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The Impact of Augmented Reality on Vocabulary Learning of EFL Elementary School Students

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Abstract: This study investigated the impact of the Augmented Reality (AR) on vocabulary learning of EFL students in Taiwan, the research site of this study. In this study, the experimental research design was employed, and multiple data sources were collected for data analysis, including a pretest, post-test, and on-site class observation. The experimental group received the treatment of the "AR word system of STEMUP", while the control group received the traditional teaching method. The class met for 40 minutes each week and the experiment lasted for one month. The research subjects of this study were the fifth-grade students of a primary school located in central Taiwan. In order to understand the effect of AR game-based instruction on students' English vocabulary learning, we selected single words (all of which are 1200 words by the Ministry of Education). Descriptive statistics, univariate analysis, and paired sample t-test were used STEMUP app system was applied in this study. Vocabulary AR will be presented in front of students by scanning the vocabulary picture to motivate student to learn English vocabulary. This study will provide directions on how AR game-based apps can be incorporated into language classrooms to enhance vocabulary learning of EFL learners.

Keywords: Vocabulary learning, augmented reality, english learning

1. Introduction

Vocabulary learning is a major factor in successful language acquisition for students who have English as a foreign language (EFL; Mearn, 1982). Elementary school is a very important stage for children to learn English. Many studies point out that a major activity in language learning is vocabulary acquisition, and vocabulary is key to the abilities of reading (Laufer & Paribakht,1998), speaking (Haynes & Baker, 1993), listening (Hincks, 2003), and writing(Hinkel, 2001). The most critical ability for students to improve their English learning is " vocabulary ability ". Students can read more books and understand more conversations. The process of learning English is like building a house and every word is like a brick. With a solid amount of words, students can learn English well. Principal Li Jiatong pointed out that "good English learning method is new words and grammar", and we can see the importance of words for learning English well. In addition, Vocabulary is considered essential to successful second/foreign language learning (Schmitt, 2000). Teachers must use various audio-visual media as learning aids to provide suitable learning content (Zhou, 1993).
The purpose of this study was to explore whether students' learning effectiveness and interest could be effectively improved by using the pretest, post-test analysis, and learning outcomes scale analysis. This study was to explore the effects of using an AR vocabulary learning app, as opposed to traditional vocabulary learning in the elementary school learning environment.

2. Literature Review

English Learning is very important in elementary school. Therefore, in addition to constructing the system of AR in English teaching, this study will also combine the use of tablet computers, which is expected to be more effective than hand-held mobile devices. Similarly, Santos et al. (2016) reported that the use of handheld AR could potentially lead to improved retention of words and keep students motivated and satisfied with vocabulary learning. Good visual display and complete information transmission can enhance learners' motivation and interest in English teaching and improve the quality and efficiency of English teaching. Therefore, the integration of AR into English courses can enhance students'interest in learning. Tsung-yu Liu and yuan-jen Chang two scholars also use the data from Taiwan as a basis to develop internationally recognized research. By using the experience and technology of these two scholars, we hope to develop AR learning system which is more suitable for children's English education.

3. Methodology

3.1 Research Design

Document analysis, interviews, and questionnaires were used in this study. The participants were fifth-grader students and divided into two groups in Taichung City. The experimental group was taught with an AR vocabulary app with speech input (StemUp). The Control group was acquired in the traditional teaching model. In each week, the children had a lesson of about 40 minutes to learn the relevant vocabulary. After the instruction, the two groups were once again assessed as to their knowledge of animal-related, stationary-related, and food-related vocabulary.
Both quantitative and qualitative methods were used in this study. Concerning students' questionnaires, were obtained for statistical analysis. The Pretest, The English reading and writing proficiency exam for these fifth-grader students, was used to identify students' English learning achievement.

3.2 Participants

The participants were fifth-grader students and divided into two groups in Tanzi District, in Taichung City. The experimental group was taught with AR applied in vocabulary and pads were used. Control group was acquired in traditional teaching model with textbook.

