

國立台灣師範大學英語學系
碩 士 論 文
Master Thesis
Graduate Institute of English
National Taiwan Normal University

平板電腦在台灣國中英語單字教學的應用
Applying Tablet PCs to English Vocabulary
Teaching and Learning in Taiwan Junior High
School

指導教授： 陳浩然 博士
Advisor: Dr. Hao-jan Howard Chen
研究生： 霍淑湄

中華民國九十七年六月
June, 2008

摘要

現今行動學習運用於教育上已成為一項趨勢，行動學習有許多優點，而平板電腦是現今最受歡迎的行動輔具之一，但在過去的研究中，鮮少有人把平板電腦運用於英文單字教學上，故本研究在檢驗平板電腦在台灣國中英文單字教學上的效用。本研究的目的有二：(1)檢驗台灣國中生透過平板電腦來學習英文單字，在英文單字學習上的成效如何。(2)調查台灣國中生對於使用平板電腦學習英文單字的心得。研究中邀請了共六十三位來自台北市中崙國中一年級的學生參與本實驗。實驗組有三十二人；而控制組有三十一人。實驗時間為十二節課。兩組學生皆需接受前測，前測內容為四課單字的選擇及填充題。前測結果為這兩組在選擇及填充題上實力都相當。接著實驗組使用平板電腦來學習單字；而控制組則使用傳統紙筆的方法來學習單字。每課單字使用三節課來教學。實驗結束，兩組均需接受後測。另實驗組需填寫一份問卷，最後，研究者從實驗組中找出兩男兩女來作訪談。

研究結果顯示：兩組在後測的選擇及填充題上均無明顯差異，但實驗組在後測的選擇及填充題，與前測比較均有顯著進步；控制組則只有填充題有顯著進步。本研究有以下幾項結論：(1)平板電腦能引起學生學習英語的興趣及對英語學習有幫助。(2)平板電腦除單字教學以外，亦可運用於其他方面的英語教學。(3)老師可以使用其他行動輔具或科技產品來教英語。(4)在使用各項行動輔具或科技產品來教學前，老師要先熟悉該項工具，且學校要多給予老師硬體及軟體上的支援。

Abstract

Applying mobile devices to education becomes a trend nowadays and there are many advantages about mobile learning. A Tablet PC is one of the most popular mobile devices in the world now, but there were few studies on applying Tablet PCs to English vocabulary teaching and learning before. So the aim of this study was to examine the effect of applying Tablet PCs to English vocabulary teaching and learning in Taiwan junior high school. There were two purposes in this study: (1) To examine the gain made in Taiwan junior high school students' vocabulary learning by applying Tablet PCs to English vocabulary teaching. (2) To investigate Taiwan junior high school students' perceptions of using Tablet PCs during English vocabulary teaching and learning. The participants were sixty-three, seventh grade students from Zung Lung Junior High School. There were thirty-two students in the experimental group and there were thirty-one students in the control group. The duration of the experiment was twelve sessions. The two groups took the pre-test before the study. There were no significant differences between the two groups both in the multiple-choice questions and the cloze questions in the pre-test. Then the experimental group used Tablet PCs to learn vocabulary, while the control group used paper and pens to learn vocabulary. The teacher spent three sessions teaching the words in one lesson. After the study, the two groups took a post-test. Then the experimental group had to finish a survey. Finally, the researcher chose two girls and two boys from the experimental group to interview.

There were no significant differences between the two groups both in the multiple-choice questions and cloze questions in the post-test. But the experimental group had significant improvement both in the multiple-choice questions and cloze questions. The control group only had significant improvement in the cloze questions. There are four conclusions of this study: (1) A Tablet PC can motivate students to learn English and it is helpful for students in learning English. (2) Teachers can use Tablet PCs to teach other aspects of English. (3) Teachers can use other mobile tools or technological equipments to teach English. (4) Teachers have to get familiar with the tools they use before teaching and schools should give teachers support with both hardware and software.

Acknowledgements

First of all, I would like to express my deepest gratitude to my advisor, Dr. Hao-jan Howard Chen. If it was not his patient guidance, insightful advice and careful correction, this thesis could not have been accomplished.

I am also grateful to my committee members: Dr. Mei-chen Angela Wu and Dr. Zhao-ming Gao, for their careful reading of my earlier draft as well as their insightful comments and valuable suggestions on it.

I would like to greatly acknowledge Dr. Chiu-pin Lin, who supplied me with several important theses for reference. And I would like to thank everyone who has ever helped me on my thesis.

Finally, my family deserves my utmost love and appreciation for tolerating my long absence in my family as a wife, a mother and a daughter under the pressure of writing this thesis. My deepest thanks go to my husband, my mother and my son for their love, understanding and support.

TABLE OF CONTENTS

CHINESE ABSTRACT.....	i
ABSTRACT.....	ii
ACKNOWLEDGEMENTS.....	iii
TABLE OF CONTENTS.....	iv
LIST OF TABLES.....	vii
LIST OF FIGURES.....	viii
CHAPTER ONE INTRODUCTION	
1.1 Background and Motivation.....	1
1.2 Purpose.....	5
1.3 Definition of Terms.....	6
1.4 Organization.....	11
CHAPTER TWO LITERATURE REVIEW	
2.1 Research on Applying Mobile Devices to Non-language Teaching and Learning.....	13
2.1.1 Research on Applying Mobile Phones to Non-language Teaching and Learning.....	14
2.1.2 Research on Applying PDAs to Non-language Teaching and Learning.....	15
2.1.3 Research on Applying Tablet PCs to Non-language Teaching and Learning.....	18
2.2 Research on Applying Mobile Devices to Language Teaching and Learning.....	21
2.2.1 Research on Applying Mobile Phones to Language Teaching and Learning.....	21
2.2.2 Research on Applying PDAs to Language Teaching and Learning.....	22
2.2.3 Previous Research on Applying Tablet PCs to Language Teaching and Learning.....	24
2.3 Research on the Advantages of Mobile Learning.....	26
2.4 Research on CALL in Vocabulary Teaching and Learning.....	29

2.5 Research on Tablet PCs in Vocabulary Teaching and Learning.....	32
2.6 Research Questions.....	33

CHAPTER THREE METHODOLOGY

3.1 Participants.....	34
3.2 Instruments.....	35
3.2.1 Pre-test.....	35
3.2.2 Software Program: Visual Classroom.....	35
3.2.3 Platform: Moodle.....	36
3.2.4 Software Program: Hot Potatoes.....	36
3.2.5 Post-test.....	36
3.2.6 Questionnaire.....	37
3.2.7 Interview	38
3.3 Procedures.....	39
3.3.1 Pre-test.....	40
3.3.2 The Experimental Group and the Control Group.....	40
3.3.3 Post-test.....	51
3.3.4 Questionnaire.....	52
3.3.5 Interview.....	52
3.3.6 Data Analysis.....	53
3.4 Data Analysis.....	53
3.4.1 Pre-test.....	53
3.4.2 Post-test.....	54
3.4.3 Questionnaire.....	54
3.4.4 Interview.....	55

CHAPTER FOUR RESULTS

4.1 Results of the Pre-test and the Post-test.....	57
4.2 Results of the Questionnaire.....	61
4.2.1 5-point Likert Scale Questions about Students' Satisfaction with Tablet PCs.....	61
4.2.2 5-point Likert Scale Questions about Students' Motivation to Learn English because of Tablet PCs.....	63
4.2.3 5-point Likert Scale Questions about Difficulties of Using Tablet PCs.....	64
4.2.4 Multi-multiple-choice Questions about Students' Satisfaction with Tablet PCs.....	65
4.2.5 Multi-multiple-choice Questions about Difficulties of Using Tablet PCs.....	69

4.2.6	Multi-multiple-choice Questions about the Future Use of Tablet PCs in English Teaching	70
4.2.7	Open-ended Questions	72
4.3	Results of the Interview.....	75

CHAPTER FIVE DISCUSSION

5.1	The Gain of the Two Groups' Vocabulary Learning	78
5.2	The Perceptions of the Experimental Group.....	81
5.2.1	The Perceptions of the Experimental Group in the Questionnaire.....	81
5.2.2	The Perceptions of the Experimental Group in the Interview.....	89

CHAPTER SIX CONCLUSIONS

6.1	Summary of the Findings.....	91
6.1.1	The Gain of the Two Groups' Vocabulary Learning.....	91
6.1.2	The Perceptions of the Experimental Group.....	92
6.2	Pedagogical Implications.....	94
6.3	Limitations of the Thesis.....	95
6.4	Suggestions for Future Research.....	97

REFERENCES.....	98
-----------------	----

APPENDICES

Appendix A	English Book One Lesson Three Worksheet of Vocabulary.....	103
Appendix B	PowerPoint of Making Sentences for L4 Vocabulary.....	106
Appendix C	English Book One Lesson Five Worksheet of Making Sentences.....	107
Appendix D	L6 Vocabulary Test.....	108
Appendix E-1	Pre-test of Multiple-choice Questions.....	112
Appendix E-2	Pre-test of Cloze Questions.....	115
Appendix F-1	Post-test of Multiple-choice Questions.....	116
Appendix F-2	Post-test of Cloze Questions.....	119
Appendix G	Questions of Survey.....	120
Appendix H	Questions of Interview.....	123

