The Effects of Project-Based Learning on Chinese Vocabulary Learning Achievement of Secondary Three Thai Students

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Abstract

This study aimed to study whether Project-based Learning (PBL) could enhance Chinese vocabulary learning achievement of Secondary Three Thai students and to study the students' satisfaction levels with Chinese vocabulary learning through Project-based Learning. The study adopted a class for an experimental study design. The population of this study was 30 students from Class 3/2 of a school in Bangkok. There were 11 males and 19 females in the PBL case study course. A pre/post-test was used before and after the intervention to assess the learning achievement of the students. A questionnaire asking about the students' satisfaction was administered after the experiment to explore their levels of satisfaction with PBL. A semi-structured interview was employed to collect the students' feedback about the course they participated in. The findings revealed that the PBL lessons could enhance Chinese vocabulary learning achievement of the participants. The Post-test mean score was 44.76, that was higher than that of the pre-test (18.23). The

one Sample T-test revealed that there was a significant value of $p<0.05$, thus confirming that the effectiveness of PBL approach. The questionnaire data showed that all items were ranked at the very high level. This means the students were satisfied with the approach used by the researcher. Data from semi-structured interview indicated that students improved their necessary skills of the 21st century such as teamwork and self-directed learning. Further studies on PBL with different groups of Chinese students are recommended.

Keywords: Project-based Learning, Chinese Vocabulary Learning, Secondary Three Thai Student

INTRODUCTION

With the establishment of Asia-Pacific Economic Cooperation, the economic exchanges between China and Thailand have been increasing, and the relationship between China and Thailand is becoming closer and closer (Hongfang, 2013). Chinese was offered as a required course in Thailand in 2003. Since then, it has been a popular subject in every school and obtained attention (Hui, 2017). However, there still exist some weaknesses that are potentially restricting the development of Chinese teaching (Ye, 2016). Chinese language study in Thailand has faced many problems or difficulties in 1) The ineffectiveness of the teaching and learning process— students cannot apply the knowledge to the real environment, 2) The inappropriateness of the textbooks used in Thailand, the same one being used to teach foreign students in China, and 3) Teachers lack the teaching competencies that can attract students' attention and enthusiasm (Masuntisuk, 2009).

Because of the above-mentioned challenges, there has been an attempt to improve the teaching and learning of Chinese. Many learning theories have been chosen (Wang, 2018). For example, PBL is widely adopted in the field of learning and teaching (Trimble, 2017). Based on this complex situation, PBL is a promising approach with positive effects on students' learning achievement, thus solving various problems in the process of teaching and learning (Baş & Beyhab, 2017).

This research was expected to find an appropriate way for students to learn Chinese vocabularies so as to optimize the learning potential of students. Students were taught 50 basic words through PBL, which is believed to be an appropriate approach. At the same time, this study could help improve teachers' teaching ability so that teachers could constantly improve and develop themselves by using a new way to teach vocabulary to Thai students. The study was based on two objectives:

1) To study whether PBL could enhance Chinese vocabulary learning achievement of Secondary Three Thai students.

2) To study the Secondary Three Thai students' levels of satisfaction with Chinese vocabulary learning through PBL.

DEFINITIONS OF TERMS

1. Project-Based Learning

Project-based learning in this research consisted of 6 steps. It started with asking the essential question, designing a plan for the project, dividing students into groups, creating a schedule, monitoring the students and the progress of the project, assessing the outcome and evaluating the experience. Students' PBL projects in the study were producing dictionaries, books, posters and cards.

2. Chinese Vocabulary Learning Achievement

HSK Level 1 Chinese vocabulary includes 150 basic words. In this study , the top 50 of the 150 vocabulary of HSK Level 1 were selected as student independent

learning projects. Vocabularies include: 1) 8 words that simply introduce personal information, 2) 12 words that briefly describe the weather, 3) 18 words that briefly describe the direction, 4) 12 words that briefly describe the animals. Students can understand remember the meaning and write these words accurately.

3. Secondary Three Thai Students

Thai students whose ages are 14- 15 years of age in Secondary Three (Mathayom Three in the Thai education system) of a school in Bangkok, Thailand. They had not had any Chinese courses before.

LITERATURE REVIEW

Chinese vocabulary is the aggregation of all words in Chinese. It also includes fixed phrases whose properties and functions correspond to words, such as idioms. Historically the term "vocabulary" is also used in the aggregation of words from a historical dynasty, a regional dialect or a social dialect just like industry language in Chinese (Zhang and Koda, 2012). The Chinese proficiency test HSK is an international standardized Chinese proficiency test for non-native speakers including foreigners, overseas Chinese and ethnic Chinese candidates (Yang and Zhang, 2007). HSK Level 1 examines the candidates' daily Chinese application ability, which corresponds to Level 1 of International Chinese Competence Standard and Level A1 of European Common Reference Framework for Languages (CEFR). To pass HSK Level 1 test, candidates must understand and use some very simple Chinese words and sentences to meet the basic communication needs, and

have the ability to further learn Chinese (Cheng, 2019).

