Under the Vision of Situated Learning: Analysing the Influence of Educational Video Games on English Vocabulary Retention in Chinese Children's Second Language Acquisition

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Abstract: This study will analyze the influence of educational video games on English vocabulary retention in Chinese children's second language acquisition. This study base on the situated learning theory and the ABC reading which is both mobile and web-based is adopted as educational game in this research. This experiment takes the Chinese primary school students with an average age of 9-10 years old as experimental subjects, and set three groups of these Chinese students including the control group. By comparing the amounts of words they can remember at different times after learning, researchers can judge whether the educational video games have any influence on students' language learning. Through the experiment, We hypothesis that the video games will have a positive effect on children's second language learning acquisition. On this basis, video games can be used as tools for language learning to provide more effective learning methods during the process of studying.

Keywords: video games, the situated learning theory, English vocabulary retention

1. Introduction

With the continuous development of science and technology, games have gradually become an indispensable part of many people's lives. At the same time, with the continuous iteration of the game itself, the game has gradually developed from a form of entertainment to multi-functional development. So many researchers try to use games as a learning tool. Some researchers mentioned an application-driven model, based on this model they developed a game system. [1] This model can offer students enhanced motivation and guide students to improve their learning status. This study will focus on the influence of video games on children's language acquisition, current research suggests that games can indeed boost children's vocabulary learning. [2] Besides, situated learning, which fully explains that situated learning can stimulate students' interest in games and promote children's learning and memory. [3] At present, it is believed that educational games are not only teaching media, but also effective learning environment. The application of situational learning theory

to establish a game model can bring users a pleasant game experience, multiple behavioral goals, adaptive goals and creative goals, and keep the game process changing and stimulating. [4]

However, the way children are taught and the curriculum is different in every country, but the experimental subjects in the current study are rarely Chinese. There are more than one forms of language education for students, so how to judge the effect of games on language education is also an issue that cannot be ignored. Therefore, under the vision of situated learning, studying the influence of educational video games on English vocabulary acquisition in Chinese children is the main goal.

In order to solve this problem, compared with traditional teaching and game teaching, the researchers tested the vocabulary memory of Chinese third-grade students twice. Combining the theory of situational learning with this experiment, we hope to find out how to make better use of games as children's learning tools.

2. Literature Review

Vocabulary retention is an essential part in foreign language acquisition, but a large majority of children have difficulty in it [5]. Fortunately, plenty of researches have indicated that educational video games which is more and more popular now have a positive effect on vocabulary learning for children. Peterson demonstrated that the computer games can improve the vocabulary learning in children in Netherlands [6]. Sundqvist and Sylvèn found that games can increase the motivation in vocabulary acquisition in English for children through an experiment with a huge number of participants from primary school [7]. Derakhshan conducted a contrast experiment, and it showed that the performances of the participants taught with video games are much better than those with traditional methods [8]. The same results were also found in several other researches, such as the study led by Calvo-Ferrer in 2017 [9]. One research carried out in 2014 indicated the reason why games can help leaning vocabulary. They found learners are fond of the fun and relax atmosphere created by games [10]. These researches have demonstrated that educational games can improve the vocabulary learning in children and their studies have made contributions to the development of language acquisition and education.

Additionally, learning English through video games is closely related to the situated learning [11]. Situated learning was put forward by Jean Lave and Etienne Wenger in 1991 [12]. One thesis named Language Learning in Virtual Reality Environments: Past, Present and Future and written by Lin and Lan in 2015 indicated that the interactive learning pattern created by educational video games can enrich students' experience on acquiring the knowledge [13]. Most of the researches on situated theory in English acquisition focus on the speaking instead of vocabulary. In 2020, one study carried out in China showed that the virtual situated learning can stimulated the students' enthusiasm for spoken English learning, and improved the learning effect [14]. Another study regarding situated learning which was also carried out in China demonstrated that situated learning have a positive effect on the learning of English speaking in tourism [15]. Based on previous studies, this paper will also focus on the perspective of vocabulary in children based on the scenario-based learning theory.