LIST OF TABLES

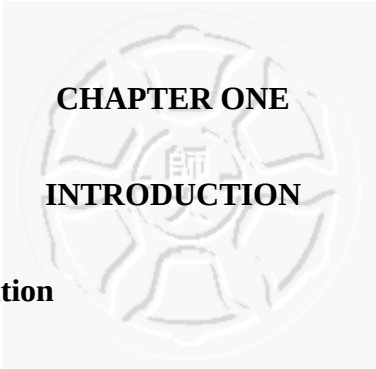
Table

1	Means of the Participants' Pre-test & Post-test.....	58
2	Independent Samples T-test Results of the Participants' Pre-test & Post-test	59
3	Paired Samples T-test Results of the Participants' Pre-test & Post-test.....	60
4	Means of Students' Satisfaction with Tablet PCs.....	62
5	Percentages of Students' Satisfaction with Tablet PCs.....	62
6	Means of Students' Motivation to Learn English because of Tablet PCs.....	64
7	Percentages of Students' Motivation to Learn English because of Tablet PCs.....	64
8	Means of Difficulties of Using Tablet PCs.....	65
9	Percentages of Difficulties of Using Tablet PCs.....	65
10	Percentages of Multi-multiple-choice Question A about Students' Satisfaction with Tablet PCs.....	66
11	Percentages of Multi-multiple-choice Question A about Students' Reasons for Satisfaction with Tablet PCs.....	67
12	Percentages of Multi-multiple-choice Question B about Students' Satisfaction with Tablet PCs.....	68
13	Percentages of Multi-multiple-choice Question B about Students' Reasons for Satisfaction with Tablet PCs.....	68
14	Percentages of Multi-multiple-choice Question A about Difficulties of Using Tablet PCs.....	69
15	Percentages of Multi-multiple-choice Question B about Difficulties of Using Tablet PCs.....	70
16	Percentages of Multi-multiple-choice Question about the Future Use of Tablet PCs in English Teaching.....	72
17	Percentages of Open-ended Questions about Students' Thought about Using Tablet PCs in English Vocabulary Teaching.....	74
18	Percentages of Open-ended Questions about the Future Use of Tablet PCs in English Teaching.....	75

LIST OF FIGURES

Figure

1	Tablet PC.....	.6
2	Visual Classroom.....	.7
3	Moodle.....	.8
4	Hot Potatoes.....	.9
5	Interactive Whiteboard.....	.10
6	Flowchart of the Procedure.....	39
7	Sending a Message to Students through Visual Classroom.....	42
8	Opening a Chatroom for Students to Ask Questions or Share their Opinions.....	42
9	Broadcasting One Group's Screen to the Other Groups.....	44
10	Five Questions of JCross in Hot Potatoes.....	45
11	Five Questions of JMatch in Hot Potatoes.....	46
12	Five Questions of JCloze in Hot Potatoes.....	46
13	Five Questions of JQuiz in Hot Potatoes.....	47
14	One Question of JMix in Hot Potatoes.....	47
15	One Student's Score and Time of the Test on Moodle.....	48
16	Showing the Right Answer of Each Item on Moodle.....	48
17	The Participants, Time and Scores of the Test on Moodle.....	49
18	The Statistics Data such as Correct Facility on Moodle.....	49
19	Means of the Multiple-choice questions.....	78
20	Means of the Cloze Questions.....	78



CHAPTER ONE

INTRODUCTION

1.1 Background and Motivation

Since the 1980s, the application of technology such as radio, film, television, language labs with audio and videotapes, computers and interactive videos has been used in language teaching and learning (Cunningham, 1998). Gradually computer-assisted language learning (CALL) became popular in the 20th century (Iandoli, 1990). But the majority of CALL applications were limited to drill-and-practice exercises. As this technology advanced, interactive applications of CALL as well as integration of various media increased (Pusack & Otto, 1990).

From 1990 to 2000, CALL had become common in language teaching and learning. The multimedia capabilities of providing authentic learning situation and local or distant networking such as e-mail, synchronous and asynchronous exchange appeared. The use of the World Wide Web in language classrooms had also increased (Liu, Moore, Graham & Lee, 2003).

In the 21st century, a big revolution in language teaching and learning is taking place. Mobile devices such as cell phones, personal digital assistants (PDAs), portable media player iPods and Tablet PCs are being applied to language teaching and learning. There are some studies showing that mobile devices used for language

teaching and learning around the world to be increasing. (Chinnery, 2006)

In comparison with language teaching and learning, there were more studies applying mobile devices to teaching and learning about other subjects (non-language teaching and learning). McGuire (2005) and Lim & Wang (2005) applied mobile phones to non-language teaching and learning. Facer, Joiner, Stanton, Reid, Hull & Kirk (2004), Mckenney (2004), Klopfer, Yoon & Rivas (2004), and Corlett, Sharples, Bull & Chan (2005) all applied PDAs to non-language teaching and learning. Lee (2004), Horng (2004), Chou (2004) and Hsin (2006) applied Tablet PCs to non-language teaching and learning. But there were fewer studies applying mobile devices to language teaching as well as learning. Thornton & Houser (2005) applied mobile phones to language teaching as well as learning. Wu (2003), and Hsu (2005) applied PDAs to language teaching as well as learning. Huang (2003), Chen (2004) and Lin (2007) applied Tablet PCs to language teaching as well as learning. Because there were fewer studies applying mobile devices to language teaching and learning than to non-language teaching and learning, more studies on applying mobile devices to language teaching and learning are needed for examining the effect of mobile devices on language learning.

The reason for a mobile learning trend in education is that there are many mobile device advantages. Koole (2006) stated that there are several cognitive and

social advantages of mobile device use. “Access to information anytime, anywhere combined with the flexibility to move or study within different environments can have additional benefits beyond merely accumulating information.” (Koole, 2006)

Mobile devices allow learners to connect socially with instructors as well as other learners thus impacting on their ability to effectively navigate information.

Among all the mobile devices, a Tablet PC is one of the most popular products available. It is a kind of computer that enables users, with the aid of a stylus, to write words or draw pictures directly on the screen; in some designs, the screens can even be turned around 180° . Willis and Miertschin (2004) mentioned that a Tablet PC has several unique features which are suitable for academic environment by being mobility, portability and accessibility. They become helpful in note taking, presentation giving, document making and information managing. Mock (2004) also suggested that a Tablet PC is an effective tool for grading students, preparing lectures, and delivering classroom presentations. Hence, a Tablet PC is a potential tool for teaching as well as learning and has been chosen for my study as a tool to help students learn a language.

Nowadays, English is still the most important international language in the world. It is also the most popular foreign language in Taiwan, where students have learned English since the third year of elementary school. However some of these

students are not so motivated in learning English. It is therefore a good idea to use a great tool such as a Tablet PC to motivate students to learn. English now becomes a wonderful element for us to examine the effect of Tablet PC on language teaching and learning.

The goal of English teaching in Taiwan's elementary school is to arouse students' interest in English. However, English education in these schools focuses only on listening and speaking. When students attend junior high school, they have to enhance their ability in reading and writing, and the lack of reading and writing training has frustrated many of them. Saville-Troike (1984) said that vocabulary is the most important factor in second or foreign language achievement. Therefore, vocabulary is the essential element to improve their English reading and writing skills. As such for this study, vocabulary was chosen to examine the effect of Tablet PCs on English teaching and learning.

Some CALL studies in vocabulary teaching and learning were done (Tozcu & Coady, 2004; Zapata & Sagarra, 2007; Stockwell, 2007; Lan, Sung & Chang, 2007), but there were far few studies involving Tablet PCs in vocabulary teaching and learning (Lin, Liu & Niramitranon, 2008). In Lin, Liu and Niramitranon's study, the researchers investigated the effect of collaborative learning with Tablet PCs on English vocabulary learning in elementary school. This study had only twenty, fifth

grade students with ten females as well as ten males and did not include a control group. The researchers spent a total of eight-two minutes with the subjects from the pre-test to the interview. Because of the different level of the subjects, the limited number of participants, the lack of a control group and the short period of the experiment time in Lin, Liu and Niramitranon's study, this thesis will focus on investigating the effect of Tablet PCs on vocabulary teaching and learning in Taiwan junior high school. There were thirty-two students in the experimental group and thirty-one students in the control group. The experiment period was about two months (twelve sessions), and each session was fifty minutes.

According to the previous reasons and literature reviews, this thesis focuses on applying Tablet PCs to English vocabulary teaching and learning in Taiwan junior high school.

1.2 Purpose

There are two main purposes in this study:

1. To examine the gain made in Taiwan junior high school students' vocabulary learning by applying Tablet PCs to English vocabulary teaching.
2. To investigate Taiwan junior high school students' perceptions of using Tablet PCs during English vocabulary teaching and learning.

