contain embedded "markers" that, when scanned by an AR device, produce supplementary information to the student rendered in a multimedia format (Stewart-Smith, 2012). Students can participate interactively

with computer generated simulations of historical events, exploring and learning details of each significant area of the event site.

Many studies have provided evidence on the benefits of Augmented Reality in understanding complex concepts (Ivanova & Ivanov 2011; Freitas & Campos, 2008) and in teaching Geometry (Lin et al., 2016). Ivanova and Ivanov (2011) who carried out a study to explore the potential of combining traditional learning methods and AR technology in understanding complex concepts, discovered that more than 75 percent of the students felt that AR technology helped them to understand different concepts in the field of computer graphics. They claimed that AR technology is a promising and efficient technology that supports thinking and enhances the retention of facts. Another research study was conducted by Freitas and Campos (2008) to design and evaluate an educational system using AR to teach concepts to second grade students at school. It explored the use of AR technology in a positive manner and form that supports student learning. Two games called "SMART" were designed and evaluated for use in school; there was a knowledge test on the classification of animals and another on means of transport. The sample consisted of three different classes within three local schools in Portugal. The students' ages ranged between 7 and 8 years, including 22 male students and 32 female students in each of the three schools. The results of the study showed that good students did not benefit much in improving their level of learning, but the impact of SMART was significantly greater within the ranks of middle-level and weak students.

AR was also used in teaching Geometry. Lin et al. (2016) used AR technology to aid in the teaching and learning of geometry in an elementary school in Taiwan on 21 students with different disabilities. The main objective of the research was to enhance students' self-confidence so that they could endeavour to finish the puzzle games by themselves. Students attempted to solve the games either traditionally (without AR materials) or with the help of AR aids. The results indicated that with the use of AR technology, participants' ability to complete the puzzle games by themselves were improved significantly whereby their performance was significantly better and that the support time was shorter than anticipated. The findings also affirmed that AR technology could enrich students' learning motivation and their frustration tolerance.

Augmented Reality in Language Learning

In language learning, Augmented Reality was found to provide fun learning environment (Mahadzir & Phung, 2013; Tan & Liu, 2004; Barreira et al., 2012; Ghasemi & Javidan, 2014) and increased interaction (Hsieh and Lee, 2008; Hsieh & Koong Lin, 2010; Beder, 2012). Mahadzir & Phung (2013) studied Augmented Reality pop-up books to motivate and support students in English language learning. They developed a pop-up book via ZooBurst tool, and it was incorporated with Keller's ARCS model of motivation. They observed primary school students using AR pop-up book for a year and conducted semi-structured interview at the end of application. They revealed that AR pop-up book contributed to "perceptual arousal, inquiry arousal, variability, goal orientation, motive matching, familiarity, learning requirements, success opportunities, personal control, intrinsic reinforcement, extrinsic rewards, and equity". In addition, it was found that AR technology increased students' performance by providing more inspiring environment for students. In another study, Tan & Lui (2004) developed a Mobile-Based Interactive Learning Environment (MOBILE) to teach body parts and creation of species in and outside classroom through mobile learning tools to improve Japanese elementary school students' English proficiency. After a process of implementation, they suggested that this technology helped to increase learners' performances in comparison with the traditional method. Similarly, Barreira et al. (2012) studied the role of augmented reality technology in teaching animal words in English to Portuguese elementary school students whose ages ranged between 7 and 9 at 3rd grade. Twenty-six children participated in this study and two groups were formed as experimental and control. Target vocabulary items were presented through matching object game by an expert teacher. At the end of the practice, students' performances in the experimental group were found higher than those of control group in accordance with the test results.

In relation to increased interaction and participation among the students using Augmented Reality, Hsieh and Lee (2008) proposed a system that can support children to learn English, providing different kinds of learning stimulation through the application of media to make children like English more. They presented Augmented Reality English Learning System (ARELS) which can present formats such

as texts, images, music, animation, movies and 3D models when users control the AR English word cards facing the webcam. ARELS offers different learning stimulation and also supports traditional education to achieve a human-computer interaction learning purpose. They concluded that students can have more fun in learning and interact better with teachers than before in the AR learning environment.