Although much has been written about video games and English language acquisition [5-15], not the majority of studies have combined English vocabulary retention and educational video games, except Chen Juan's "The Effect of Educational Games on English Vocabulary Acquisition for Primary School Students in China"[16]. This article also investigated, but it has limitations in some aspects. In terms of research design, Chen proposed to set up two groups of experimental classes, one using game-based method and the other following the routine English teaching according to the traditional teaching mode [16]. Such grouping does not take into account the actual situation of Chinese education. Because many students aspire to higher education and entry into universities and colleges is extremely competitive, the primary and secondary school syllabuses developed by the Ministry of

Education also place great emphasis on the content of the entrance exams, emphasizing the exams and the pressure to succeed [17]. For this reason, it is impossible to implement game-based classes in Chinese primary education in reality, making the study less practical. Regarding the participants of the experiment, Chen selected fourth graders who had already learned English for one year [16]. However, the first year of traditional method learning can have an impact on subsequent game method learning studies, making the uncontrollable variables increase and the experimental results inaccurate. Also, about the procedure of the experiment, Chen's experiment lasted only about four weeks. Four weeks is too short a period of time. Because the subjects were fourth graders who had already experienced one year of traditional teaching, in the beginning of the game-based method, the differences brought about by the game-based teaching method would generate novelty in the students. Moreover, four weeks is too short for the novelty to wear off, which would increase the motivation of the children in the game group and have an additional positive effect on the results, making the results of the experiment unreliable. It needs to be noted that the theory of situated learning is not utilized in Chen's article, although she designed situated learning task, which is a gap in related researches. Also, this work studies language retention and look at children's English vocabulary retention after a period of time, whereas Chen article only studies children's language acquisition, and this is another point that this work develops.

To address these limitations, necessary changes needed to be taken. In 2001, the Chinese Ministry of Education decided to introduce English courses in elementary school, and the starting grade for English courses in elementary school is usually the third grade [18]. So, in order to make a more comprehensive comparison，and to exclude the influence of traditional learning, three classes of Grade 3 was selected. The three classes were divided into two experimental groups and one control group. The control group follows the routine English teaching, while one experimental group was taught using the game-based method only, and the other was taught using a combination of traditional teaching and the game-based method.

The experimental methodology excludes the influence of traditional education, so that the experimental design is more reasonable and accurate. The experimental time is longer, thus the experimental results are more accurate and reliable. Besides, the role of scenario-based learning theory is better utilized. This paper provides a good reference for the development of English teaching methods in China in the future.

3. Logic

To understand the impact of educational games on Chinese children's English vocabulary retention, Chinese Grade 3 students will be divided into three groups, including the control group using traditional teaching, one experimental class using the game and traditional methods and the other experimental class using only the game teaching. After giving them post-test and vocabulary retention test, the difference between the two tests for each group will be calculated. By comparing these differences, the conclusion can be drawn.

The differences of three groups can be similar to each other, and it demonstrates that educational games have no effect on Chinese children's English vocabulary retention. If the difference of traditional learning group significantly smaller than other two groups, it demonstrates that educational games have a negative effect. Other situations can demonstrate that educational games have a positive effect. Also in this study, the use of games stands for the use of situated learning.

4.   Method

4.1.   Participants

Three third-grade classes' students of the same size (≥50 students) from China were selected for the study, all of them are Chinese native speakers. The students' mean age is 9-10 years old.

In addition, there will be three experimental groups in the present study, the control class and the two experimental classes. The control class using traditional teaching will be set as the first group. The experimental class using the game and traditional methods will be regarded as the second group, and the experimental class using only the game teaching should be the third group. And all children have normal vision and no brain damage.

4.2.   Material

4.2.1. Game

ABC reading [19] which is both mobile and web-based is adopted as educational game in this research. It creates a relaxing atmosphere of word learning for children, including colorful pictures，which is related to the corresponding English words. It helps children learning English mainly through reading picture books. Those picture books cover several subjects，including science, exploration, daily life, story, human and society and nature. They can be classified into more than twenty levels from aa to Z according to the level of difficulty of the core words the picture book contains. Different level is for children in different ages. Level E，which is suitable for children who are in age of 9 to 10 is chosen for the participants (three classes of grade 3). Students will learn the five to eight core words (e.g., picture book *Bath Time* contains six words，including time, tugboat, slips, bath, bubbles and tub.) in each picture book through learning the whole sentence which contains one core word with a vivid colorful picture on the left of the sentence, reading the words and then the sentences by themselves and the system will give a score according to their records.

4.2.2. Questionnaire

One questionnaire will be involved in this research before the experiment. The questionnaire aims to investigate the basic information of each participant including their situations of English learning before the experiment (e.g., Have you ever studied English before? When did you start to learn English?). If the participant has already learned English by themselves or through a tutorial class, they can still take part in this research，but their final score will be excluded in the process of data analysis.

