บทความวิจัย

IMPLEMENTING ENGLISH GAME-BASED LEARNING APPLICATIONS IN CLASSROOMS TO IMPROVE PRIMARY SCHOOL STUDENTS' ENGLISH VOCABULARY SKILLS

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ABSTRACT

The aim of this study is to find the most effective teaching method to use along with English Game-Based Learning applications for teaching vocabularies in classrooms. The quasi-experimental research was employed to compare vocabulary scores among three teaching methods (Pre - teaching, Group learning, Exploratory learning). The purposive sampling technique was used to select ninety - one grade - 1 students in a primary school located in Samut Prakarn Province. The three teaching methods were applied separately in three classrooms with two types of English Game - Based Learning applications. Three research hypotheses had been tested using One Way ANOVA, paired-samples t - test, and MANOVA. To find the most effective teaching method resulted from One Way ANOVA, it shows that the mean of Exploratory Learning improvement scores from application A ($\overline{X}$ = 8.19, S.D. = 5.16) and B ($\overline{X}$ = 10.57, S.D. = 6.00) are better than Pre-teaching ($\overline{X}$ = 6.69, S.D. = 5.73 and $\overline{X}$ = 6.34, S.D. = 5.54) and Group learning ($\overline{X}$ = 3.59, S.D. = 7.61 and $\overline{X}$ = 6.59, S.D. = 5.75). Furthermore, the result from paired - samples t - test shows that the improvement scores from application A ($\overline{X}$ = 6.12, S.D. = 6.49) and B ($\overline{X}$ = 7.82, S.D. = 6.02) are not different and the results from MANOVA shows that none of the improvement scores from the application A

and B are influenced by the teaching methods (pairwise comparison was tested at .025 divided by 3, resulting in .008 level). The open - ended questions were made to interview the teacher for finding the teacher's suggestions and opinions. In contrast with the results from the quantitative data analyses, the teacher believed that Pre - teaching is the proper method to use. The major findings are these followings: (1) English Game - Based Learning applications promotes self - learning or learning by doing, (3) Types of English Game - Based Learning applications are not influenced by different teaching methods, and (4) The teacher prefers to use the familiar teaching methods in the traditional learning environment with English Game - Based Learning applications.

Keywords: Game - Based Learning Application, Primary School Student, English Vocabulary Skills

INTRODUCTION

Due to the AEC (ASEAN Economic Community), English will be used as a main language for communication, and therefore, the country that has high English proficiency skills will gain competitive advantages. According to the English proficiency index in the year 2013, Thailand was ranked 55th out of 60 nations (The Nation, 2013), which means most Thai students lack English language competency, and they will lose opportunities, such as international careers and wider access to knowledge. Therefore, English language should be addressed as a main issue for Thai students. However, even though there is the growing number of bilingual schools in Thailand, English is only limited to some students whose parents can afford tuition fees, and the rest of them lacks equality in education, which comes from the gaps between rich and poor families.

One Tablet Per Child (OTPC) provides benefits for Thai students to explore technology that contributes to their learning with supporting teachers to explain difficult contents that help students to learn English faster (OBEC, 2013). It is interesting to find out that the Game-Based Learning applications in tablets combined with the teaching methods, will effectively help students learn and will attract their attention to the lesson that could lead to more understanding on the contents, resulting in a development of knowledge

that can be applied in real world situations, especially, in the English subject.

RESEARCH OBJECTIVES

1. To study the difference between the three models of teaching methods and to find out the most effective method to be applied with the application being implemented,

2. To implement the teaching methods and to measure the improvement of the students' test scores, and

3. To compare the students' scores and to evaluate the difference in outcome when students use English gaming applications with three difference teaching methods

EXPECTED BENEFITS

This research will fill out the gaps between traditional teaching methods and technology that was introduced as a policy from the Thai Ministry of Education. The students are the end result that will answer how well the policy is. Without the proper teaching method, the purpose to integrate technology with teaching to gain a better result is ineffective. The findings of the study will be beneficial to the teachers for considering what tools that should be used in their teaching and what methods that should be applied in order to enhance students' learning skills. The key significances of the research are as follows:

1. This study is an effort in helping students improve their English test scores,

2. This study helps bridge the gap between traditional teaching and teaching with technology,

3. The teachers can select the best teaching method when using English Game-Based Learning applications to teach vocabularies, and

4. The English Game-Based Learning applications can support the schools that lack native English speakers.

RESEARCH SCOPE

This research focuses on Grade1 students in Thai public schools in Thailand but does not cover home-schooled students and other private schools. Therefore, the assumption and results of the research may not be applicable to use in other areas apart from where the research has been conducted.