Project-based Learning theory is a learning theory based on three underlying learning theories: Cognitive Learning Theory, Constructivist Learning Theory and Cooperative Theory. Each learning theory is clearly related to Project-based Learning theory. Project-based Learning encourages students to work in small groups towards successful competition of a project by sharing information with the group members in order to produce the best work (Harinie, Sudiro, Rahayu and Fatchan, 2017). Cognitive Learning Theory and Constructivist Learning Theory aims to get learners continue their own learning and develop their learning ownership (Davcev, Stojkoska, Kalajdziski and Trivodaliev, 2016). In this way, the two theories support each other. Another theory, Cooperative Theory values cooperation among the group members in learning (Britton, Simper, Leger and Stephenson, 2017). All these theories prove that students should learn from one another than from the teacher, who acts as a faciliatory and guide for them. Especially in time of difficulties. In this study, students need to learn new Chinese vocabulary through their existing knowledge in the process of completing the project. This is the embodiment of constructivist learning theory in this study. According to Jun (2010), teamwork is paramount in a project-based learning process. During the project implementation phase in this research, students were divided into small groups so that students could collaborate on project learning.

Project-based Learning (PBL) is a model that organizes learning around projects (Thomas, 2000). According to Thomas (2000), projects are complex tasks, based on

challenging projects, that involve students in design, problem-solving, decision making, or investigative activities; give students the opportunity to work relatively autonomously over extended periods of time; and culminate in realistic products or presentations (Mergendoller and Thomas, 2005; Trippel, 2013; Norboevich, 2019).

Project-based Learning must be student driven and encourage student choice (Condliffe, 2017). Students take responsibility for their work, identify problems that need further clarification, decide how to research solutions and find resources, and manage their working hours. As students take more responsibility for their work, the role of teachers has changed in the PBL environment. Teachers become guides, not masters of everything in the classroom (Norboevich, 2019). The instructor uses scaffolds to guide student learning by helping students find the information that they need, aiding students in clarifying their ideas, or teaching them what they need to know to succeed in their project (Condliffe, 2017). According to Krakowski (2012), eventually, teachers fade into the background as students gain greater autonomy.

According to Bell (2010), students, using PBL is the driving force of learning, because they admit that it is easier for them to understand the information they get through this practical method; it provides them with encouragement to find information, rather than passively expecting it to be taught, so as to go beyond the limitations of classical teaching methods and strive for time to devote to the project at hand. In addition, some projects can take the form of internships. In particular, professors are actually encouraging students to participate in research projects so that they can gain valuable

experience, which is impossible to get elsewhere.

Standardised Project-based Learning steps are often carried out for better student learning and achievement. The following steps are a result of literature review of experts' studies and suggestions.

1. Start with the Essential Question.

An essential question is any question requiring one of the following thought processes: a question which requires the student to develop a plan or course of action. a question that requires the student to make a decision. The essential question directs the course of student research (Helle, Tynjälä & Olkinuora, 2006).

2. Design a Plan for the Project.

The project plan is an executive system which includes a proposed project and its management. It provides key information about the project and shows how to manage, execute and control it. It contains detailed steps to complete the project. It enables leaders to intuitively understand the progress of the project, provides guidance for project leaders and their teams, and enables them to gradually enter the completion stage from the implementation stage of the project (Spikol, Ruffaldi, Dabisias & Cukurova, 2018).

3. Create a Schedule.

In the process of PBL implementation, the plan plays a guiding role. A good plan will make the learning and teaching process such more smoothly (Cunningham, 2016). Educators should create plans based on the themes of previous courses and the actual

needs of students. In the process of plan creation, educators should guide students to create their implementation plans according to the different characteristics of different groups of students, rather than by educators. Educators should be in a guiding position to lead students to PBL activities, and in the process, students should develop the ability of team cooperation and plan making (Christensen, 2019).

4. Monitor the Students and the Progress of the Project.

Monitoring group projects requires as much planning and preparation as designing the project itself, but it helps prevent many common problems in group work (Arick, Young, Falco, Loos, Krug, Gense & Johnson, 2003). Students who have not worked in groups before, or who have experience only with ineffective groups, will need more structure, guidance, and regular communication with you. Students who are more experienced with group work, or who have worked in effective groups before, may need less. However, it is important to monitor all groups to some extent so that feedback can be provided and interventions can be made if necessary (Vanhala, 2018).

5. Assess the Outcome.

PBL is a teaching method involving different types of active learning opportunities. Because students actively participate in classroom learning and show their progress in mastering content or problem-solving ability, this method provides a lot of opportunities for real embedded evaluation and does not waste time to acquire from teaching (Mutakinati, Anwari & Kumano, 2018).

6. Evaluate the Experience.

In PBL, many aspects of student achievement need to be evaluated. The final result is very important, but the whole process of task execution should be voted. The significance of PBL is that students learn not only the content, but also how to cooperate with others and solve problems in the process of project implementation (Naz, Lu, Hatipoglu & Rambo-Hernandez, 2016).

METHODOLOGY

This study adopted this mix-step model of PBL with an aim to improve student's vocabulary learning skill. The research design of this study was a mixed methods approach with a collection of quantitative and qualitative data. In this study, the impact of Project-based learning on Chinese vocabulary learning in Secondary Three Thai students were the focus.

This study was a one group pre/post-test experimental design. Students of one class were randomly selected as a sample group by drawing class number to study Chinese vocabulary based on PBL within 6 weeks. The students' HSK level 1 learning achievements were tested through the pre-test and the post-test. The students' project results were evaluated by a specially designed rubric, and the students' satisfaction levels were collected through questionnaires and interviews.