3.3 StemUp System Framework and Function

StemUp (SU) is a set of the AR system, students with mobile phones or tablets, scanning AR marker, vivid display StemUp of the word, students can carry out three-dimensional learning. Students can play the game and answer the question correctly, will be awarded a gold coin, increase the motivation of students. In addition to reading the vocabulary, students can also practice pronunciation, students will be able to read the single word to pass. Some most important characteristics of StemUp are teachers can edit courses and create Multiplayer classrooms. In addition, the system can record the student's learning process, whether all of them moved, how much time it took to complete and how many times it took to answer correctly, and record the student's learning process in detail.

3.4 Experimental Procedure

The Experiment Procedure as shown in Figure 1:

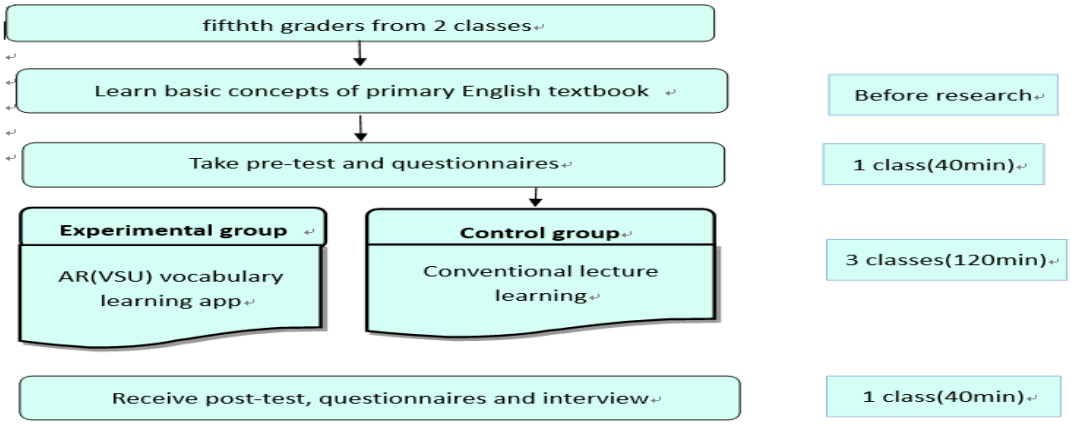

Figure 1. The Experiment Procedure

4. Results and Conclusion

From the literature review, most of the researches reveal that AR in English courses can increase students' motivation. Besides, AR courses could potentially lead to improved retention of vocabulary. Although this study has not been carried out because of covid-19 and students' summer vacation, some research outcomes could be used for future researchers. The teaching plan of the AR words of food, animal, and stationary in StemUp can be shared with researchers for AR-related research. In addition, researchers can download the StemUp in Andriod or ios app, please mail to me, danieliao820@gmail.com, and help you activate your account. We hope this AR system will be beneficial to researchers for future research.

5. References

Che Samihah Che Dalima, Mohd Shahrizal Sunar,Arindam Dey,Mark Billinghurst(2020). Using augmented reality with speech input for non-native children's language learning. *International Journal of Human-Computer Studies.134 (2020).44-64*

Ruo Wei Chen1 and Kan Kan Chan(2019). Using Augmented Reality Flashcards to Learn Vocabulary in Early Childhood Education. *Journal of Educational Computing Research* Volume: 57 issue: 7, page(s): 1812-1831. DOI: 10.1177/0735633119854028

Solak, E., & Cakir, R., (2016). Investigating the role of augmented reality technology in the language classroom. *Online Submission*, 18(4), 1067 – 1085.

Santos, M.E.C., Lubke, W., Taketomi, T., Yamamoto, G., Rodrigo, M.M.T., Sandor, C.,Kato, H., (2016). Augmented reality as multimedia : the case for situated vocabularylearning. Res. Pract. Technol. Enhanced earn. https://doi.org/10.1186/s41039-016-0028-2.

Boonbrahm, S., Kaewrat, C., Boonbrahm, P., (2015). Using Augmented Reality Technology in Assisting English Learning for Primary School Students. *Springer International Publishing*, Cham, pp. 24 – 32.

Wu, H. K., Lee, S. W. Y., Chang, H. Y., & Liang, J. C. (2013). Current status, opportunities and challenges of augmented reality in education. *Computers & education*, 62,41 – 49.