1.3 Definition of Terms

Tablet PC: A Tablet PC refers to a notebook- or slate-shaped mobile computer. Its touchscreen or digitizing tablet technology allows the user to operate the computer with a stylus or digital pen, or a fingertip, instead of a keyboard or mouse. This form offers a more mobile way to interact with a computer. Tablet PCs are often used where normal notebooks are impractical or unwieldy, or do not provide the needed functionality(see Figure 1). (Wikipedia, 2007)



Figure 1. Tablet PC

Virtual Classroom: Virtual Classroom refers to a software program used in a Tablet PC. A teacher can send a file or a message to students and open a chatroom for discussion. He can observe and control students' screens with his own Tablet PC. He can also broadcast a student's screen to other students for sharing information (see Figure 2).



Figure 2. Visual Classroom

Moodle: Moodle refers to a free e-learning software platform (also known as a Course Management System (CMS), or Learning Management Systems (LMS), or Virtual Learning Environment (VLE)). It has a significant user base with 25,281 registered sites with 10,405,167 users in 1,023,914 courses (as of May 13, 2007). Moodle is designed to help educators create online courses with opportunities for rich interaction. Its open source licence and modular design means that people can develop additional functionality. Development is undertaken by a globally diffused network of commercial and non-commercial users, spearheaded by the Moodle company based in Perth, Western Australia (see Figure 3). (Wikipedia, 2007)



Figure 3. Moodle

Hot Potatoes: The Hot Potatoes software suite includes five applications that can create exercises for the World Wide Web. The applications are JCloze, JCross, JMatch, JMix and JQuiz. There is also a sixth application called The Masher, that will compile all the Hot Potatoes exercises into one unit. Hot Potatoes is not freeware, but it is free of charge for publicly funded, non-profit, educational users who make their pages available on the web. Other users must pay for a licence. Hot Potatoes was created by the Research and Development team at the University of Victoria Humanities Computing and Media Centre. Commercial aspects of the software are handled by Half-Baked Software Inc(see Figure 4). (Wikipedia, 2007)



Figure 4. Hot Potatoes

Interactive Whiteboard: An interactive whiteboard is an electronic device that interprets a projected two-dimensional surface that interacts with a computer's desktop generally on an interactive computer screen. Interactive whiteboards typically require a computer to generate the display via a projector. Typically software mimics the computer's mouse and keyboard, while some models have basic whiteboard functionality present within the physical whiteboard. They are used in many settings including classrooms, business presentation and work group (see Figure 5). Uses include:

1. Operating directly on a large display, use of software that is loaded onto the connected PC, including internet browsers or proprietary software.
2. On a large display, use of software to capture notes written on a whiteboard or whiteboard like surface.
3. The ability to control (click and drag), mark-up (annotate a program), or use Optical Character Recognition on a computer-generated image displayed on or behind the touch surface.



Figure 5. Interactive Whiteboard

1.4 Organization

This thesis consists of six chapters. The first chapter is the introduction. It includes the background as well as motivation, purpose, and definition of terms. The second chapter is the literature reviews. Five aspects of literature are reviewed in this chapter. First, previous research on applying mobile devices to non-language teaching and learning are reviewed. Second, previous research on applying mobile devices to language teaching and learning are written. Third, previous research on the advantages of mobile learning are mentioned. Fourth, previous research on CALL in vocabulary teaching and learning are described. Fifth, previous research on Tablet PCs in vocabulary teaching and learning are presented. According to these five aspects of previous research, the topic is decided. There are two research questions in this thesis. The third chapter is the methodology. Here the participants, the instruments, the procedures and the data analysis of this thesis are described. The fourth chapter is the results. It consists of results of the pre-test and the post-test, results of the students' questionnaires, and results of the students' interview. The fifth chapter is the discussion. It discusses the differences between the experimental group and the control group on the segmental improvement between the pre-test and the post-test, the response of the experiment group in the questionnaire, and the feedback of the experiment group from the interview. The

sixth chapter is the conclusions. It concludes the summary of the findings, the pedagogical implications, the limitations of the study and the suggestions for future research.



CHAPTER TWO

LITERATURE REVIEW

This chapter reviews five aspects of literature which are relevant to this research. First, previous research on applying mobile devices to non-language teaching and learning are summarized. Second, previous research on applying mobile devices to language teaching and learning are reviewed. Third, previous research on the advantages of mobile learning are described. Fourth, previous research on CALL in vocabulary teaching and learning are presented. Fifth, previous research on Tablet PCs in vocabulary teaching and learning are written. Based on these literature reviews, two research questions are posed for investigating the effect of applying Tablet PCs to English vocabulary teaching and learning.

2.1 Research on Applying Mobile Devices to Non-language Teaching and Learning

Many researchers explored the effect of mobile devices on education. There have been many studies applying mobile devices such as mobile phones, PDAs and Tablet PCs to non-language teaching and learning in recent years.

2.1.1 Research on Applying Mobile Phones to Non-language Teaching and Learning

McGuire (2005) discussed a pilot study of an innovative project called eVIVA. EVIVA took advantage of mobile phones and the Internet to support formative assessments. The eVIVA pilot study initially ran from June 2002 until July 2003 and extended until July 2004. There were ten universities in UK joining this project. Each school was asked to involve one teacher and twenty students in the pilot project. Students were asked to compile an online portfolio to provide annotated evidence of their Information and Communication Technology (ICT) learning milestones. Once each 'digital portfolio' was ready, students were expected to participate in a telephone viva (oral test) in which they answered a number of pre-selected questions about both their working processes and their learning journey. The feedback of teachers was very positive. Teachers considered that it increased students' motivation and self-esteem. It improved teachers' awareness of students and teacher-student relationships. Students took more responsibility for their own learning and became independent. Teachers and students both recognized the value of oral practice. Students' feedback was also positive. The majority of students enjoyed using the system. They said it was a better way to take a test with a mobile phone. They thought it was good to know the questions in advance and it enhanced their

self-confidence. It stimulated students' learning and students had fun recording the voice files and messaging.

Lim and Wang (2005) tried a collaborative handheld educational game named EcoRangers on mobile phones. EcoRangers was designed to help students practice skills relevant to ninth and tenth grade social studies found within Singapore's education system, specifically through the pedagogical strategy, and structured academic controversy. The training was done in three secondary schools among fifty, ninth grade students. Students were able to debate open-ended questions from a variety of perspectives concerning social studies by using their mobile phones. Students gave a positive feedback about the EcoRangers game. They thought that the game gave them an understanding of topics taught in both social studies and geography. It helped them see different points of view and was helpful in broadening their understanding of social studies. It not only improved their debating skills, but also gave them the opportunity to apply geographical and sociological concepts that they had learned.

2.1.2 Research on Applying PDAs to Non-language Teaching and Learning

Facer, Joiner, Stanton, Reid, Hull and Kirk (2004) used PDAs to develop a mobile game which was designed to encourage the development of children's

conceptual understanding of animal behavior. Ten children with five boys and five girls, aged from eleven to twelve years, played and explored the game. Children could have direct physical interaction with space and with other players. The game was combined with principles of engagement and self-motivation to create a powerful and engaging learning experience. They found that the mobile game might be employed as a tool for supporting learning.

Mckenney (2004) started a handheld program by PDAs at the Ohio State University Medical Center in 2001. Two hundred and ten, third and fourth year medical students and residents joined this program. Medical students were required to do a twelve-week ambulatory clerkship in their third year. Mckenney examined students' use in taking traditional materials and delivering them in a personal digital assistant-friendly format. The students gave positive feedback about the learning experience. But the project team also faced three basic challenges: (1) The team tried to make the images on the PDA display at the same level of "desktop" quality. (2) The team tried to replicate display tools that would normally be seen when viewing an image on a desktop computer and then put them on the PDA. (3) The team looked at how the materials submission process could be streamlined and still remained suitable for both desktop and PDA displays.

Klopfer, Yoon and Rivas (2004) applied PDAs to engage students in

Participatory Simulations for learning science. This study employed two simulations: Virus, an epidemiological simulation and LLAP, a simulation of the Mendelian genetic inheritance. One private middle school was selected for the Virus game. The study group included eighty-two students from five different classes, ages ranged from eleven to thirteen years old. They played the game, Virus, in their science classes. One public school and one private high school were selected for the LLAP. There were seventy-one students in the public school, and one hundred as well as seventeen students in the private school. The ages of both groups were from fourteen to sixteen years old. They played the game, LLAP, in their biology classes. This study showed Participatory Simulations on Palms was as capable as the original Tag-based simulations in engaging student collaboration in a complex problem-solving task. For students, this inexpensive Palm technology not only motivated them, but also helped them to understand the relationship between science and technology. For teachers, this type of activity served to identify what misconception their students still retained even after instruction.