According to the cluster random sampling method, students in class 3/2 were used as research samples. The class consisted of 30 students with 11 males and 19 females. According to the students' Chinese test scores of the previous perenties, the

students in this class had relatively balanced Chinese scores, and there was no significant difference from other groups. At the same time, the students in this class had no Chinese family members, the language environment was the same, and prior to the study none of them received extra-curricular Chinese education.

The research instruments for this study consisted of intervention instruments and research instruments. A PBL design course with the lesson plans and the project assignment assessed with a rubric. Research instruments which would respond to Objectives 1 and 2 were the Chinese vocabulary pre-test and post-test, the students' satisfaction interview and a questionnaire.

In this study, intervention instruments included the lesson plans, the project work and the rubric of students' work. The lesson plans were designed following the PBL steps. Time allocated for the study lasted 6 weeks with 50 minutes of 10 PBL courses to guide students' Chinese vocabulary learning. Each lesson plan was divided into six parts. Students chose the project style in groups. According to the project of this study, the goal was vocabulary learning. The students were required to display their works, such as dictionaries, books, posters, vocabulary cards, newspapers and other forms, so that the work and performance of students in the process of project implementation would be evaluated.

A rubric was used to evaluate the project work of every group, focusing on the evaluation of the students' project progress, theme, HSK level 1 vocabulary, display quality, appropriate design, self-learning ability, teamwork ability and creativity.

In this study, the research instruments included the Chinese vocabulary pre- and post-test, the students' semi-structured interviews and the students' satisfaction questionnaires. The pre-test and the post-test were the main test tools in this study. In the process of Chinese vocabulary teaching, HSK Level 1 vocabulary syllabus was adopted. The pre-test and the post-test were designed into 2 parts. The first part included 5 judgment questions, 10 vocabulary picture multiple choice questions, and 5 situational dialogue multiple choice questions. The second part consisted of 15 vocabulary picture judgment questions, 5 vocabulary picture multiple choice questions and 10 situational vocabulary multiple choice questions. All test questions were selected from HSK level 1 of 2018 Test Paper.

According to Turner III (2010), interviewing as a way of getting to know the situation has become very important. Teachers need to get timely feedback from the course through interviews with students, so as to make improvement for the following term class. Interviews were done in Thai with a Thai teacher conducted them for the researcher. Thus, the satisfaction was also collected. The students' satisfaction interview questions were as follows:

1. Are you satisfied with this Project-based Learning?
2. How do you feel about teamwork in this learning process?
3. Do you think Project-based Learning is helpful for Chinese vocabulary learning?
4. Are you satisfied with the results of your group's project presentation?

5. Do you think you have gained the knowledge and skills to improve vocabulary through this project-based learning? What aspects of your ability have been improved?

At the end of the PBL course, the students' satisfaction levels were collected in order to find out how much the students liked the course. At the same time, the students' attitudes about the PBL course through questionnaires could be explored as another set of data for interpretation of the findings. The sample questionnaire comprised 10 items with space to fill in their free responses and the students were asked to select the number that marched their satisfaction level. According to Likert (1932), the 1- 5 Likert scale contains the following values: Value 5 = Strongly Agree (SA), 4 = Agree (A), 3 = Neutral, 2 = Disagree (D), and 1 = Strongly Disagree (SD). According to Best (1981), the respondents' rating categories are: Very low = 1.00 - 1.49, Low = 1.50 - 2.49, Medium = 2.50 - 3.49, High = 3.50 - 4.49, Very high = 4.50 - 5.00.

FINDINGS

There are four major findings from the three instruments used in the study: the pre/post-test, the questionnaire and the interview. Firstly, PBL could enhance Chinese vocabulary learning achievement of Secondary Three Thai students. According to the results of the pre-test and the post-test, the scores of students' post-tests are much higher than those of students' pre-tests. The information obtained is shown in Table 1.

Table 1 Dependent Sample Test

Dependent Sample Test								
95% Confidence Interval of the Difference								
	$\overline{X}$	SD	p	t	Sig	MD	Lower	Upper
Pre-test	18.233	5.042	0.467	23.654	0.0005	-26.533	24.287	28.778
Post-test	44.766	3.510	0.467	23.654	0.0005	26.533	24.772	28.784

Table 1 shows the data analysis results of the pre-test and the post-test. The mean score ($\overline{X}$) of the pre-test was 18.233 (SD=5.042). The mean score ($\overline{X}$) of the post-test was 44.766 (SD= 3.510). The mean is the most commonly used feature in statistics, which is used to show the centre position of the data with more observations. The smaller the standard deviation (SD), the smaller the difference between individual score and the mean score ($\overline{X}$), and vice versa. 3.510<5.042. The score of the sample group showed the post-test SD was smaller than the pre-test SD. This proves that the students' post-test scores were closer to the mean score ($\overline{X}$) of the post-test. The mean difference (MD) between the two groups was 26.533. The t-value of the pre-test and the post-test was 23.654. The p-value of the pre-test and the post-test was 0.467. The p-value greater than 0.05 means equal variance, while p-value represents significance, p-value greater than 0.05 means significant effect (p>0.05). P-value of pre-test and post-test was 0.467. 0.467>0.05. This means was equal variance, represents a significant effect. Sig of the pre-test and the post-test was 0.0005. Sig represents difference, Sig less than 0.05 indicates difference, and Sig greater than 0.05 indicates no difference (Sig<0.05). 0.0005<0.05. It is

proved that there is difference in this experiment.