HYPOTHESIS

$H_0$1: There is no difference in the students' improvement in the English scores among the three teaching methods (Pre-teaching, Group learning, and Exploratory learning).

H_a1: There is a difference in the students' improvement in the English scores among the three teaching methods (Pre-teaching, Group learning, and Exploratory learning).

$H_0$2: There is no difference in the students' improvement in the English scores between application A and Application B.

H_a2: There is a difference in the students' improvement in the English scores between application A and Application B.

$H_0$3: There is no difference in the students' improvement in the English scores among teaching methods and application types.

H_a3: There is a difference in the students' improvement in the English scores among teaching methods and application types.

CONCEPTUAL FRAMEWORK

The conceptual framework of this research has derived from the literature review and theories, leading to the design of the study and the selection of teaching methods and English Game-Based Learning applications to teach primary school students' English vocabularies. The conceptual framework is shown in Figure 1.

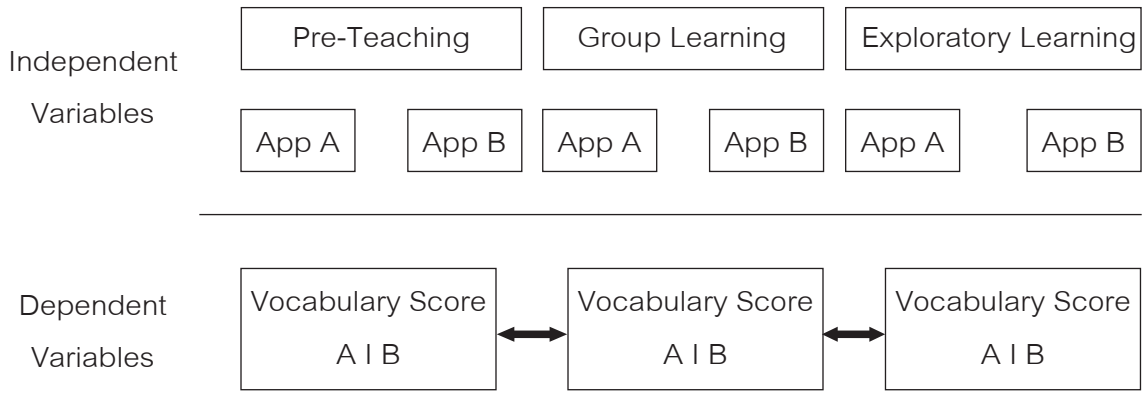

Figure 1 Conceptual Framework of the study demonstrates variables in the study.

Independent Variables: The independent variables include three teaching methods that will be used in this experiment with two types of English Game-Based Learning applications.

Dependent Variables: The outcome from the experiment will be vocabulary scores from each teaching method, which will help the researcher compare and summarize the findings in order to answer the research questions along with research objectives and hypotheses.

METHODOLOGY

This research aims to find the most effective teaching method to use with the English Game-Based Learning applications developed by the Thai Ministry of Education (MOE). The teaching method and application will be implemented in English subject classrooms. The research is conducted during a semestral period. This research is a quasi-experimental research which contains both quantitative data analysis from vocabulary test scores and qualitative data analysis from teachers' interviews.

For quantitative data analysis, there are three experimental groups and one teacher. The researcher will compare three teaching methods from students' vocabulary test scores. The findings will answer research questions and prove the three hypotheses. This research will apply teaching methods separately in three classrooms.

In pre-teaching, the teacher lists vocabularies from application A and B, pronounces the words, provides meaning and definition, then give tablets to students. In group learning, the teacher asks students to form a group of 3-5 members in application A and 50:50 ratios in application B and guides student to work collaboratively. Later, the teacher gives one tablet per group to play. In exploratory learning, the teacher raises questions regarding a set of vocabularies that students will learn. Next, the teacher gives tablets to students and asks them to find answers for the questions produced by the teacher.