Corlett, Sharples, Bull and Chan (2005) provided seventeen students in the Human Centered Systems MS class with a PDA, a mobile learning organizer, to manage their learning in the Department of Electronic, Electrical and Computer Engineering at the University of Birmingham for ten months during the academic

session 2002/2003. The primary uses of the organizer were communication, time-management and access to content. Timetable, web browser, instant messaging and e-mail were the functions in a PDA which students used most. However, there were also several problems students using the organizer had including weight, screen size, limited memory and short battery life. There were four significant conclusions derived from students' attitude: (1) Students considered that using a PDA did not hinder learning. (2) Students thought that battery life of a PDA was a significant problem. (3) Students did not feel unsure about using a PDA without prior knowledge of how to use it. (4) Students concluded that the advantages outweighed the disadvantages of taking part in the trial.

2.1.3 Research on Applying Tablet PCs to Non-language Teaching and Learning

Lee (2004) conducted an action research on mobile project-based learning in elementary school science education. He looked at the Instructional Systematic Design Model used on a Tablet PC. The subjects were twenty-four, fourth and fifth grade elementary students. The aim of the research was to provide a teaching and learning model for mobile project-based learning. This research attempted to design lesson plans, teaching materials and web sites with the ADDIE Instructional Systematic Design Model. Tablet PCs and the wireless network technology were

used to design lesson plans, develop teaching materials and construct web sites for an observation learning course on butterfly ecological gardens. The conclusions of the research were: (1) Researchers should keep the ADDIE Instructional Systematic Design principles in mind when developing teaching and learning materials for mobile project-based learning model. In addition, they must follow the analysis, design, development, implementation and evaluation procedure closely. (2) When designing, researchers must always center a mobile project on students' learning. They should try to provide room for students' active exploration. They should try to meet students' needs such as searching for information, investigating or surveying problems, lab practice, interviewing experts and discussion. (3) Proposed suggestions for professional development in the areas of teaching preparation, teaching strategies and action research reflection were made.

Horng (2004) explored the potential and usability of mobile e-learning tools and the extent to which mobile e-learning could support learning interest in a more effective and efficient manner with cerebral palsy (CP) students through the use of Tablet PCs. One male and one female third year senior high school CP students were the subjects. They used Tablet PCs and traditional desktop computers to conduct tasks such as emailing, drawing and typing. The aim of the project was to identify the limits of mobile e-learning tools for the sake of CP students. Results

showed the importance of computer learning to the CP students. It not only provided the students opportunity to obtain skills in computer use, but also helped students build confidence in themselves.

Chou (2004) integrated a Tablet PC and a wireless network into a digital classroom environment. It offered communication and scaffolding aids to hearing impaired students, mitigated their learning load and promoted the effects of learning. The subjects were seven, second year junior high school students with hearing impairments. They used Tablet PCs in a digital classroom environment in their mathematics classes. The results of their mathematics learning indicated that the digital classroom environment enhanced the communication between the teacher as well as students and promoted problem solving. The teacher and students both confirmed the worth of digital classroom environment in deaf education.

Hsin (2006) developed game-based learning software program through a Tablet PC to evaluate the learning effects on spatial ability for one hundred and two, second grade elementary school students. There were fifty-seven boys and forty-five girls around the age of eight. The activities in the software program included games that included training on egocentric orientation system of reference, fixed system of reference and coordinated system of reference. The experimental results showed the software program had a good effect on motivating students' learning.

Based on the previous reviews, there were a lot of studies applying mobile devices to non-language teaching as well as learning. They showed that mobile devices had educational potential.

2.2 Research on Applying Mobile Devices to Language Teaching and Learning

For comparison purposes fewer language teaching and learning studies were available than non-language teaching and learning. The following studies are previous research done applying mobile devices such as cell phones, PDAs and Tablet PCs to language teaching and learning.

2.2.1 Research on Applying Mobile Phones to Language Teaching and Learning

Thornton and Houser (2005) presented three studies on applying mobile phones to English teaching and learning. In the first study, they polled three hundred and thirty-three Japanese university students about their use of mobile phones. One hundred percent reported owning a mobile phone. Ninety-nine percent reported sending e-mails on their mobile phones. This confirmed that a mobile phone was potentially a great media and tool for learning in Japan because of the high frequency of students' owning and using them. In the second study, they e-mailed one-hundred-word long English vocabulary lessons at 9:00, 12:30, and 17:00, three

times a day, to forty-four female Japanese university via their mobile phones. These students were compared with students who learned the same material on paper or over the Web. It was found that students who studied on mobile phones learned more English words. In the third study, they created a web site teaching English idioms. Student-produced animated films showed the literal meaning of the idioms, a video showed the idiomatic meaning, and the textual materials provided an explanation, script as well as quiz. Thirty-one sophomore students evaluated the site by using video-capable mobile phones. They had few technical difficulties using mobile phones and its educational effectiveness was highly rated.

2.2.2 Research on Applying PDAs to Language Teaching and Learning

Wu (2003) built an English PDA learning environment with a Windows CE-based platform. This platform system was used in Compaq as well as HP PDA and offered improved Windows compatibility, combined with real-time processing support. The purpose of this environment was to share knowledge and assist in learning combining the process of a game with the analysis and estimation of the users' vocabulary. At first, a user had to take a Computerized Adaptive Test (CAT). According to the user's ability, the computer opponent, with the proper artificial intelligence grade level, was produced. The computer opponents provided

appropriate learning materials for the user and adjusted the difficulties of materials when the user's ability changed. Through the game playing process and the mechanism of the knowledge feedback, the user's zone of proximal development (ZPD) would be built. The ZPD is the difference between what a user can do with help and what a user can do without guidance. With this game the user would gradually upgrade his or her own ability by acquiring more related knowledge, likewise the computer opponent's grade was adjusted according to the estimation of the users' vocabulary. When the ability of the users' vocabulary changed, the computer adjusted the difficulty level of the learning materials within this stimulation. The users' vocabulary would increase.

Hsu (2005) presented a personalized intelligent m-learning system (PIMS) on PDAs. Sixteen juniors in a university joined the experiment. This system could recommend appropriate English news articles to learners according to the learners' reading ability which had been evaluated by the proposed fuzzy item response theory (FIRT) for non-native English speakers. Learners' new or unfamiliar vocabulary could be automatically discovered and retrieved from the English news articles by the PIMS system for enhancing learners' vocabulary learning ability. There were three conclusions from this study: (1) A database of English news articles could help English teachers produce English reading materials. (2) Learners could read English

news articles at any time and everywhere with the PIMS system. (3) The PIMS system enhanced learners' motivation and time spent on learning English. (4) It improved learners' reading ability.

2.2.3 Research on Applying Tablet PCs to Language Teaching and Learning

Huang (2003) developed wireless formative assessment software program for both Tablet PCs and PDAs to help teachers conduct formative classroom assessment and he also tried to evaluate their learning effects on students. One senior high school English teacher and two classes participated in this evaluation experiment. The experiment group consisted of twenty female and twenty-two male first year senior high school students. The control group consisted of twenty female and nineteen male first year senior high school students. It reached three objectives: (1) The formative assessment software program for Tablet PCs and PDAs assisted teachers to conduct formative assessments in the classroom while offering a wireless environmental support to forty students using wireless networks. (2) The English learning performance difference between the experimental and control groups was reduced while the achievement increases of the experimental group's were more stable than the control group's after long-term use of his software program. (3) The author explored and documented the advantages and limitation of using mobile and

wireless devices in classroom teaching activities.

Chen (2004) discussed the use of Tablet PCs in English teaching. The author tested the hardware and software on a Tablet PC, and investigated several English teaching programs. Twenty-four English teachers had operated Tablet PCs for fifteen hours, and then finished a questionnaire. Through the survey, Chen analyzed the potentials and limitations of Tablet PCs. At the same time, he discovered some valuable and potential language learning software programs, and then he tried to develop and propagate the use of Tablet PCs in English teaching at schools of all levels. The results showed most users gave positive feedback on the use of Tablet PCs in language learning. They also gave high evaluation marks on the use of Tablet PCs in their formative assessments. But the high price and the lack of knowledge as well as the technical support were obstacles for English teachers using Tablet PCs.

Lin (2007) constructed a computer supported collaborative learning environment and examined the feasibility and efficiency of integrating mobile learning devices in an English classroom scenario. The participants were ten, third year junior high school students. They practiced relative clause grammar exercise on a platform with Tablet PCs. There were three conclusions drawn from this study. First, constructing a classroom using Tablet PCs to support collaborative learning was feasible. Well designed learning activities would be a benefit to both a teacher and

students. Second, it upgraded teaching benefits. The teacher was able to get immediate feedback on the students' learning status with the supporting functions of recording and analysis of the system. The teacher was encouraged to manage teaching activities and groupings with convenience and efficiency in mind. The teacher was also encouraged to design questions before class began and manage questions according to students' learning status as necessary. The teacher was thus able to manage learning activities on the platform with feasibility and convenience before and during the class. Third, it improved students' learning interest and collaborative learning benefits. The students were able to construct their own knowledge comprehension while promoting learning and interest in grammar through their peers' collaborative learning. The students felt more interested and confident in learning with the convenience and immediate feedback of mobile learning. The students' abilities in communication, collaboration, coordination were improved and the interaction between the teacher and the students became closer.