Similarly, Hsieh and Koong Lin (2010) developed the Augmented Reality English Vocabulary Learning System (AREVLS) with immersive English Vocabulary learning in Taiwan. The program consists of two components: (1) Magic Book, and (2) Card Matching system. In these two components, users can use webcams to capture AR marker of the Magic Book to learn the pronunciation of the letter and its word. On the other hand, in Card Matching Games, the system will show the 3D virtual objects if the learners match the words and the picture correctly. From the interviews done among teachers, English-learning beginners and householders who participated in the programme, AREVLS has positive usability and users enjoyed their interaction with it. In addition, Beder (2012) adopted a research on the use of AR to facilitate language learning when he compared the actual performance differences among 20 participants in Sweden. The participants were divided equally in two groups: the control group used a traditional method of using classic flashcards and the other group used AR developed learning device to learn new vocabulary. Questionnaires then distributed right after the learning session and a week later. The findings showed that the group who used AR developed device showed a positive improvement in long term compared to the control group.

Finally, in another study, Ghasemi & Javidan (2014) presented a model for development of AR through mobile learning in English training for children in Iran. Data containing name and 3D image of the objects were uploaded to cloud database. Students used camera function in their mobile phones to capture images of any object and connected to the metadata in the cloud database through the AR application. The application would eventually identify the object from the cloud database and the name of the objects would be sent to the students. The combination of AR based learning and mobile learning eliminates time and geographical limitations. Moreover,

it can increase students' learning motivation and practice time by entertainment and inadvertently learning in home.

Thus, it is an advantage for limited proficiency students in primary schools to use AR flashcards to learn English vocabulary. These flashcards can motivate them to learn through experiences by listening to the sounds or looking at the movements made by the objects in the flashcards. The mixture of real life and virtual reality allows teachers to bring more information and excitement into the classroom.

METHODOLOGY

Research Design

This study employed an action research whereby it is essentially a series of cycles of Reflection, Planning and Action. Kemmis & McTaggart (1988) developed a concept for action research with a spiral model comprising four steps: planning, acting, observing and reflecting. Action research involves making improvement of one's own teaching technique. Therefore, it is deemed to be the most appropriate method to be adopted in this study. Teachers are encouraged to be researchers investigating what is happening in their classrooms. It normally starts with one cycle of planning, acting, observing and reflecting, which usually leads to another, in which improvements suggested by the initial cycle are incorporated.

In this study, researchers attempted to examine the effectiveness of using Augmented Reality flashcards to improve rural students' vocabulary. The researchers focused specifically on the use of AR flashcards as they captured students' interests and they incorporated the element of the technology use in the classroom. In examining students' responses towards AR flashcards in learning vocabulary, researchers used both qualitative and quantitative methods ranging from the vocabulary test scores before and after using the AR flashcards, semi structured interview, and observation. The guided semi structured interviews were recorded and transcribed. The observations were made through the video recordings and also recorded as reflection at the end of each stage.

Participants and Settings

Five researchers were involved in this study. Two of the researchers were the English teachers from this school who actually conducted the research, recorded each teaching and learning sessions, collected all the data, arranged the guided semi structured interview and made some reflections, while other researchers acted as 'critical friends' who provided feedback during the analysis process.

The school was selected based on 'convenient sampling' (Creswell, 2013) due to its manageability and practicability. The school is located in a rural area, which is about 40 km away from the small town of Jeli. It is a moderate sized school, comprises of 426 pupils from Year 1 to Year 6. Overall, the students' English proficiency in this school ranges between intermediate and low proficiency. The respondents for the study were chosen from Year 1 low ability students. There are 5 boys and 5 girls selected based on 'convenient sampling'. Researchers used Convenience sampling, which is a non-probability sampling technique where subjects are selected because of their convenient accessibility and proximity to the researcher. This is why researchers chose their own school as the study setting due to its manageability and practicability factors. Ilker Etikan et al, (2016) stated that convenience sampling is a type of non-probability or non-random sampling, where members of the target population that meet certain practical criteria, such as easy accessibility, geographical proximity, availability at a given time, or the willingness to participate are included for the purpose of the study. Moreover, convenience sample is usually used because it allows the researchers to obtain basic data and trends regarding the study without the complications of using a randomized sample. Khattri et al. (1997), defined rural as an area that has a population less than 2,500 people while Mohd Asraf (2004), refers rural school students as those whose failure rate in national standardized English examinations is twice that of their urban counterparts. Hence, in the context of this study, rural students are defined as students who have limited proficiency in learning English that live in a population of less than 2500 people.

As a matter of fact, the participants have been considered as low ability students based on their performance in Literacy and Numeracy Screening (LINUS). LINUS (English) involves the screening for

Construct 1 until Construct 12 based on the instrumentation provided by the Ministry of Education. Pupils were graded as '*LINUS tegar*' if they cannot achieve beyond K1 and K1 construct and regarded as '*LINUS*' if they achieve the range between K3-K12. If a student can master the entire construct, he/she is no longer considered as LINUS students. Below are the achievements of each respondent in the LINUS (English) Screening 1 in early March 2018.

