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Virtual Reality for Undergraduate English Language Learners: A Formative Study

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Abstract. The use of technology is becoming widespread in science and technology classes due to its overwhelming benefits in learning. Yet many English language teachers lack knowledge of the existing technologies and the 'know-how' to use it in the classroom. In this paper, the researchers report the pilot study conducted to explore the effects of virtual reality (VR) headset, an inexpensive version of VR tools, onto the language learner's affective variables such as engagement, motivation, and independent learning. It also explores the effectiveness of VR headset onto the language learner's ability to learn vocabularies and to follow instructions. In a class of 55 students, only eleven students volunteered to participate. They were asked to wear a VR headset, identify the pictures aloud, and join the semi-structured individual interviews. Findings suggest very interesting results. Descriptive reports show very high mean scores of the learner's engagement ($M=4.63$), motivation ($M=4.72$), and independent learning ($M=4.63$). The average mean score concerning their ability to follow instruction was 4.36. With regards to vocabulary test, the average mean score in the post-test was 2.73, higher than the average mean score of 1.18 in the pre-test. Despite the overwhelming benefits of using VR headset in the language class, this paper concludes with limitations as it only reports the results of the formative study.

Keywords: Virtual reality, English language, affective variables

1 Introduction

The use of technology to improve language teaching and learning has been promoted over the years due to its overwhelming benefits. One of the available technologies gaining popularity is virtual reality and/or augmented reality as it allows real-world like experiences for language learners. For example, in virtual worlds, students could interact with specific situations in a dinner party, a cruise ship, a museum and so on. In some situations, where language learning could be expensive, virtual reality could bring language learners to places such as international airports.

Research has shown some evidences that virtual reality has positive effects on the affective and cognitive aspects of language learning. In the affective aspect, learners were found to increase autonomy, engagement, motivation and interests in language learning [1]. For cognition, learners may enrich their vocabularies.

Having to control the technology with just a click to learn, language learners may review the lesson when mistakes are committed. Immediate feedback could be programmed unlike in textbooks. In some programs where students can create their own virtual world, they can directly communicate or interact with other characters, for example, when asking information to strangers.

Incorporating newer technologies into language learning could be beneficial for the learners [2, 3]. Providing them with affordances that create beyond classroom traditional experiences, for instance, through gamification could promote active learning. So the use of VR headset, an inexpensive version of VR tools, is utilized in the present study.

2 Background of the Study

Virtual reality is becoming a trend in foreign language learning as realistic situational communication programs can be developed such as greetings, job interviews, ordering foods, or telephone conversations. Accordingly, virtual reality can help overcome constraints of traditional language classrooms by providing learner-centered experiences such as control over the language learning process [4].

VR is one of the most recent technologies utilized in education. Among children who do not complete assignments and were unprepared in class, a technology supported learning environment altered their negative behaviors onto becoming more engaged in classroom activities [5]. In another study, students who were asked to do some computer-based tasks exhibited excitement as compared to traditional in-class settings [6]. Assistive technology was also found helpful to solve individual differences, for example, students with learning disabilities [7].

With the use of technology in the classroom, learning could become student-centered. Some authors suggested that the use of virtual learning environment make students engage and excited as they can learn at their own pace [8]. It could also be beneficial for the teacher as assessments could be streamlined.

The popularity of Pokemon Go prompted Godwin-Jones [9] to review the existing literature on how games can be utilized by the education community. For instance, creating a personal avatar, which involves physical appearance, could be used to teach sex, dress, and hair color, among others. Participants may also create a digital storytelling book by taking screenshots of scenes they have been into. Students may also want to

write a journal of their virtual experiences. Although commercial games are not designed for language learning, teachers may use its popularity and integrate it in language learning. However, teachers must consider its suitability [10].

Cheng, Yang and Andersen [11] adapted a virtual reality video game called *Crystalize* to teach Japanese language and culture among 68 participants in the university. They were exposed to VR and non-VR versions. Accordingly, half of the participants learnt how to bow. Also, participants were less involved in Japanese culture when non-VR version was used. Qualitative responses of the participants were found promising such as ‘getting connected with people’, ‘a real-life experience, and a ‘fun talk’ with others. Despite the gains, the participants expressed dissatisfaction from technological and interface problems, for examples, motion sickness and difficulty in reading words. Although the study noted high level of motivation in the study, there was no instrument used that measured the construct. With regards to vocabulary learning, it was found that there was no significant difference between VR and non-VR conditions. Similar result has been reported by Lin and Wu [12] among junior high school students.

Other studies have reported increase of vocabulary learning in other lesser-known languages such as Filipino and German [13]. By using immediate and delayed post-tests to evaluate the effect of AR and non-AR applications, they observed a larger difference of AR as compared with non-AR application, which means that AR resulted in better retention of words among the participants. With user ‘good’ experience as one of the objectives of the study, the use of AR resulted to the reduction of cognitive load, improved attention, and increased attention [13]. Similar positive gains have been reported by Lin and Hsiao [14] in learning Chinese and English.