4.2.3. Test

4.2.3.1. Post-test

Participants will take a test at the end of the experiment. The test contains fifty items totally and each item requires participants to fill in the blanks with one English word according to the corresponding Chinese meaning given on the left of the blank. Those English words will be selected from the core words contained in Level E picture books. For example:

洗浴（bath）草莓（strawberry）星期五（Friday）奶酪（cheese）

Participants will be given thirty minutes to finish the test. Full mark is one hundred and two points for each item.

4.2.3.2. Vocabulary Retention Test

There will be one vocabulary retention test seven days which is one of the critical time nodes of the forgetting [20] after the end of the experiment, according to one research in 2023 which is different in method of data analysis from this research [21]. This test aims to test the effect of the vocabulary retention. The content of this test will be the same as the post-test. The participants will also be given thirty minutes to finish this test.

4.3. Procedure

4.3.1. Pre-test

The participants will be asked to fill in a simple questionnaire before the experiment. In addition, the researchers will train the participants of group two and group three to operate the game for two days before the experiment.

4.3.2. Formal Experiment

The experiment lasted for one semester. Participants in group one will be taught through the traditional teaching method; participants of group two will be taught through a mixed method which means in the first half part of the class, the participants will be taught through traditional way while in the second half part, they will play the game; participants of group three will be taught through the game. The teaching content of three groups will be the same. Participants will learn sixteen words (two picture book) each class. In the first three weeks of a month, participants will learn new words，while in the last week of the month, they will review what they have learned in first three weeks.

4.3.3. Post-test

Participants will take a test at the end of the experiment. They will be given thirty minutes to finish a test contains fifty items in total. Full mark is one hundred and two points for each item. Each participant will have a score after the test. There are three groups of participants totally. The mean score of first group will be recorded as A1, the mean score of second group will be recorded as A2; similarly, and the mean value of the students' scores of third group will be recorded as A3.

4.3.4. Vocabulary Retention Test

This test also contains fifty items totally and its full mark is also one hundred. The participants will also be given thirty minutes to finish this test. They will also have their scores after retention test. The mean score of first group will be recorded as A1', the mean score of second group will be recorded as A2'; similarly, and the mean value of the students' scores of third group will be recorded as A3'. Then the difference (D-value=AX-AX') between the two test for each group will be calculated. The D-value for group one (D-value1=A1-A1') will be recorded as R1; D-value for group two (D-value2=A2-A2') will be recorded as R2; D-value for group three (D-value3=A3-A3') will be recorded as R3.

4.4. Analysis

At the data analysis stage, The D-value R (R=AX-AX') between the mean scores of the post-test and the retention test needs to be compared. When comparing the values, the smaller the value indicates that the method of English vocabulary learning has a positive effect on vocabulary retention; and vice versa.

Outliers (e.g., a very small number of students do not cooperate with the experiment and do not complete the word memorization tasks, resulting in extremely low final scores) should be removed before making a comparison of the mean scores of each group. SPSS will be involved in the data analysis.

Table 1 shows that there are three situations that can prove the positive effect of educational games on Chinese children's English vocabulary retention, where the difference of the first group always significantly larger than that of the second or third group. If the differences of three groups are basically the same, then it proves that educational games have no effect. If the difference of the first group(traditional learning group) is the smallest, then the educational games are proven to have a negative effect.

Table 1: Data Patterns and Corresponding Conclusions.

Effect	Situation	Conclusion
Positive	R2 << R1 / R3	Educational games have a positive effect on Chinese children's English vocabulary retention.
	R3 << R1 / R2	
	R2 = R3 << R1	
No effect	R1 = R2 = R3	Educational games have no effect on Chinese children's English vocabulary retention.
Negative	R1 << R2 / R3	Educational games have a negative effect on Chinese children's English vocabulary retention.

5. Results And Discussion

There are three possible answers according to the experiment. The researchers divided students to three groups and the first group is the control group which uses the traditional teaching.

And then comparing the difference value between the two tests in the same group with the control group. Hypothesize can be drawn that video games can have a positive effect on children's vocabulary memory learning.

6. Conclusion

6.1. Implications

This current study can provide evidence that educational video games will have an impact on the English vocabulary retention in Chinese children. Therefore, this paper can be utilized in studies regarding vocabulary retention and educational video games. Furthermore, the present study will also provide evidence that situated learning such as learning through educational video games can influence English vocabulary retention of Chinese children.

6.2. Limitations

Removing the scores of those who have learned English before the experiment will lead to different numbers of participants in each group, which may influence the accuracy of the result. Additionally,

if participants review the words learned after class, the effects of the vocabulary retention of them may be better those who just learn in class, which is difficult to control and will also influence the result.

Acknowledgments

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