Table 1

Profile of the Respondents

No	Name	Gender	Age	English Proficiency	LINUS Results
1	Firqan	M	7 years old	Low ability	K1 - K2
2	Aidil	M	7 years old	Low ability	K1 - K2
3	Mazliyana	F	7 years old	Low ability	K1 - K2
4	Jannah	F	7 years old	Low ability	K1 - K5
5	Damia	F	7 years old	Low ability	K1 - K2
6	Uzma	F	7 years old	Low ability	K1 - K6
7	Rayyan	M	7 years old	Low ability	K1 - K2
8	Fizran	M	7 years old	Low ability	K1 - K2
9	Farhan	M	7 years old	Low ability	K1 - K2
10	Qhadeeja	F	7 years old	Low ability	K1 - K2

Data Collection Methods

This study engaged a series of methods which included both quantitative and qualitative methods. Quantitative data were gathered based on the vocabulary pre-test and post-test scores, while qualitative data were obtained from semi-structured interview conducted with the pupils and also through the video recordings for observation purposes.

Pre-test and post-test

Self-constructed vocabulary tests were given to the students for the pre-test and post-test which constituted a fill in the blank questions.

The answers for the fill in the blank questions were available in the boxes provided. The vocabulary items were piloted to another teacher and some amendments were made to the word choice and its difficulty level. This is also to ensure the tests' validity of the instrument used and the relevance of the questions to the objectives of the study. These tests were constructed based on the topic 'Pet Show' in the Year 1 syllabus which covers the topics on pets, endangered animals and small insects. Students learned five targeted endangered animals which are hippopotamus, rhinoceros, leopard, gorilla and tapir. While for small insects, they learned about bee, ant, caterpillar, dragonfly and beetle. An intervention was carried out using the Augmented Reality (AR) flashcards to enhance learners' vocabulary learning. In total there were 10 questions for both pre-test and post-test with ten targeted vocabulary items related to animals were tested.

Semi-structured interview

For the semi-structured interview session, the researchers had chosen two open-ended questions asking about the effectiveness of AR flashcards and learners' attitudes towards it. The questions are (i) Do you like these AR digital flashcards? and (ii)Why do you like these AR digital flashcards?

Observation

Researchers recorded the processes of teaching and learning during the implementation of AR flashcards activity. Recorded observations were analyzed to assess students' behaviors and participation.

Reliability

Bryman and Bell (2011) stated that reliability refers to the consistency of a measure of a concept. It represents the degree to which the results of a study are replicable and generalizable when a study is conducted again (Easterby, 2008). Methodological triangulation was used to ensure validity and reliability of the methods used. The contents of the recorded interview were transcribed, examined and verified to ensure accuracy and not bias with the help of 'critical friends'. The scores for pre-test and post-test were also examined and verified twice in this research.

Data Collection Procedures

This action research involved 5 stages: Stage 1 included pretest which was answering vocabulary test (fill in the blanks). The purpose of this stage was to analyze the current vocabulary knowledge about animals that students have. In Stage 2 teachers introduced the topic with only pictures on flashcards and conducted some activities on vocabulary and at the end of the session, students answered the same task sheet used in Stage 1. Stage 3 involved the integration of AR flashcards in which this was the first-time students were exposed to such technology. There were few activities conducted at this stage, and at the end of the session, the students were tested with task sheet again. The same task sheet was used in stage 1, 2 and 3 in order to gain data (test scores) to see the effectiveness of the AR flashcards usage in teaching and introducing new vocabulary to the students. Stage 4 was then conducted by introducing a new topic, '*small creatures*' which purpose was to see the effectiveness and the consistencies of the data gained when using the AR flashcards in teaching a new topic. In phase 4, semi guided interviews were also conducted with the students to see their perceptions of the AR flashcard's effectiveness and what this AR application makes them feel in the vocabulary learning process. Phase 5 involves the evaluation of data gained from the test scores, guided semi structured interview, and observations which were made through video recordings. The semi-structured interview was conducted in Malay to lower the participants' anxiety and derive more information from them after the pre-test. Series of planning, acting, observing and reflecting were conducted through this action research process.

Data Analysis

The researchers employed a quantitative analysis based on the numerical data gathered from each vocabulary tests in the four stages. Descriptive analysis of the vocabulary scores was done for all the stages and means of the scores were tabulated. As for the qualitative analysis, thematic analysis was conducted to identify themes in the data obtained from the guided semi-structured interview. The data were then triangulated with the observation findings.