Since commercial games may not be applicable to specific language learning contexts, language teachers may need to adapt based on immediate contextual considerations [15].

In the context of the present study, little has been known on how the use of VR headset is related to motivation, engagement, independent learning, and vocabulary learning among first-year non-English major university students in Thailand.

3 Purpose of the Study

This paper reports the results of the formative study on the use of virtual reality (VR) headset in English language learning. It is a part of a research project that aims to explore the effects of VR technology, specifically, the use of VR headset onto the language learner’s affective variables such as engagement, motivation, and independent learning. Additionally, it explores its effectiveness on English language vocabulary learning as well as the ability of the learner to follow instructions.

4 Methods

4.1 Research Instruments

Research instruments include the following: VR headset (VR Box), iPhone 6s™, a 360 VR stimulus video (sourced from Youtube), observation sheet (a checklist), survey form (a 5-point Likert-scale), vocabulary picture cards (see Figure 1), and individual interviews. Individual interviews were conducted to know the learners' experiences.

The 360 VR stimulus video is a Youtube-sourced media available online - <https://www.youtube.com/watch>. Because the researchers are unable to create media resources as well as to save time, the researchers have utilized Learn English in VR – Describing Houses published by LearnEnglishVR on September 21, 2017. The topic was chosen as the students could relate to the topic as compared to other resources which describe places in other countries of which students may not have any background knowledge about it. The clip is 2 minutes and 16 seconds long – *not too short and not too long*.

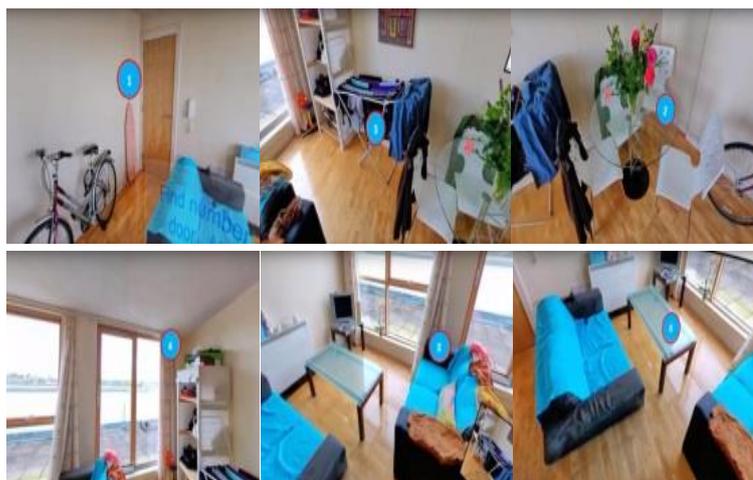


Fig. 1. Vocabulary picture cards

A survey form contains a binary scale with three items focusing on engagement (high engagement to low engagement), motivation (high motivation to low motivation), and independent learning (very independent to highly dependent). The three items were made as short as possible for the participants to gauge their opinion towards the VR activity accurately.

The vocabulary picture cards were derived from 360 VR stimulus video (see Figure 1 above). There were six picture cards including an ironing board, a dining table, clothes rack, curtains, a sofa, and a coffee table.

For the interviews, one question was asked – What do you think about the use of VR in English language learning?

4.2 Participants of the Study

Convenience sampling was used in the formative study. Out of 55 freshmen students enrolled in a foundation English course, only eleven students volunteered to take part in the study.

4.3 Data Collection Procedures

The following were observed in the data collection process: (1) The overview of the research project was explained and the students were given instructions on what to do with the VR headset, the vocabulary tests, and elicitation of their feedback, (2) Each student was asked to name the picture cards, (3) Each student was asked to put on the VR headset, (4) iPhone 6s™ was inserted and the video stimulus was played, (5) The reaction of each student was recorded, (6) Each student was asked about their experience and accomplished the survey form, and (7) Each student was asked to name the picture cards again.

Before the use of VR headset, each participant was asked to name the pictures being shown. For a correct answer, each participant has to name the picture in English. Answers were incorrect if it was spoken in Thai and if it was described (e.g., that thing is where people sit *instead* of a sofa).

Upon the use of VR headset, the students were asked to listen to the speaker and follow the instruction given (see Table 1). The speaker starts with – *You are now standing in the middle of an apartment. I want to show you some vocabulary and expressions for houses. Find number one, it's near the door. Have you found it? It is an ironing door.*

Table 1. List of instructions

Number	Specific instruction
1	Find number one, it's near the door.
2	Look left, you'll see number 2.
3	To the left of the dining table, you'll see another important object for the home. Can you see number 3?
4	Look left, you will see number 4.
5	Now find number five.
6	Finally in front of the sofa, you will number 6.