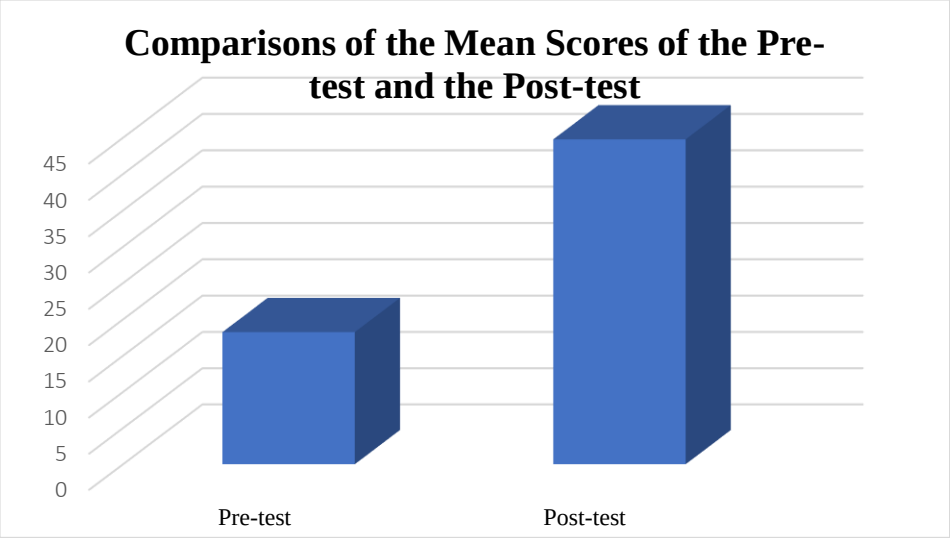

Figure 1: Comparisons of the Mean Scores of the Pre-test and the Post-test

Figure 1 shows the mean scores of the pre-test and the post-test. The mean score of the pre-test was 44.766, higher than 18.233, the mean score of the post-test.

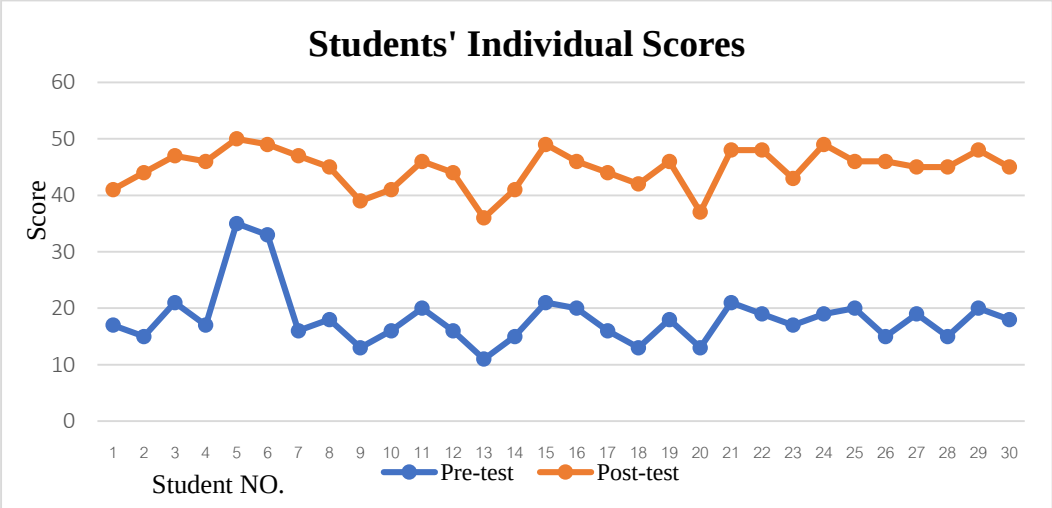

Figure 2: Students' Individual Scores

Figure 2 showed the individual scores of each student in the pre-test and post-test. This figure clearly illustrates the differences in the scores of all students in their pre-test and the post-test. This proves that project-based learning is very helpful for students'

understanding of Chinese vocabulary, reading and writing.

Secondly, this group of students were very satisfied with Project- based Learning. According to the results of the questionnaire, students were willing to accept project-based learning, and looked forward to being in a Project-based Learning class again. Table 2 below shows questionnaire data description statistics.

Table 2 One Sample Test

One Sample Test						
NO.	Validity Samples	MIN	X	$\bar{X}$	SD	Sig
1	30	3.00	5.00	4.70	0.53	0.0005
2	30	3.00	5.00	4.60	0.56	0.0005
3	30	4.00	5.00	4.83	0.37	0.0005
4	30	4.00	5.00	4.83	0.37	0.0005
5	30	4.00	5.00	4.90	0.30	0.0005
6	30	4.00	5.00	4.80	0.40	0.0005
7	30	3.00	5.00	4.70	0.53	0.0005
8	30	3.00	5.00	4.76	0.50	0.0005
9	30	4.00	5.00	4.83	0.37	0.0005
10	30	4.00	5.00	4.80	0.40	0.0005

Table 2 shows the details of the questionnaire data, including the minimum

value (MIN), the maximum value (MAX), the mean scores ($\overline{X}$) and the standard deviation (SD). The mean and SD were computed for all the statements and the researcher used them to find out the items with the high scores and those with the lower scores respectively.