FINDINGS

The study was set to find out the effectiveness of using Augmented Reality (AR) flashcards to improve vocabulary and to explore students' perceptions towards the use of Augmented Reality (AR) flashcards. The findings revealed that revealed that students have improved gradually from Stage 1 to Stage 3 with the use of AR flashcards. Subsequently, a comparison was made between mean scores from Stage 1 until Stage 4 where it has shown that the intervention of AR flashcards facilitates students to quickly grasp the targeted words during the introductory lessons. The following table and figures represent the pupils' score for pre-test and post-test measurement.

Table 2

Result of Vocabulary Tests in all stages

No	Students	STAGE 1 (/5)	STAGE 2 (/5)	STAGE 3 (/5)	STAGE 4 (/5)
1	Firqan	1	3	5	5
2	Aidil	1	1	5	3
3	Mazliyana	1	2	3	3
4	Jannah	2	2	5	5
5	Damia	1	3	5	5
6	Uzma	2	3	5	5
7	Rayyan	1	1	5	5
8	Fizran	1	1	3	3
9	Farhan	2	3	3	3
10	Qhadeeja	1	3	5	5
	Mean Score	1	2	4	4

As indicated in the above table, all the students (100%) improved significantly in their vocabulary. Four students improved from 1 to 5; while others improved from 2 to 5 marks. Considering that these are low proficiency students with limited English, these scores indicated an improvement not just in the students' scores but also in the fun learning teaching methods used by the teachers.

This finding is supported by the interviews conducted with the students. Based on the guided semi-structured interview conducted, all students expressed their likeness towards the use of Augmented Reality (AR) flashcards during the lessons because they reported it to be interesting. Six of the participants mentioned that these AR flashcards were colourful, engaging and stimulating. They were amused to see the movements from the projected images. Below are the transcribed data based on the semi structured interview done by the researcher to check students' perceptions of the AR flashcards. It was discovered that the students' interests were aroused and they were seen motivated throughout the lesson. Extracts below illustrates students' perceptions of the AR flashcards.

Extract 1: Interest and motivation

Teacher	Do you like the flashcards? **Awok suko dok?** *<Do you like the flashcards? >*
All	Yes!!
Teacher	Yes. Why do you like the flashcards? **Bakpo awok suko?** *<Why do you like the flashcards?>*
Student 1	**Sebab geghok.** *< Because it moves.>*
Teacher	**Bergerak, lagi***?< It moves, more reasons? >*
Student 2	**Comey**. *<It's cute.>*
Teacher	***Comey, lagi***? *<It's cute, more reasons?>*
Student 3	**Sebab cantik**. *<Because it's pretty.>*
Teacher	**Cantik.. Uzma, sebab apa awok suka?** *<It's pretty.. Uzma, why do you like the flashcards?>*
Student 4	***Sebab cantik***. *<It's pretty.>*
Teacher	**Cantik jugok.** *OK. <Because it's pretty too. OK>*

In Extract 1, students mentioned that they liked the use AR flashcards because the animals moved and at the same time, they were beautiful and cute.

Similarly, in Extract 2, students reported that they liked the AR flashcards because they were pretty, cute and colourful, that aroused

their interest and motivation to learn English. An observation was also made through the video recording during every session conducted where it was found that students were amazed with such technology to help them learning vocabulary. It could be compared how students actually sat still at their desk during stage 1 and 2, however during stage 3, due to excitement, some of them climbed up the teacher's desk and were fascinated to be involved in the lesson with the use of AR

Extract 2: Interest and motivation

Teacher	**Awok suko dok flashcards hok teacher tunjuk tadi?**<*Do you like the flashcards I showed you just now? >*
All	**Suka**!*!<Yes!!>*
Teacher	**Suka…Oloh, terbalik pulok doh..hmm..bakpo awok suko?**<*You like it..oops, it's facing the wrong way..hmm..why do you like the flashcard?>*
Student 5	**Sebab cantik***.< Because it's pretty >*
Teacher	**Sebab cantik, lagi***?< Because it's pretty, more reasons? >*
Student 6	**Comey**. *<It's cute.>*
Teacher	**Comey, lagi***? <It's cute, more reasons?>*
Student 7	**Comey.** *<It's cute.>*
Teacher	**Comey, lagi? Ado dok?**< *It's cute, anymore reasons? >*
Student 8	**Warna-warni**. *<It's colourful.>*
Teacher	**Warna-warni**. *.OK<It's colourful..OK>*

DISCUSSION

The findings showed that students were responding well to the Augmented Reality (AR) flashcard technology during learning vocabulary in the classroom. AR flashcard involves an augmented reality technology, which offers 3D learning content and visualization of 3D objects from different views in comparison with traditional 2D practices (Chang et al., 2010). In addition, this tool supports learning through various channels by mean of sound, picture, writing, video and

animation. These facilitative tools reduced the problems originated from individual differences and helped to create an effective learning atmosphere by providing richer context particularly for oral courses based on interaction (Solak, & Cakir, 2015).