With the evident lack of studies, more studies are needed to examine the effect of mobile devices on language teaching and learning.

2.3 Research on The Advantages of Mobile Learning

Mobile learning is a trend in education because there are many advantages

obtained by applying mobile devices to teaching and learning. The following studies reviewed here demonstrate these advantages.

Koole (2006) stated that mobile devices offered several cognitive and social advantages. He proposed six benefits that mobile devices offered to teaching and learning. First, mobile learning permitted learners to discover new concepts, procedures and challenges. They could generate new information as they moved with their mobile devices through their physical and virtual space. Second, learners had the opportunity to integrate their perspectives with those of others in equally unique situations. Concepts and procedures developed for specific purposes could be applied to new situations. Third, technology could become a tool for the access, exchange, and creation of appropriate information. Devices which offered the most flexible ways to connect with a variety of systems assisted learners in locating and sharing information permitting them to solve a variety of problems. Fourth, the development of instructional methods which encouraged learners to share and discuss their thoughts with instructors and other learners could lead to more effective collaboration and co-construction of knowledge. Fifth, increased social interaction could help learners cope with the abundance of knowledge which was characteristic of today's Internet culture. Sixth, learners could not only access information more quickly and efficiently, but they could also reach other learners as well as subject

experts. They could seek the assistance of others when they need to evaluate, organize, or locate appropriate information.

Through the above review, we know that there are a lot of merits of applying mobile devices to teaching and learning. A Tablet PC is one of the most popular mobile devices nowadays. Several scholars have mentioned its merits for teaching and learning.

Willis and Miertschin (2004) mentioned that a Tablet PC has several unique features which are suitable for the academic environment—mobility, portability and accessibility. Professors from the College of Technology at the University of Houston had used Tablet PCs for one year. The paper described these experiences and the possibilities of new ways of teaching and learning. It proved that a Tablet PC is helpful in note taking, document markup, participating in presentations, teaming as well as collaboration, and information management.

Mock (2004) suggested that a Tablet PC is an effective tool for grading students, preparing lectures, and delivering classroom presentations. Mock used a Tablet PC to conduct a course with a Classroom Presenter System which was extended by Simon, et. al. (CS1) and a software engineering (SWE) course. The CS1 course consisted of hand-written materials and the SWE course consisted of PowerPoint lectures. A Tablet PC was used as a digital whiteboard by connecting it to a data

projector in the classroom. There were several advantages of replacing the blackboard with a Tablet PC. (1) The lecture could be conducted entirely by drawing in digital ink without preparing materials in advance. Additionally, materials could be prepared in advance and annotated during the lecture. (2) The instructor could re-display previously covered materials which would normally have been erased on a blackboard. (3) Users could use multiple pens in different colors, widths and styles. (4) It was easy to switch to other applications such as telnet and web browser. (5) Digital ink could be saved and viewed later through a web browser. (6) By standing off to the side, the instructor never occluded the screen and could maintain eye contact with the audience while lecturing. Outside of the classroom, a Tablet PC proved to be a useful tool for grading, working with lecture material and capturing meeting notes.

According to the two studies above, there were a lot of good qualities of applying Tablet PCs to teaching and learning.

2.4 Research on CALL in Vocabulary Teaching and Learning

Some researchers tried to examine the effect of CALL on vocabulary teaching and learning. There were some studies of CALL in vocabulary teaching and learning.

Tozcu and Coady(2004) investigated the effect of direct vocabulary learning using Computer Assisted Language Learning(CALL) in vocabulary knowledge, reading comprehension, and speed of word recognition. The subjects were fifty-six intermediate level students who were studying English full time for university academic preparation located at two different sites. Twenty-eight students were in the experimental group and twenty-eight students were in the control group. The two groups were given pre- and post-tests in vocabulary, reading comprehension, and reaction time. Students in the experimental group studied as many as two thousand words in the Computer lab for three hours per week for eight weeks for a total of twenty-four hours. Students in the control group were each required to do two, two-page articles per week, and answer four comprehension questions based on these articles. Both groups showed increases in vocabulary gain and reading comprehension, and a decrease in reaction time for frequent word recognition, with the experimental group showing significantly greater gains than the control group.

Zapata and Sagarra (2007) examined the effects of an online workbook and a paper workbook on L2 vocabulary acquisition. Two hundred and forty-five students completed their homework with an online workbook, while three hundred and four students finished their homework with a paper workbook. They received four hours of classroom instruction per week and worked with an online or a paper workbook

once a week during their two semesters. They completed a screening test and four vocabulary tests. There was no significant difference between the two groups after one semester of instructional treatment. But the online group proved better than the paper workbook in the second semester.

Stockwell (2007) investigated the use of a prototype mobile-based intelligent vocabulary tutor system with students in an advanced EFL class. There were only eleven students in this study. Students used the tutor to complete vocabulary activities through either their mobile phones or through computers. Students achieved better scores when using a computer. There were reasons for the result. The first one was the technological problem. Students were concerned about the small screen size and cost of a mobile phone. The second one was the psychological problem. Students could not accept a mobile phone as a learning tool.

Lan, Sung and Chang (2007) explored the potential application of mobile technology for elementary EFL reading instruction. The subjects were fifty-two, third grade students from an elementary school in Taipei. This research included two studies. In Study One, the weaknesses of collaborative learning in a traditional EFL setting were observed. In Study Two, a mobile-device-supported peer-assisted learning (MPAL) system was developed for the purpose of addressing the identified weaknesses. This research showed that MPAL reduced anxiety in elementary EFL

learners, promoted motivation to learn, and enhanced oral reading confidence. This research also provided evidence that a mobile-device-supported EFL reading program was a portable and potential solution that could provide students with adaptable and ubiquitous support for collaborative EFL reading activities at any place and time.

There were some studies of CALL in vocabulary teaching and learning, but there were few studies concerning a Tablet PC in vocabulary teaching and learning.

2.5 Research on Tablet PCs in Vocabulary Teaching and Learning

There were few studies concerning a Tablet PC in vocabulary teaching and learning.

Lin, Liu and Niramitranon (2008) deployed a computer supported collaborative learning scenario by using a Tablet PC with Group Scibbles. There were ten female and ten male fifth grade elementary school students used in their study. The researchers designed a collection of vocabulary activity software to facilitate students engaging in collaborative learning English. The students had to fill in blanks with ten words and some prepositions by using the stylus of their Tablet PCs and then they could discuss it with their classmates. But, there was no control group and the experimental period was a short eight-two minutes. The results showed that a Tablet PC enhanced instructional design while arousing students' motivations and improving

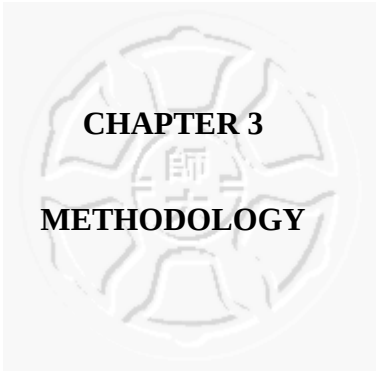
students' mutual interactions.

In Lin, Liu & Niramitranon's study (2008), the subjects were twenty, fifth grade elementary school students, there was no control group and the experimental time was only a short eighty-two minutes. Therefore my thesis investigated the effect of Tablet PCs on vocabulary teaching and learning of seventh grade students in junior high school. There were thirty-two students in the experimental group and thirty-one students in the control group. The experiment period was twelve sessions, and each session was fifty minutes.

2.6 Research Questions

On the basis of the studies above, two research questions are posed to investigate the effect of applying Tablet PCs to English vocabulary teaching and learning in Taiwan junior high school.

1. Do students learn more words by applying Tablet PCs to English vocabulary teaching and learning?
2. What are students' perceptions when they use a Tablet PC to learn English vocabulary?



CHAPTER 3

METHODOLOGY

The participants, the instruments, the procedures and the data analysis of the study are presented in this chapter.

3.1 Participants

Two classes of seventh grade junior high school students were invited to join the experiment. One class was the experimental group and the other class was the control group. There were thirty-two students in the experimental group, with seventeen male and fifteen female students. There were thirty-one students in the control group, with eighteen male and thirteen female students. These students' age ranged from thirteen to fifteen years old. All of them had to take an English vocabulary pre-test taken from Lesson Three to Lesson Six in Han-lin Version Book One. The aims of the pre-test were to assess the sixty-three participants' English vocabulary proficiency within a limited scale and to see whether there was any significant difference between the two groups before the treatment. The researcher was their teacher.

3.2 Instruments

The instruments in this study included one pre-test, the software program: Visual Classroom, the platform: Moodle, the software program: Hot Potatoes, one post-test, one questionnaire, and one interview.

3.2.1 Pre-test

A pre-test of English vocabulary from Lesson Three to Lesson Six in Han-lin Version Book One was performed in this study. The aims of the pre-test were to assess the sixty-three participants' English proficiency using words from selected text and to see whether there was any significant difference between the two groups before the experiment. The pre-test consisted of forty multiple-choice usage questions testing forty different words and twenty-five cloze questions testing the spelling of twenty-five different words selected.