Students in all groups will be required to take pre-test sets A and B and post-test sets A and B for the application A and app B. The vocabulary scores will be analyzed focusing on the effectiveness of each teaching method and the influence of the app interaction. In this research, the quantitative method is used in most of the analysis where the data is collected from vocabulary test scores and analyzed by statistical software.

For the qualitative data analysis,

after finishing analyzed the quantitative data, the researcher will gather the results and uses the semi-structured interview that the teacher will be asked by opening questions related to teaching methods and interactive applications.

The population in this research comprises of Grade 1 students in public schools located in Samut Prakarn Province, Area 2. The research will be conducted with Grade 1 students (Prathomsuksa 1) in English classrooms. The research sample consists of 91 grade 1 students who study English subject in classrooms. In this study, the school where the researcher will collect the data is selected from one school in Area 2. In the school, Grade 1 students consist of 58 males and 33 females students which are divided into 3 classes. The school has a total of 543 students and 14 classes in the primary level. The researcher will use the purposive sampling techniques to find the same characteristics in the population.

In this study, the research tools and instruments consist of (1) OTPC Tablets (2) English Game-Based Learning applications A and B (3) English vocabulary test (4) Semi-structured interview

OTPC Tablets: the OTPC tablets were distributed to all public schools in Thailand, and Grade 1 students were the first group to receive the devices. The OBEC released 200-day-lesson plans to help teachers use the tablets in classrooms. However, there was no reinforcements used in every school. The researcher will use three teaching methods from the literature review to compare and find a suitable method when teaching with the tablets.

English Game-Based Learning application A and B: In application A, students will have to control the running puppy to collect coins and bones. The puppy has to jump to avoid the obstacles and fall into holes. When the puppy grabs a bone, the pop-up question will appear with the native voice guidance. The students will have to answer questions about careers and work places. If they press the wrong answer, the life bar will reduce. In application B, the students will have to learn animal names by matching pictures with words. The students have chance to review the answer and make challenge by randomly selecting the pictures of animals, and then the students will have to select one word from the board that matches the meaning of a picture.

According to Lee, Karlova, Clarke, Thornton, & Perti Andrew (2014), the Facet analysis in Table 1 defines English Game-Based Learning applications genres.

Table 1 Facet analysis of English Game-Based Learning Application A and B

	Application A	Application B
Gameplay	Action	Puzzle
Style	Adventure	Matching
Purpose	Education	Education
Target Audience	Everyone	Everyone
Presentation	2D	2D
Artistic Style	Cartoon	Cartoon
Temporal aspect	Timed action	Turn-based
Theme	Children	Children
Setting	Spatial	Spatial
Mood/Affect	Adventurous/cute	Peaceful
Type of ending	Finite	Infinite

English Vocabulary Test: The students will be required to take the vocabulary pre-test before they learn and play English Game-Based Learning application A and B. After the experiment is conducted, students will have to take the vocabulary post-test, and the numerical data will be collected and used by statistical software to analyze.

Semi-structured Interview: The researcher will use semi-structured interview with the teacher. The open-ended questions will be used to record the teacher's experience about each teaching methods and application interaction. The information collected from semi-structured interview will be presented in the research findings.

Validity and Reliability: The two English Game-Based Learning applications and the English vocabulary tests A and B were developed by the Thai Ministry of Education, which has been approved by the experts in related fields. The contents in applications A and B and the test design are based on The Basic Education Core Curriculum and CEFR framework that suite Grade 1 students. The semi - structure interview questions have been reviewed by the experts and evaluated using the Content Validity of the overall scale (CVI).

Data Collection: All data collection

from the school, the students and the tests will be kept confidential. The researcher has chosen statistical software to analyze the data. The vocabulary pre-test and post-test scores from three experimental groups will be collected and analyzed using statistical software to find (1) The teaching method that students score highest in the vocabulary tests, (2) The English Game-Based Learning application A or B that students score highest in the vocabulary tests, and (3) Teaching methods or English Game-Based Learning application interaction that improves students' vocabulary scores.