The researcher used the observation sheet (see Table 2) to mark the reactions of each participant (e.g., P1, P2, P3) during the task. A tick (✓) was used for a correct response while an X mark was used to indicate an incorrect response.

Table 2. Sample observation sheet

Instruction	P1	P2	P3	P4	P5
1	✓	✓	X	✓	X
2	✓	✓	X	✓	X
3	✓	✓	X	✓	X
4	✓	✓	X	✓	X
5	✓	✓	X	✓	X
6	✓	✓	X	✓	X

After the use of VR headset, the students were asked to indicate their perceived level of engagement, motivation, and autonomy (see Table 3).

Table 3. Survey form

Affective variable	Levels							
Perceived level of engagement	Very high	5	4	3	2	1	0	Very low
Perceived level of motivation	Very high	5	4	3	2	1	0	Very low
Perceived level of autonomy	Very high	5	4	3	2	1	0	Very low

4.4 Data analysis

SPSS was used to analyze the quantitative data. Mean of scores, standard deviation, and correlations were computed. Qualitative data from the students' insights were coded accordingly.

5 Results

Several interesting results were revealed. Descriptive analysis (see Table 4) showed high level engagement ($M=4.63$, $SD=0.80$), high level of motivation ($M=4.72$, $SD=.64$), and high level of independent learning ($M=4.63$, $SD=.67$). Moreover, participants were able to follow the instructions ($M=4.36$, $SD=0.80$). For the vocabulary tests, post-test indicated an increase of vocabulary knowledge ($M=2.73$, $SD=1.48$) than the pre-test ($M=1.18$, $SD=0.39$).

Table 4. Descriptive analysis

No.	Variables in the study	Mean of scores	SD
1	Level of engagement	4.63	0.80
2	Level of motivation	4.72	0.64
3	Level of independent learning	4.63	0.67
4	Ability to follow instructions	4.36	0.80
5	Vocabulary test 1	1.18	0.39
6	Vocabulary test 2	2.73	0.80

Further analysis on the relationships of the affective variables (see Table 5) revealed a strong significant relationship between motivation and independent learning ($r=.87$, $p<.01$). Non-significant relationships were revealed between engagement and motivation ($r=.55$, $n.s.$); and, engagement and independent learning ($r=.46$, $n.s.$). For language vocabulary learning, there was a significant difference on the students' vocabulary performance before and after the use of VR, $t(10)=6.70$, $p=.000$). However, the sample population is small to claim significant results.

Table 5. Relationships of affective variables

	Engagement	Motivation	Independent learning
Engagement	-	.55	.46
Motivation	-	-	.89**

** Correlation is significant at the 0.01 level (2-tailed)

Individual insights indicated negative comments concerning the clearness of the pictures in the 360 VR stimulus video and their inability to remember the words. Students positively said things such 'it was fun', 'it looks like the real thing', and 'I was moving instead of sitting down'.

6 Discussion and Conclusion

The use of VR in language learning motivates students to increase, for example, their vocabulary repertoire. This finding likely supports the enormous literature indicating the advantages of using technology in the classroom [2, 3]. Thus, it possible to conclude that technological integration could increase motivation in language learning. This, however, should not be taken for granted as Ciampia [10] insinuated that appropriate technology should be used. When teachers carefully select technology suitable for the students, it is more likely that students get motivated and engaged in learning [13]. This is also related to another important finding, which confirms previous studies, that the use of VR increases student engagement in language learning. Further, in the present study, the researchers have taken into account the context of stimulus video into the required task. When students can relate with the learning material to their immediate context, the task becomes more meaningful to them.

As shown in the preliminary findings, motivation and independent learning are significantly correlated. Giving students control over their language learning cultivates autonomy in language learning. Though the findings are from a formative study, it lends support to massive empirical evidence showing positive gains of independent learning in the language classroom. When students make mistakes, they can always go back and redo the task until they get the right answer. Like in Mulrine's study [8], students got excited and more engaged when they can take charge of their learning process. It would be interesting in the final study to delve deeper insights as to how motivation affects independent learning as well as how the interplay of the two variables play a role in

language acquisition. In the final study, the individual interviews may include two or more probing questions related to the topic above.

Since this paper reports the formative study, the final study must incorporate the following observations. Firstly, participants must be familiar with the VR headset to avoid negative comments as indicated above. Familiarity of the tool may also let the participants more focused on the language task. In fact during the interview, some of the participants complained about the clearness of the video. When students are familiar on how to use the tool, they might be able to adjust clearness accordingly. Secondly, a bigger population sample is necessary in the final study to have more meaningful interpretations of results. The more participants the stronger claim of significance will be. Next, pilot studies should always be conducted to be prepared in the data collection of the final study. Also, future studies may also explore the effects of VR-based and non VR-based language lessons. Considering an experimental study could more provide convincing results.

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