3.2.2 Software Program: Visual Classroom

Virtual Classroom is a software program which can be used in a Tablet PC. A teacher can send a message or a file to students and open a chatroom for discussion. He can observe and control students' screens with his own Tablet PC. He can also broadcast a student's screen to other students for sharing information.

3.2.3 Platform: Moodle

Moodle is a teaching and learning platform. Teachers can open a lesson and post messages on it. They can also upload different exercises as well as tests on the platform, enabling students to practice on line. Students can also take tests. Then after they finish the test, they can submit it immediately and Moodle can show students the answers as well as the scores. The scores are recorded and are sent to the teacher. Moodle can then analyze the scores and produce statistical data for the teachers' reference.

3.2.4 Software Program: Hot Potatoes

Hot Potatoes is a software program that produces five kinds of English exercises: word puzzle(JCross), matching(JMacth), filling-in-the-blank(JCloze), multiple choice(JQuiz) and unscrambling words(JMix). After students finish the exercises, Hot Potatoes can correct their answers and show students their scores. The exercises can be loaded on Moodle for students to practice.

3.2.5 Post-test

A post-test covering the English vocabulary from Lesson Three to Lesson Six in Han-lin Version Book One was also performed in this study. The aims of the test

were to examine the grade improvement of the two groups and observe any significant difference between the two groups after the experiment. The post-test consisted of forty multiple-choice questions and twenty-five cloze questions covering instructed vocabulary. The questions in the post-test were very similar to the questions in the pre-test being different only in order of the options and order of the questions.

3.2.6 Questionnaire

A questionnaire was given to the students after the experiment. The questionnaires included three categories of questions—5-point Likert scale questions, multi-multiple-choice questions and open-ended questions. In the 5-point Likert scale questions, there were five questions about their satisfaction with a Tablet PC, three questions dealing with the motivation to use a Tablet PC and one question about difficulties found in using a Tablet PC to learn English vocabulary. In the multi-multiple-choice questions, there were two questions about their satisfaction, two questions about the difficulties and one question about the future use of a Tablet PC in English teaching as well as learning. In the open-ended questions, there were two questions about suggestions they would make about using a Tablet PC and the future use of a Tablet PC in English teaching as well as learning.

3.2.7 Interview

There were four interviewees with two boys and two girls from the experimental group. The interviewer was the teacher. There were three questions in the interview. The first one is “What are the advantages and disadvantages of a Tablet PC?” The second one is “Do you think learning English is more interesting with a Tablet PC?” The third one is “Do you think a Tablet PC is helpful for learning English?” Each interviewee answered the three questions during a fifty-minute interview (one session).

3.3 Procedures

The procedure of this study is presented by the following flowchart as in Figure 6.

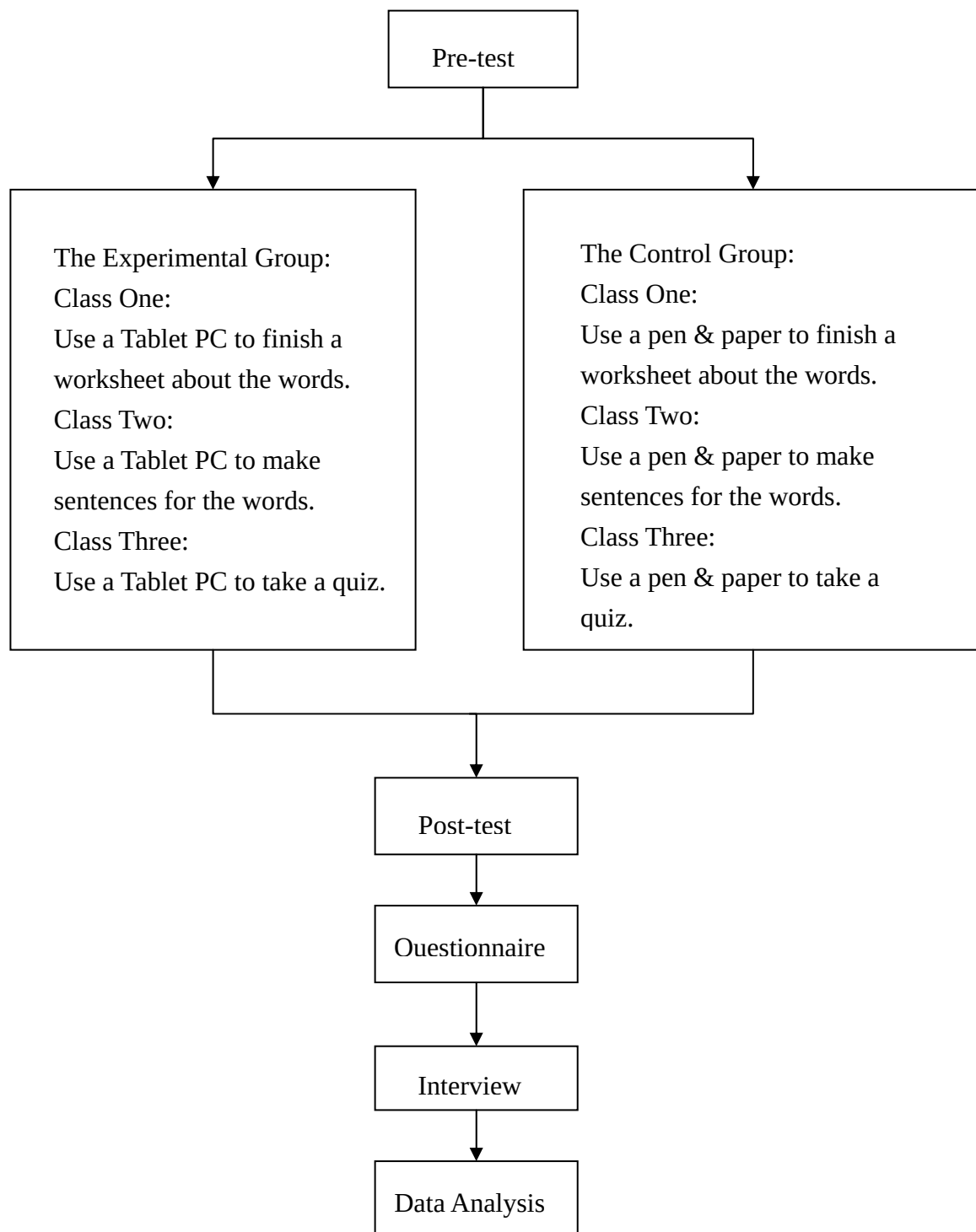


Figure 6. Flowchart of the Procedure

In the study, the researcher took three sessions to teach the vocabulary of each lesson. There were twenty words in Lesson Three. There were twenty-nine words in Lesson Four and Five. There were thirty words in Lesson Six.

3.3.1 Pre-test

At the beginning of the experiment, the sixty-three students took a pre-test to assess their English proficiency with words from Lesson Three to Lesson Six of Han-lin Version English Book One and to check whether there was any significant difference between the two groups. There were forty multiple-choice questions about the word usage and twenty-five cloze questions about the word spelling.

3.3.2 The Experimental Group and The Control Group

The researcher divided the sixty-three students into two groups, an experimental group with thirty-two students and a control group with thirty-one students. In the study, the teacher taught four lessons from the Han-lin Version English Book One, from Lesson Three to Lesson Six. The lessons moved in a cycle four times.

For the experimental group, in the first session of each lesson, the teacher gave each student a Tablet PC. Through the software program,, Visual Classroom, she

sent the students a worksheet with word explanations, usage and exercises for the lesson. Then the teacher used an Electric Whiteboard to explain the worksheet. The students used the stylus of their Tablet PCs to take notes and write down their answers to the worksheet on the screen. After they completed the worksheet, they had to e-mail the worksheet back to their own mailboxes, so the students could review their work. In the process of teaching the words through Visual Classroom, the teacher sent messages to the students to make sure they followed proper steps, for example, “ Welcome to my English class!” “ Are you ready to have your English class?” “ I will send a file to you.” “ Please open the file that I just sent you.” “ Who has not received my file?” “ Have you finished your worksheet?” (see Figure 7)

The teacher also opened a chatroom in Visual Classroom for students to ask questions and share their feeling as well as their opinions in class (see Figure 8).