DATA ANALYSIS

1. Difference on the students' improvement in vocabulary scores among Pre-teaching, Group Learning and Exploratory Learning using One-Way ANOVA.

2. Difference on students' improvement in vocabulary scores between Applications A and B using paired-samples t-test.

3. Difference on students' improvement in vocabulary scores among three teaching methods and application types using MANOVA.

RESEARCH RESULTS AND DISCUSSION

RESEARCH RESULTS

The results of the three hypotheses and semi - structure in this research study are as follows: Hypothesis 1, The researcher used One-Way ANOVA to measure the mean differences of students' improvement in English scores of application A and B among three teaching methods (Pre-teaching, Group learning, and Exploratory learning). This analysis was used to find the most suitable method to teach English vocabularies using English Game-Based Learning applications. There are two dependent variables (aimprove and bimprove) to be analyzed based on one the fixed factor "Teaching_Method".

Table 2 Levene's test results of Students' Improvement in English Scores from application A and B

Teaching_Method	aimprove		bimprove		N
	Mean	S.D.	Mean	S.D.	
Pre-teaching	6.69	5.73	6.34	5.54	26
Group Learning	3.59	7.61	6.59	5.75	27
Exploratory Learning	8.19	5.16	10.57	6.00	26
Total	**6.12**	**6.49**	**7.82**	**6.02**	**79**

In application A, there is a significant effect of teaching methods in English vocabulary score improvement at the $p < .05$ [F (2,76) = 3.712, p =.029]. In application B, there is a significant effect of teaching methods in English vocabulary score improvement at the $p < .05$ [F (2, 76) = 4.419, p = .015].

Because the F test is significant, the follow up tests were conducted to evaluate the pair-wise differences among the means. The researcher decided to use Tukey's test that could assume the equal variances because the test of homogeneity is not statistically significant. In addition, the standard deviation values range from 5.16 to 7.61 in application A and 5.54 to 6.02 in application B, which indicates that the variances are not different from each other.

Table 3 Tukey's test for the groups in each teaching method pairwise in comparison with the Summary of aimprove and bimprove

Teaching_Method	aimprove		Sig.
	Mean Differences	S.D.	
Pre-teaching and Group Learning	3.099	1.72	.178
Pre-teaching and Exploratory Learning	-1.500	1.74	.666
Group Learning and Exploratory Learning	-4.599*	1.72	.025

Teaching_Method	Bimprove		Sig.
	Mean Differences	S.D.	
Pre-teaching and Group Learning	-.246	1.58	.987
Pre-teaching and Exploratory Learning	-4.230*	1.60	.027
Group Learning and Exploratory Learning	-3.984	*1.58.	037

By using Tukey's test, Pre-teaching and Exploratory Learning are significantly different in statistics from each other as well as Group Learning and Exploratory Learning (a significance level of 0.05).

Hypothesis 2, The researcher used paired-samples t-test to compare a mean of students' improvement in English scores between two applications. There are two variables: aimprove and bimprove.

Table 4 The Means Summary for aimprove and bimprove.

	Mean	S.D.	N
aimprove	6.12	6.49	79
bimprove	7.82	6.022	79

Table 5 T-test for the mean difference between aimprove and bimprove.

	Mean Difference	S.D.	Sig.	N
aimprove and bimprove	1.696	5.923	.013	79

The paired-samples t-test was conducted to evaluate whether the students' improvement in English scores between application A and B is different. The results indicate that the mean English scores from application A (M = 6.12, SD 6.49) are different from the mean English scores from application B (M = 7.82, SD 6.02), t (78) = -2.54, p = .013. The null hypothesis is rejected.

Hypothesis 3, A One-Way multivariate analysis of variance (MANOVA) was conducted to determine the effects of the three types of teaching methods (Pre-teaching, Group-Learning, and Exploratory Learning) on the two improvements of the test scores from application A and application B.

Table 6 MANOVA: The Effects of three types of teaching methods on application A and B improved scores

Dependent Variable	df	df error	F	p	Partial Eta Squared
Application A	2	76	3.71	.029	.089
Application B	2	76	4.419	.015	.104

Wilk's A = .84, F (4, 150), p <. 01. Analyses of variances (ANOVA) on the dependent variables were conducted as a follow-up test for MANOVA. By using the Bonferoni method, each ANOVA was tested at .025 level. ANOVA on the application A was not statistically significant F (2,76) = 3.71, p = .029, partial eta square = .089, while ANOVA on the application B was statistically significant F (2,76) = 4.42, p < .05 partial eta square = .104.