This technology enhanced young learners' motivational level, information and experiences that the children will never forget (Rasalingam, Muniandy, & Rass, 2014), where, students kept on repeating the animal names that they saw on the flashcard until end of the session. This led to an intrinsic motivation to learn. The application managed to grab their attention and interest, therefore the engagement level increased and their motivation elated (Bomia et al., 1997; Mahadzir and Phang, 2013; Ghasemi and Javidan, 2014). According to Peterson et al., (2007), when technology integration is used correctly, it can improve students' motivation and curiosity. The students in this study waited and finished all of the flashcards that showed all of the animals. The development of this interactive technology is valuable in its potential to enhance the method of learning. The integration of the AR flashcard technology has dramatically increased the efficiency and effectiveness in learning. This is also in congruent with Mahadzir & Phung's (2013) research where they found that this technology increased students' performance by providing more inspiring environment for them. Our study provided evidence that technology when introduced at the earlier stages of schooling helped students to be more engaged in the new experience and fun learning environment.

Moreover, the developed application is expected to provide benefits in terms of vocabulary learning using speech recognition, which enables language-based learning software applications using speech recognition technology to check student's pronunciation, can generate stronger literacy benefits. From the results, we can see how positive results in terms of usability and learnability of the teachers. In addition, our research supports the view that better motivation and engagement are found amongst children whose views are sought and valued through AR flashcard method. This finding supports earlier studies that AR flashcards provided fun learning environment (Mahadzir and Phung, 2013; Tan & Lui, 2004; Barreira et al., 2012; Ghasemi & Javidan, 2014) and increased students' interaction (Hsieh and Lee, 2008; Hsieh and Koong Lin, 2010; Beder, 2012) during

vocabulary learning activities. Students gained new vocabulary and retained the information that was presented to them. They also had a lot of fun using this technology in their classroom. Some of the students mentioned that because there was an element of animation, the learning process became more engaging and exciting.

CONCLUSION

This action research showed that the augmented reality technology usage in teaching vocabulary has demonstrated an effective progress to the rural area students' vocabulary acquisition. Students not only showed improvement in term of vocabulary scores but also in learning motivation and engagement. Students acquired more knowledge and experience in learning by using this application despite the traditional method which is dull and boring. They also responded well in terms of the use of technology and gadgets during the learning process.

The results also indicated that the use of augmented reality flashcards provided a fun and engaging environment. Therefore, it is an effective tool to use in learning vocabulary to young learners. After all, teacher may also consider the use of this application in teaching other language skills such as reading, writing and speaking. For future research, it would be interesting to investigate the use of augmented reality flashcards for pupils in urban areas considering their gender, learning styles, and motivation. In a nutshell, it is the teacher's role to create meaningful and fun teaching to their students. Teachers must be creative in adapting and adopting materials in their teaching to attain successful learning outcomes from their learners particularly in a rural area.

The importance of the research detailed in this paper is not the technology itself, but rather what added value the technology brings to the learning environment. In our research, we treat the evolvement of flashcard from traditional tool which using cardboard pictures to a type of multimedia tool that is situated in authentic environment and served as multimedia learning tool as a framework for developing our educational applications. Visual arts, including two-dimensional (2D) and three-dimensional (3D) representations, can bring people with

different perspectives towards their surroundings and also is the core curriculum of early art education (Huang, Li, & Fong, 2016). We share our experiences in developing a handheld this tool and one specific use case, namely, situated vocabulary learning. From the results, we can state that flashcard using Augmented Reality technology has the potential to create compelling learning experiences. The role of AR flashcard in ubiquitous learning is to present the information onto the real environment thereby creating a stronger connection between the digital content and the real environment. Moreover, the effect of integrated AR flashcard in learning environment helped young learners to inspect objects from different angles and enhance their understanding of different concepts. As today's generation is called digital native, the use of technology in education makes learning more inspiring, motivating, meaningful and remarkable (Singhal et al., 2012).

Our study showed positive effects of engaging students with learning and demonstrated the educational value for nurturing student's creativity and imagination. The findings of this study will be significant in aiding teachers especially in rural schools to be more creative in their lessons. If teachers can learn to embrace teaching with augmented reality ideas used in digital flash cards and mobile devices, and view them as powerful learning tools, they can create engaging lessons that increase accessibility for all learners, including those with special needs. More longitudinal research on vocabulary retention among ESL primary learners using Augmented Reality is needed to enhance their vocabulary learning.

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