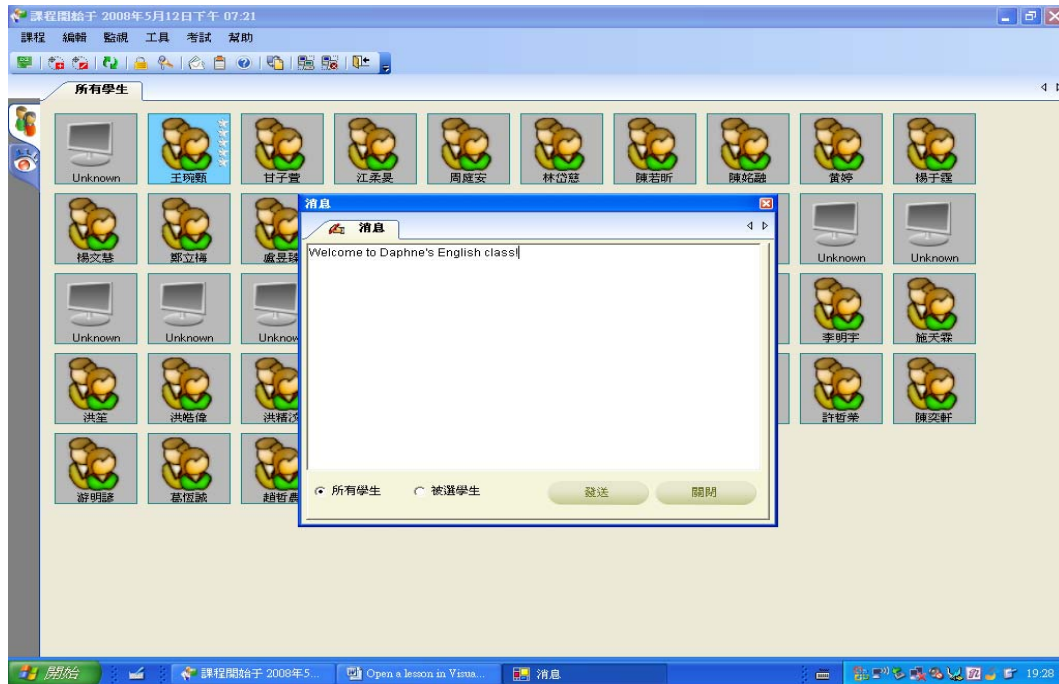


Figure 7. Sending a Message to Students through Visual Classroom

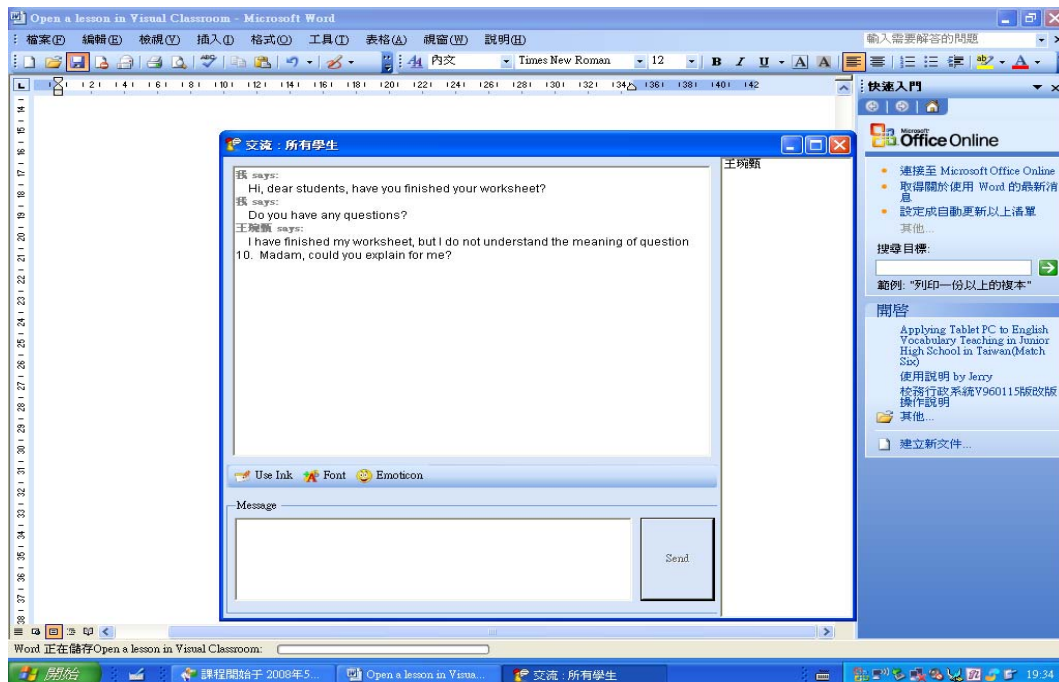


Figure 8. Opening a Chatroom for Students to Ask Questions or Share their Opinions

In the second session, the teacher gave two students one Tablet PC. The students had to finish their mission with their partners. The teacher sent them a PowerPoint file containing list of words for sentence making from the lesson through Visual Classroom. The students had to discuss with their partners and then make sentences for the words. They had to use the stylus to write down the sentences on the screen. After they finished making the sentences, the teacher asked volunteers to share their sentences with their classmates. They had to raise their hands to get the chance of sharing their sentences with others and each pair could get points for it. The teacher then broadcasted their screens to the other students through Visual Classroom (see Figure 9). The teacher also asked the other students to find grammatical mistakes in the sentences and encouraged them to correct the sentences. The students who corrected the sentences could also get points. If there was no student who could correct the sentences, the teacher would show the correction with her stylus on the screen.

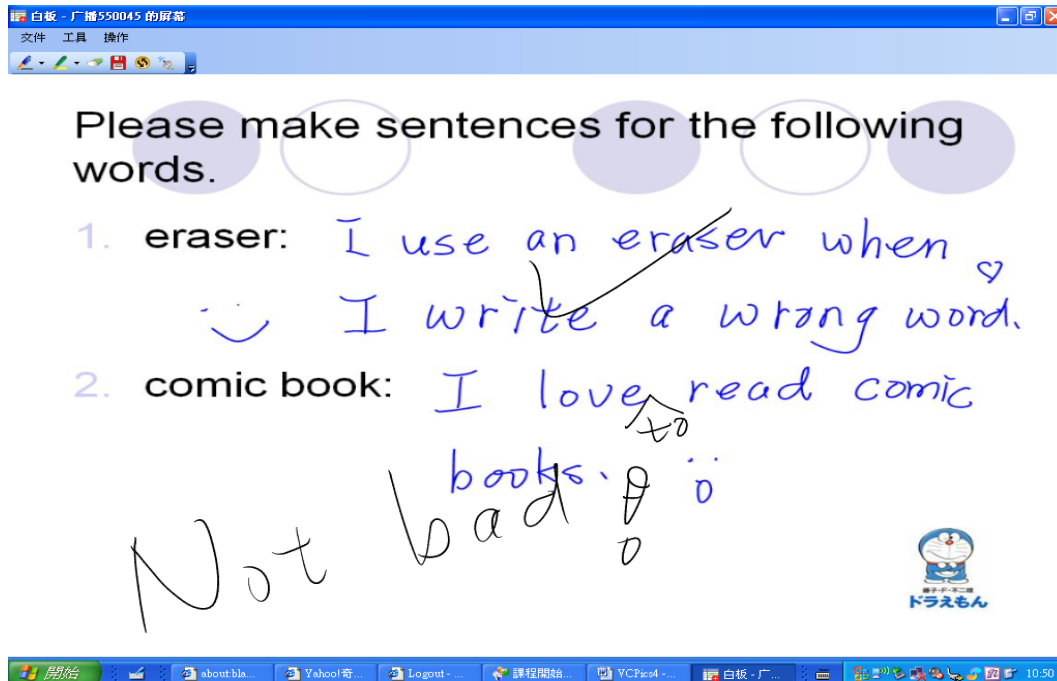


Figure 9. Broadcasting One Group's Screen to the Other Groups

The teacher used Hot Potatoes software program to design a test covering the words of this lesson before the third session started. In the test, there were five kinds of questions: Puzzle Words (JCross), Match (JMatch), Filling in the blanks (JCloze), Multiple Choice (JQuiz) and Unscrambling Sentences (JMix). There were five questions in each part except the Unscrambling Sentences (JMix) which had only one (see Figure 10, 11, 12, 13 & 14). The teacher opened a class on Moodle and uploaded the test on this teaching and learning platform before the third session. In the third session, the teacher gave each student one Tablet PC. The students had to take the test on Moodle by the stylus. After the students finished the test, the students could know their scores immediately and learn their mistakes (see Figure 15

& 16). The teacher could receive students' scores immediately (see Figure 17).

Moodle helped the teacher produce statistics, such as correct facility (see Figure 18).

And then the teacher and the students can review and discuss the topics where the students made their most mistakes.