Post-hoc analyses to the univariate ANOVA for the application A and application B improvement score were conducted to see which teaching strategy affected the scores strongly. Each pairwise comparison was tested at the .025 divided by 3 resulting in .008 level. The results show that none of the application A and application B improvement scores was affected by the teaching method.

Overall, there is no a statistical significance in any of the pair. This means that the teaching methods do not influence the application types.

Qualitative information from teacher's interview: The six open-ended questions were made to interview the teacher for finding their suggestions and opinions.

Question 1: Please compare the strengths and weaknesses of each teaching method (Pre-teaching, Group Learning, Exploratory Learning).

Answer 1:

Pre-teaching

Strengths

- The teacher could teach basic vocabularies to learn in that period.

- Students had a chance to practice spelling.

Weakness

- Time - consuming.

Group Learning

Strengths

- Students knew how to share and patiently wait for their turns.

- Students knew how to socialize.

Weaknesses

- To organize the group activity, space was needed.

- The teacher had to be well-organized and knows how to motivate students.

Exploratory Learning

Strength

- Teacher felt relaxed when not to having to teach.

Weakness

- Students did not gain knowledge without teacher's guidance.

Question 2: How can English Game-Based Learning application help students improve English vocabulary skills?

Answer 2: English Game-Based Learning applications allowed students to practice spelling, pronunciation, and listening repeatedly. The visualized and graphic and the colors attracted students' attentions, and it was easy for remembering vocabularies.

Question 3: In your opinion, which teaching method is the most effective when used with English Game-Based Learning application and why?

Answer 3: Teacher's opinion is that Pre-teaching is the most effective method to teach vocabularies with the applications because students gained vocabulary knowledge from the traditional teaching, and students have to be ensured to know vocabularies learned in the class before they practiced by themselves.

Question 4: Which teaching method and application facilitate students' enjoyment and how?

Answer 4: Both applications that were learned with Exploratory Learning method promote student's enjoyment because students were independent on their own learning.

Question 5: How each application type affects students' English vocabulary learning?

Answer 5: Two types of English Game-Based Learning applications do not show any difference in enhancing students' learning.

Question 6: Do you think using three teaching methods along with two types of application give different results in terms of students' improvement in English vocabulary scores? Please explain why?

Answer 6: Regarding the question 5, the types of applications do not give a different vocabulary improvement whilst teaching methods, especially, Pre-teaching has an impact on students' learning as explained in the question 3.

Discussion

The Game-Based Learning and other interactive applications have been installed onto the tablets for teachers and students to use for learning activities. Many studies and surveys have proved that using technology in teaching, such as Game-Based Learning applications, can help improve students' learning performance and bring fun while studying (Derakhshan and Khatir, 2015), (Abdul Rabu and Talib, 2017). However, technology in education has not fully utilized in teaching and learning. Apart from using technology in teaching and learning in classrooms, an effective teaching method is needed to be concerned as supported by Pooja (2017) that teaching method is the most important variable on students' academic

achievement. Hence, the researcher decided to find the effective teaching methods to help teachers to teach and to help students to improve English vocabulary skills as stated by TESOL (2013), "learning words is important to help students who study English as a second language".

The result of this research shows that the Exploratory Learning method with using English Game-Based Learning applications had higher improvement scores than other two teaching methods without the effect from application types. The researcher used three hypotheses to answer the research questions which were summarized in qualitative and quantitative points. The analyzed data from results of three hypotheses are discussed below.

The result from hypothesis 1 was used to find which one out of three teaching methods was the most effective when used with English Game-Based Learning applications in the classrooms. The research result revealed that the three teaching methods had significant effect toward the students' performance on vocabulary test scores, however, Exploratory Learning was confirmed by the data analysis to be the most effective teaching method that was used with English Game-Based Learning application to teach Grade 1 students vocabularies. To support the results, Squire, Giovanetto, Devane, and Durga (2005) illustrate the process of how expertise and game literacy are formed over the summer program. The findings have shown the participants who are guided to use the game successfully will explore and develop their own strategy in winning the game over other players who still follow the instructions. Together with the right teaching method, English Game-Based Learning applications can help primary students achieve learning English vocabularies (Abdul Rabu & Talib, 2017).