According to Likert (1932), the 1- 5 Likert scale. Value 5 = Strongly Agree (SA), 4 = Agree (A), 3 = Neutral, 2 = Disagree (D), and 1 = Strongly Disagree (SD). According to Best (1981), the respondents' rating categories are: Very low = 1.00 - 1.49, Low = 1.50 - 2.49, Medium = 2.50 - 3.49, High = 3.50 - 4.49, Very high = 4.50 - 5.00. Table 3 below shows the analysis of questionnaire data.

Table 3: Students' Levels of Satisfaction with Chinese Vocabulary Learning through Project-based Learning.

No.	Item	Mean	SD	Level
5	The teacher is timely and correct guidance t students. (Teacher)	4.90	0.30	Very high
3	The teacher is approachable and willing to help m (Teacher)	4.83	0.37	Very high
4	The teacher treats all students with respec (Teacher)	4.83	0.37	Very high

6	The teacher uses a variety of methods a instructional materials to enhance student learni (Teacher)	4.80	0.40	Very high
2	The teacher is open to questions and discussio (Teacher)	4.60	0.56	Very high
	Teacher Total	4.79		Very high
9	I improved my self- study ability through proje based learning. (Students)	4.83	0.37	Very high
10	I feel satisfied with the Project- based learni process. (Students)	4.80	0.40	Very high
8	I improved my teamwork ability through proje based learning. (Students)	4.76	0.50	Very high
	Students Total	4.80		Very high
1	The lesson is well-prepared and organized. (Lesso	4.70	0.53	Very high
7	Project- based learning is helpful for Chine vocabulary learning. (Lesson)	4.70	0.53	Very high
	Lesson Total	4.70		Very high

Table 3 shows the Mean, S.D and Level of each item, it can be seen from this that the item with the highest average value is NO. 5, Mean: 4.90; SD: 0.37; Level: Very high. It means Item 5 “timely and correct guidance for students” is the most satisfying

factor for students. The lowest is NO.2 “The teacher is open to questions and discussion”. Mean: 4.6000; SD: 0.56324; Level: Very high. For the teacher’s part, students were satisfied with teacher's teaching attitude and teaching method. For the students’ part, students were satisfied with Project-based Learning and believed that their self-learning ability and teamwork ability have been improved. For the lesson part, students were satisfied with the organization of the course and project-based learning. For the total mean score, the students’ part was the highest; the teacher’s part was medium and the lesson part was the lowest. All parts were in the very high level.

Thirdly, from the interview data, students clearly showed their feelings towards Project-based Learning. The content analysis shows their feelings in Figure 3 as follows.

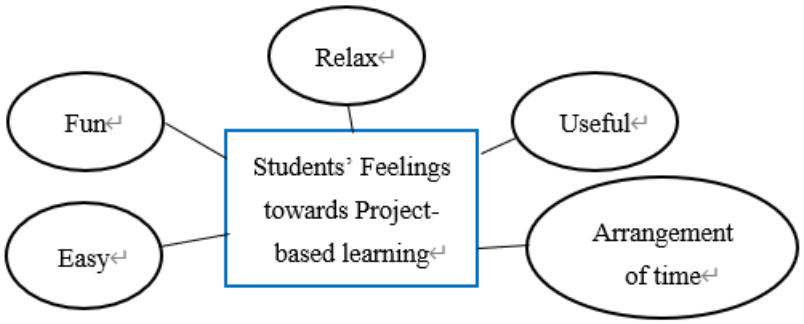

Figure 3: Students’ Feelings towards Project-based Learning

Figure 3 shows students’ feelings towards Project-based Learning. The students thought that Project-based Learning was very helpful. The way of class was interesting, easy and free. It could make students arrange their study time reasonably and help them remember more vocabulary. However, the students show positive feelings how Project-based Learning could facilitate them to voice their satisfaction in some aspects as shown in Figure 4.

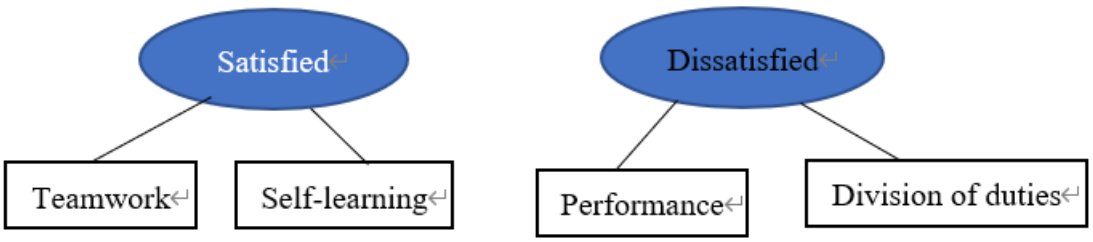

Figure 4: Areas of Satisfaction and Dissatisfaction

Figure 4 shows the areas of satisfaction and dissatisfaction of students. Most of the students were satisfied with the results of their projects, and some of them felt indifferent with the lessons. Students were satisfied with their teamwork and their self-learning skill that had been improved. Students were dissatisfied with their performance and division of duties. According to the above data analysis, it could be proved that Secondary Three Thai students are highly satisfied with Project-based Learning.