However, a result from the data analysis and a range of mean differences of improvement scores among three teaching methods were approximately between 3 and 5 points. Thus, Exploratory Learning cannot be considered to be the best teaching method compared to Pre-teaching or Group Learning when used with English Game-Based Learning applications. This is because during the study, three groups of three learning methods were set up the limitation by timeframe.

The research findings from the hypothesis 2 and 3 were used to find out if there were any other factors that affected the result from the hypothesis 1. The hypothesis 2 was tested to find the

improvement scores between application A and B and the result shows that the mean scores in both applications are statistical significance (p = 0.013) but it is approximately one point different in mean score. Differently to the result from the hypothesis 2, the hypothesis 3 shows there is not statistically significant in test scores when implementing three teaching methods with two types of applications. This can explain that the other factors do not have a significant effect on students' improvement scores. The findings from Pooja (2017) also support this study that the method of teaching has a big impact on students' achievement. Therefore, the teacher has to carefully select the teaching method that works with English Game-Based Learning applications.

In the teacher's opinion, it is contrast with the quantitative results that Pre-teaching is the effective method to be used with the English Game-Based Learning applications. The interview result from the teacher can be explained that the teaching style is related to teachers' belief (Canto-Herrera & Salazar-Carballo, 2010), and the belief is from teachers' attitude, school environment, job satisfaction, and professional development (OECD, 2009).

Another interesting finding is the reflection of students toward the three teaching methods. The Group Learning appears to be very enjoyable for Grade 1 students to learn through the English Game-Based Learning applications. The indirect effect of learning this method is the collaboration among students. When students were sitting in a group, there was always one student who took a leader role to guide others to play the game and shared among the groups to get involved in the activity. Furthermore, when the teacher set up a competition between two groups, students were very excited to compete with the opponents. This reflection is supported by Huong (2006) that Group Learning has be dealt with social interaction, and it creates learning environment when students are set in a team and help each other.

While the Group Learning reflect students' enjoyment to learn vocabularies, Pre - teaching is in contrast with students' reflection. Some students were not be able to concentrate for a long period without calling for an attention from the teacher. This is supported by Fry and Bi (2013) that the teacher-center teaching method requires less students' involvement, and in order to achieve the students' performance, teachers need to design their teaching in more Teacher-Student Interactive method (Pooja, 2017).

In this research, self - learning is best explained in the Exploratory Learning method. Students independently played the English Game-Based Learning applications after the teacher explained the gameplay instructions. Each individual was looking for the way to score well in the game. However, some students raised their hand for assistant from the teacher and the researcher. The students were able to get high scores when they repeatedly played for about 3 to 5 times. The students focused on the games and expressed their stress and enjoyment when they got wrong or correct answers. Students who concentrated on playing games were able to score better than students who raised their hand for a guideline as supported by the study from Squire, Giovanetto, Devane, and Durga (2005).

Regarding the results, the data analysis of this study shows that Exploratory Learning method used with the English Game-Based Learning applications is statistically significant in the improvement in English vocabulary test scores, but this trend is slightly higher than the study group of Pre - teaching method. Moreover, the interview with the English teacher gave different points of views. The teacher believes the Pre-teaching method used with the English Game-Based Learning applications is effective to teach English vocabularies since the students had no basic knowledge of English vocabularies and came from different family backgrounds. Hence, the teacher can teach basic English vocabularies to students as fundamental knowledge before allowing them to play and learn through the English applications. For other two methods, Group Learning and Exploratory Learning are dependent on the teacher's teaching skills and students' basic English knowledge.