Fourthly, Project- based Learning could enhance self- learning ability and teamwork ability of Secondary Three Thai students. As a student-centred learning theory, project- based learning has a positive significance in promoting students' self- learning ability. In the process of Project- based Learning in this study, students were divided into five groups to complete their projects, which virtually exercised the team cooperation ability of students. Students have shown their improvement in various areas as shown in Figure 5 below.

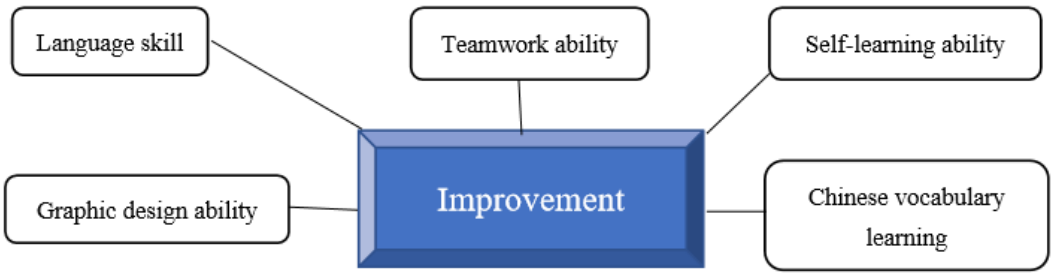

Figure 5: Areas of Students Learning Improvement

Figure 5 shows the areas of students learning improvement. The students thought that through the Project-based Learning process, they improved their language skill, teamwork ability, self-learning ability, graphic design ability and Chinese vocabulary learning ability. According to the results of the questionnaire and the interview, it proved that students agreed that Project-based Learning could enhance self-learning ability and teamwork ability of secondary three Thai students.

DISCUSSION

According to the findings of this research, using Project-based Learning is really an effective and appropriate method for Secondary Three Thai students' Chinese vocabulary learning achievement.

1. Responses to Objective 1

According to the results of the pre-test and the post-test, the scores of students' post-tests are much higher than those of students' pre-tests. This proves that project-based learning is very helpful in students' understanding of Chinese vocabulary,

reading and writing. This finding was supported by Cao (2009), Reisi and Saniei (2016), Fors (2016) and Garzón Bernal (2018), who agree that PBL the use of PBL will increase students' vocabulary acquisition. According to Mergendoller & Thomas (2005), Project-based learning enables students to find their own learning methods and deepen their understanding and memory of vocabulary in the process of autonomous learning and teamwork. In the process of project implementation, they actively learn the required vocabulary to facilitate the perfect implementation of the project. This way of learning gives students a task, so that students need to take the initiative to learn vocabulary, deepen understanding to complete the task or project. Students can recognize actively, and also can make students learn and understand relevant vocabulary consciously in the process of completing tasks or projects passively (Martinez, 2010).

As a student-centred learning theory, project-based learning has a positive significance in promoting students' self-learning ability. Student-centred approach is the mainstream learning method in the 21st century. It focuses on transforming the original teacher-centred education model into student-centred education model (Holmes & Hwang, 2016). The student-centred education model can better stimulate the potential of students, enable students to choose their own learning content and learning methods with their own interests, and enable students to give full play to their own strengths (Harada, et al., 2015). In the student-centred teaching mode, the students' independent hands and brains will be more frequent, which is not the result of the students being forced, but in the student-centred learning mode, the students must take the initiative to

collect relevant information and formulate relevant strategies to achieve the best learning effect (Sahli, 2017). This is that students unconsciously exercise the ability of self-study, which is conducive to students develop good learning habits.

2. Responses to Objective 2

According to the results of the questionnaire, students were willing to accept PBL, and looked forward to be in a PBL class again. For the teacher's part, students were satisfied with the teacher's teaching attitude and teaching method. For the students' part, students were satisfied with PBL and believed that their self-learning ability and teamwork ability have been improved. For the lesson part, students were satisfied with the organization of the course and PBL. Students enjoy PBL lesson because the PBL learning process makes students feel fun and relaxed (Guthrie, 2019). At the same time, through PBL, students' self-learning ability, teamwork ability and language ability have been significantly improved (Genc, 2015).

From the interview data, students clearly showed their feelings towards PBL. The students thought that PBL was very helpful. The way of class was interesting, easy and free. It could make students arrange their study time reasonably and help them remember more vocabulary. Most of the students were satisfied with the results of their projects. The above data analysis proved that Secondary Three Thai students are satisfied with PBL. Learning by doing makes students designed their own learning approaches with the groups. However, they express dissatisfaction over diversion of responsibilities. There accused in many activities where students must work in teams. If some members did not

contribute, put in efforts to the group work, they felt unhappy about those riders-on.

As the theory of teamwork ability, Cooperative Learning is an educational approach which aims to organize classroom activities into academic and social learning experiences. There is much more to cooperative learning than merely arranging students into groups, students must work in groups to complete tasks collectively toward academic goals. (Gillies, 2016). According to Johnson, D. and Johnson, R. (2009), students in cooperative learning settings compared to those in individualistic or competitive learning settings, achieve more, reason better, gain higher self-esteem, like classmates and the learning tasks more and have more perceived social support.

PBL supports teamwork learning, students can learn in groups and share their experiences, knowledge and skills (Condliffe, 2017). In this environment, students can accumulate knowledge by challenging each other, collecting information and analyzing data, thereby creating a unique product to express their newly discovered understanding (Helle, et al., 2006). Upon completion, new student knowledge will be displayed and important people who understand the content will be allowed to read, listen and provide feedback. Public lectures encourage students to produce high-quality end products (Genc, 2015).

When students take their knowledge and experience to deal with the problem at hand, they will clearly express what they know, and then continue to outline the problems that still need to be solved (Davcev, et al., 2016). Self-directed research with individual students needs to be shared with the group and integrated into their research.

And put forward methods to solve new problems. As part of the integration process, students use problem-solving methods (Fuller, 2012). Students work in small groups, brainstorming, communicating and critical thinking. They need to reflect on research and discuss solutions, and learn to provide and receive feedback to improve the quality of the products they create. In fact, they are evaluating their performance, which helps to develop the cognitive skills they recognize (Holmes & Hwang, 2016).

CONCLUSION AND RECOMMENDATIONS

This study was done under the quantitative and qualitative mixed approach. The purpose of this study was to explore the effects of Project-based Learning on Chinese vocabulary learning achievement of secondary Three Thai students. Mixed methods were employed to collect both, quantitative and qualitative data. The study was based on two objectives: 1) To study whether Project-based Learning could enhance Chinese vocabulary learning achievement of Secondary Three Thai students, 2) To study the Secondary Three Thai students' levels of satisfaction with Chinese vocabulary learning through Project-based Learning. The results of the pre-test and the post-test responded to the first objective. According to the analysis of the pre-test and the post-test, it was found that Project-based Learning can enhance Chinese vocabulary learning achievement of Secondary Three Thai students. The questionnaire and interview results reflected the second objective. According to the analysis of the questionnaires and the interviews, it was found that Secondary Three Thai students highly satisfied with Project-based Learning.

It is recommended that future researchers may choose Project-based learning to explore other areas in Chinese learning such as reading and writing on other fields of study. Regarding the research duration, this study was conducted for 6 weeks. This research suggests longer period of study time should be allocated when conducting research on project-based learning. For the sample size, a total of 30 students were used in this study. Future researchers may conduct project-based learning research with more samples to find out whether the findings will be different.

REFERENCES

Arick, J. R., Young, H. E., Falco, R. A., Loos, L. M., Krug, D. A., Gense, M. H., & Johnson, S. B. (2003). Designing an outcome study to monitor the progress of students with autism spectrum disorders. *Focus on Autism and Other Developmental Disabilities, 18*(2), 75-87.

Baş, G., & Beyhab, Ö. (2017). Effects of multiple intelligences supported project-based learning on students' achievement levels and attitudes towards English lesson. *International Electronic Journal of Elementary Education, 2*(3), 365-386.

Bell, S. (2010). Project-based learning for the 21st century: Skills for the future. *The Clearing House, 83*(2), 39-43.

Best, J. W. (1981). *Research in education* (4th ed.). NJ: Prentice Hall.

Britton, E., Simper, N., Leger, A., & Stephenson, J. (2017). Assessing teamwork in undergraduate education: A measurement tool to evaluate individual

teamwork skills. *Assessment & Evaluation in Higher Education, 42*(3), 378-397.

Cao, Z. Z. (2009). *Vocabulary learning through project-based learning--three cases of english major students.* (Master's thesis). Retrieved from ProQuest Dissertations & Theses Global. (UMI No. 1870408996).

Cheng, Y. (2019). On the treatment of "even" in TCFL textbooks -- Taking HSK standard course as an example. *Modern Chinese, 1*(6), 30-45

Christensen, S. W. (2019). *A Phenomenology Examining Middle Level Principals' Lived Experience after Five or More Years Implementing Project-Based Learning.* (Master's thesis). Retrieved from ProQuest Dissertations & Theses Global. (UMI No. 4096549378).

Condliffe, B. (2017). *Project-based learning: a literature review*. Retrieved from https://files.eric.ed.gov/fulltext/ED578933.pdf

Cunningham, K. R. (2016). *Variables that impact the implementation of project-based learning in High School Science Wayne State University.* Dissertations. 1437. Retrieved from https://digitalcommons.wayne.edu/oa_dissertations/1437

Davcev, D., Stojkoska, B., Kalajdziski, S., & Trivodaliev, K. (2016). Project based learning of embedded systems. *Republic of Macedonia, 2*(1), 120-125.

Fors, A. J. (2016). *Techniques to improve foreign language vocabulary retention: A case study of the perceptions of public high school foreign language teachers.* (Doctoral dissertation, Trident University International). Retrieved from https://search.proquest.com/openview/0379bce1986bc7a234eae1b365b13682/

1?pq-origsite=gscholar&cbl=18750&diss=y

Fuller, D. (2012). Beyond CanLit(e): Reading. Interdisciplinarity. Trans-Atlantically. In Shifting the Ground of Canadian Literary Studies, S. Kamboureli and R Zacharias (eds). pp. 65-85. Waterloo, ON: Wilfrid Laurier University Press.

Garzón Bernal, V. L. (2018). *Using guided discovery to implement project-based learning for the acquisition of vocabulary in ninth graders at a public school in Bogotá (Colombia)*. (Master's thesis, Universidad de La Sabana). Retrieved from https://intellectum.unisabana.edu.co/handle/10818/35125.

Genc, M. (2015). The project-based learning approach in environmental education. *International Research in Geographical and Environmental Education, 24*(2), 105-117.