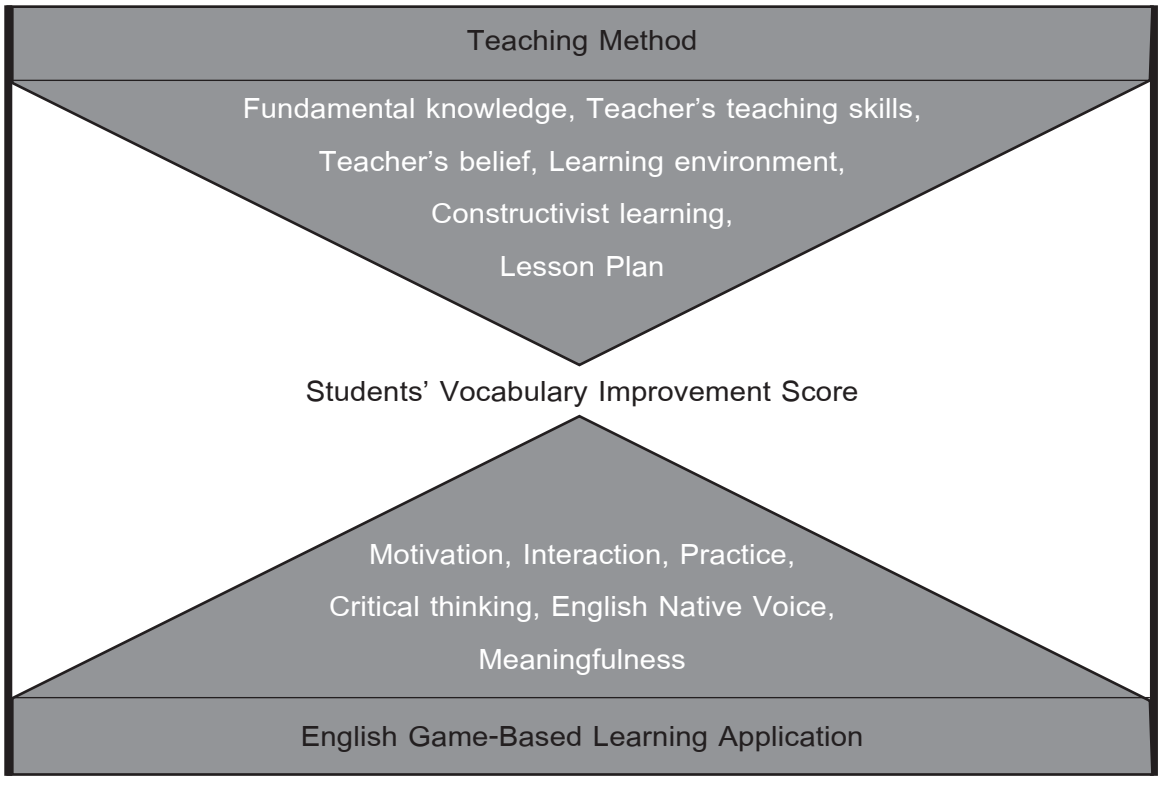

Figure 2 The Factors Affecting Students' Vocabulary Score Improvement Through the Teaching Method and the English Game-Based Learning Applications illustrated by Papob Puttimanoradeekul

The research findings conclude that the use of English Game-Based Learning application can motivate students to learn English as a foreign language, and it makes them willing to explore vocabulary knowledge from learning by doing. All of the three teaching methods can help students improve English vocabulary test scores. Especially, Exploratory Learning method shows the highest improvement score results.

SUGGESTIONS AND RECOMMENDATIONS

The findings of this study can provide guidelines and help English teachers to find out the importance of using technology in education. The teachers can prepare varieties of lesson plans to boost students' learning ability by using English Game-Based Learning applications that can be used for everyone who study English as a foreign language

for better learning and understanding.

Although this research provides the guideline for primary school teachers to select the effective teaching method to teach English vocabularies along with the use of English Game-Based Learning applications, the questions can be raised for further research: How teaching methods and English Game-Based Learning applications can be applied in different subject areas? Regarding research findings and the review of literature, the following recommendations are made below:

1. The quantitative data collection in long term is necessary to find out whether the improvement in vocabulary scores between Exploratory Learning and Pre-teaching is slightly or greatly different.

2. The further research may be conducted in different subject areas as the findings could benefit various stakeholders.

3. The training program for all teachers is necessary to effectively implement English Game-Based Learning applications in classrooms.

4. Schools are recommended to accept the use of technology tools for education and changes in learning habits of the new generation of students.

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