Gillies, R. M. (2016). Cooperative learning: Review of research and practice. *Australian Journal of Teacher Education, 41*(3), 3-9

Harada, V. H., Kirio, C., Yamamoto, S., Reman, J., & Dickinson, G. K. (2015). Project-based learning: Rigor and relevance in high schools. *School Library Management, 6*(2), 157-160.

Harinie, L. T., Sudiro, A., Rahayu, M., & Fatchan, A. (2017). Study of the Bandura's Social Cognitive Learning Theory for the entrepreneurship learning process. *Social Sciences, 6*(1), 1, 125-130.

Helle, L., Tynjälä, P., & Olkinuora, E. (2006). Project-based learning in post-secondary education–theory, practice and rubber sling shots. *Higher Education, 51*(2),

287-314.

Holmes, V. L., & Hwang, Y. (2016). Exploring the effects of project-based learning in secondary mathematics education. *The Journal of Educational Research, 109*(5), 449-463.

Hongfang, S. (2013). The economic relations between China and Thailand under the context of CAFTA: An assessment. *Chinese Studies, 2*(01), 52.

Hui, F. A. N. G. (2017). On Investigation and Study of Thailand Middle School Students' Interest in Learning Chinese. *Journal of Hengyang Normal University, 5*(2), 31-40

Johnson, D. W., & Johnson, R. T. (2009). An educational psychology success story: Social interdependence theory and cooperative learning. *Educational Researcher, 38*(5), 365-379.

Krakowski, M. (2012). Two models of authenticity: Signature pedagogy, problem based learning, and cultural contextInternational. *Society of the Learning Sciences. Vol. 2,* 261-265.

Likert, R. (1932). *A technique for the measurement of attitudes*. NY: Archives of Psychology

Martinez, R. (2010). *Project -based learning: An applied ethnographic case study of two secondary english language arts classrooms.* (Master's thesis). Retrieved from ProQuest Dissertations & Theses Global. (UMI No.762998831).

Masuntisuk, R. (2009). *Chinese Language Teaching in Thailand at the Primary and*

Secondary Education Levels. Retrieved from http://www.thaiworld.org/upload/question/file_827.pdf

Mergendoller, J. R., & Thomas, J. W. (2005). *Managing project based learning: Principles from the field*. Retrieved from http://www.dr-atfield.com/science_rules/articles/Managing%20Project%20Based%20Learning.pdf

Mutakinati, L., Anwari, I., & Kumano, Y. (2018). Analysis of students' critical thinking skill of middle school through stem education project-based learning. *Jurnal Pendidikan IPA Indonesia, 7*(1), 54-65.

Naz, A., Lu, M., Hatipoglu, K., & Rambo-Hernandez, K. (2016, October). Employing project-based learning to address the Next Generation mathematics standards in high schools. In *2016 IEEE Frontiers in Education Conference (FIE)* (pp. 1-5). IEEE.

Norboevich, U. B. (2019). Advantages of PBL in EFL environment. ***Проблемы педагогики****, 2*(41), 84-97.

Reisi, M., & Saniei, A. (2016). The contribution of word webbing to project-based learning in teaching vocabulary: A comparative study in an EFL context. *Journal of Language Teaching and Research, 7*(6), 1190-1197.

Sahli, R. (2017). *An examination of the effectiveness of project-based learning on student academic achievement and teacher perceptions of project-based learning*. (Master's thesis). Retrieved from ProQuest Dissertations & Theses Global. (UMI No. 2026817186).

Spikol, D., Ruffaldi, E., Dabisias, G., & Cukurova, M. (2018). Supervised machine learning in multimodal learning analytics for estimating success in project-based learning. *Journal of Computer Assisted Learning, 34*(4), 366-377.

Thomas, J. W. (2000). *A review of research on project-based learning. The Autodesk Foundation, San Rafael, CA*. Retrieved from http://www. bie. org/index. php/site/RE/pbl_research, 29

Trimble, E. A. (2017). *Project-based learning: A pathway to success.* (Master's thesis). Retrieved from ProQuest Dissertations & Theses Global. (UMI No. 1925343202).

Trippel, D. A. (2013). *Tools for problem- and project-based learning in sustainability science education: A case study of two undergraduate classes*. (Master's thesis). Retrieved from ProQuest Dissertations & Theses Global. (UMI No. 1355951055).

Turner III, D. W. (2010). Qualitative interview design: A practical guide for novice investigators. *The Qualitative Report, 15*(3), 754.

Vanhala, M. (2018). Implementation of inquiry and project-based learning in a high school chemistry classroom: An action research project. *Journal of Teacher Action Research, 4*(3), 1-22.

Wang, C. (2018). Analysing Teachers' Expertise, Resources and Collective Work Throughout Chinese And French Windows. *Ensino da Matemática em Debate, 5*(3), 367-382.

Yang, C., & Zhang, J. (2007). Some Proposals on Chinese Proficiency Test (HSK) Reform.

Applied Linguistics, 3(10), 45-66.

Ye, Y. (2016). An Investigation of Chinese New HSK Test Takers' Learning Motivation in Thailand. *ABAC Journal, 36*(2), 20-36.

Zhang, D., & Koda, K. (2012). Contribution of morphological awareness and lexical inferencing ability to L2 vocabulary knowledge and reading comprehension among advanced EFL learners: Testing direct and indirect effects. *Reading and Writing, 25*(5), 1195-1216.