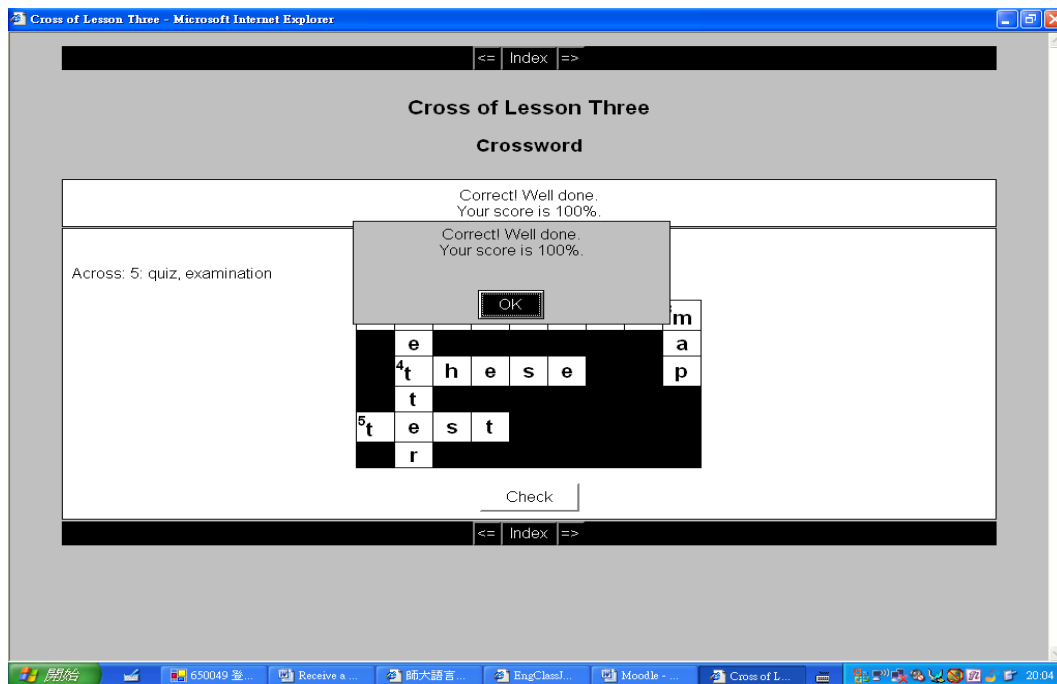


Figure 10. Five Questions of JCross in Hot Potatoes

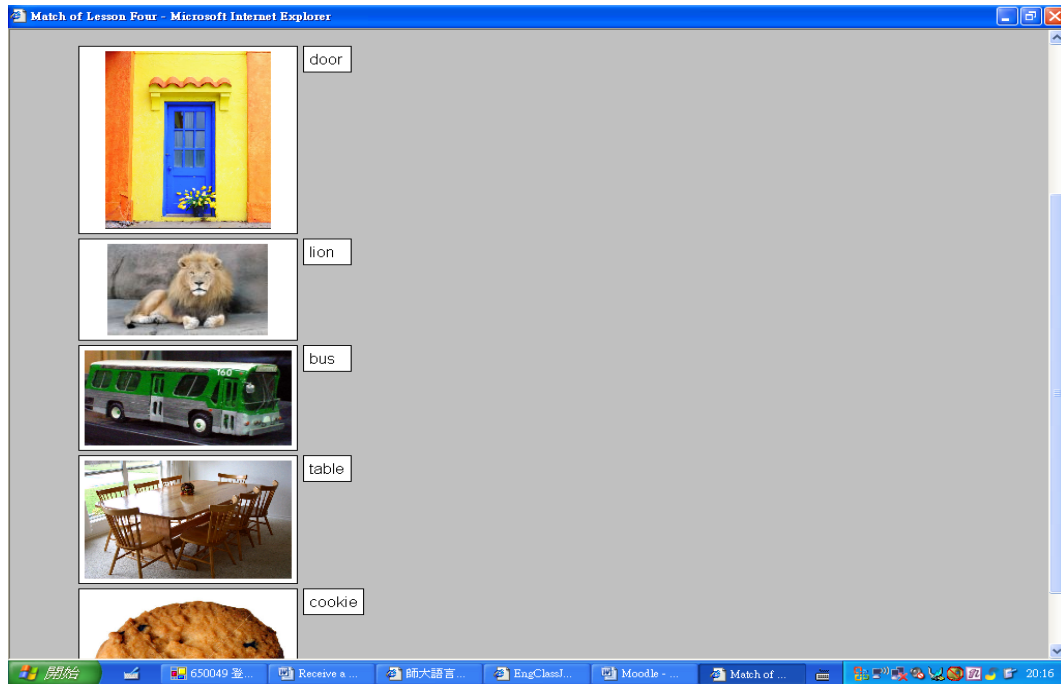


Figure 11. Five Questions of JMatch in Hot Potatoes

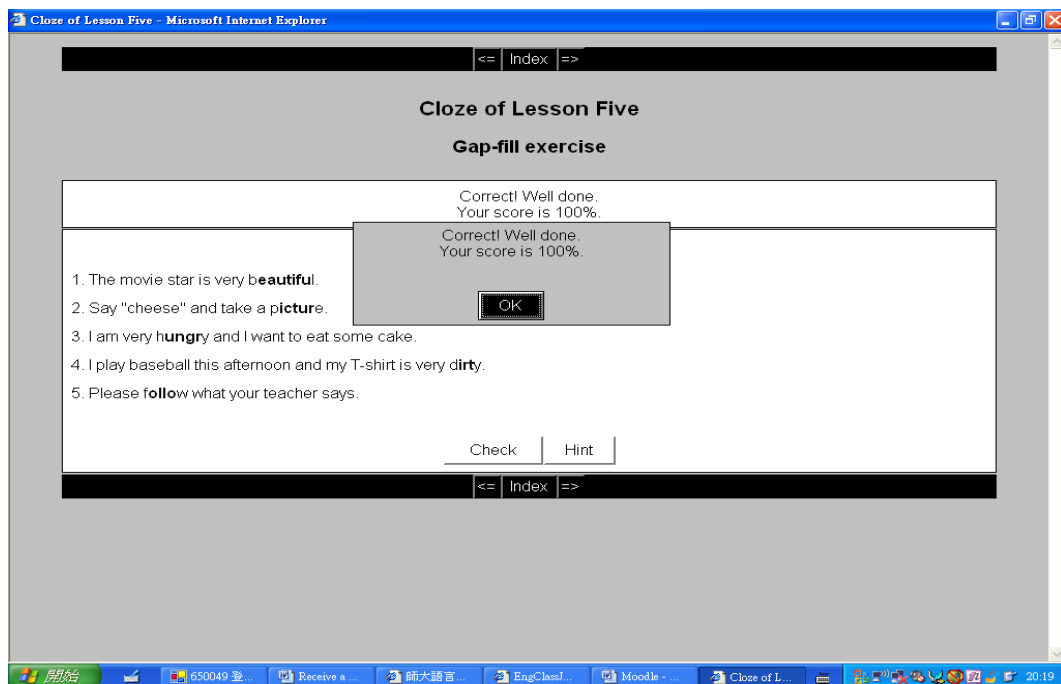


Figure 12. Five Questions of JCloze in Hot Potatoes

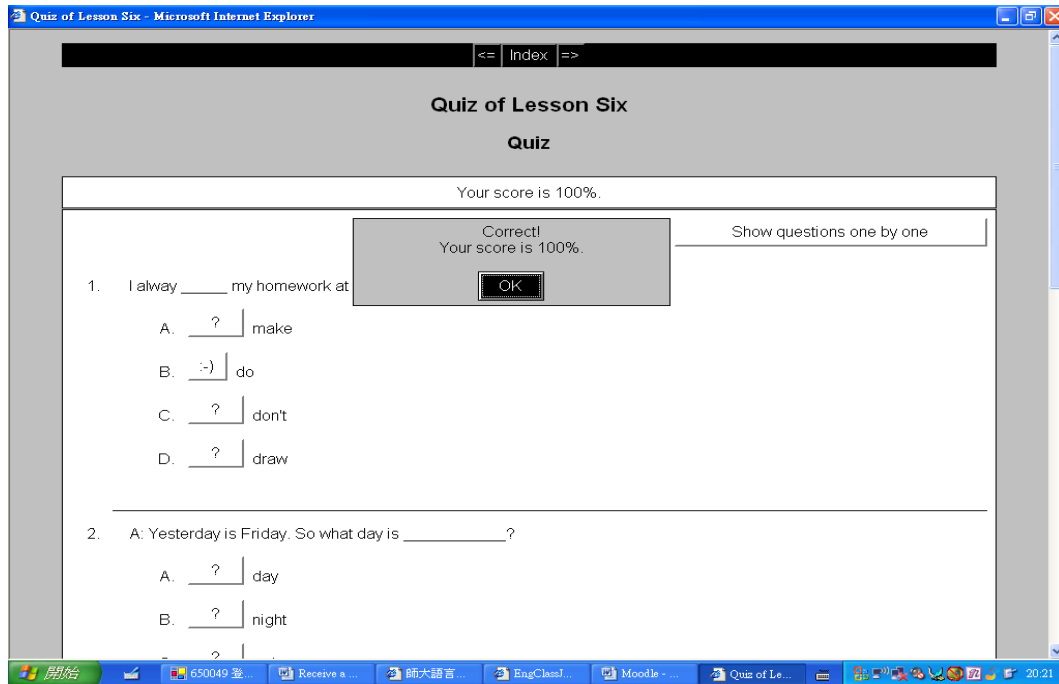


Figure 13. Five Questions of JQuiz in Hot Potatoes

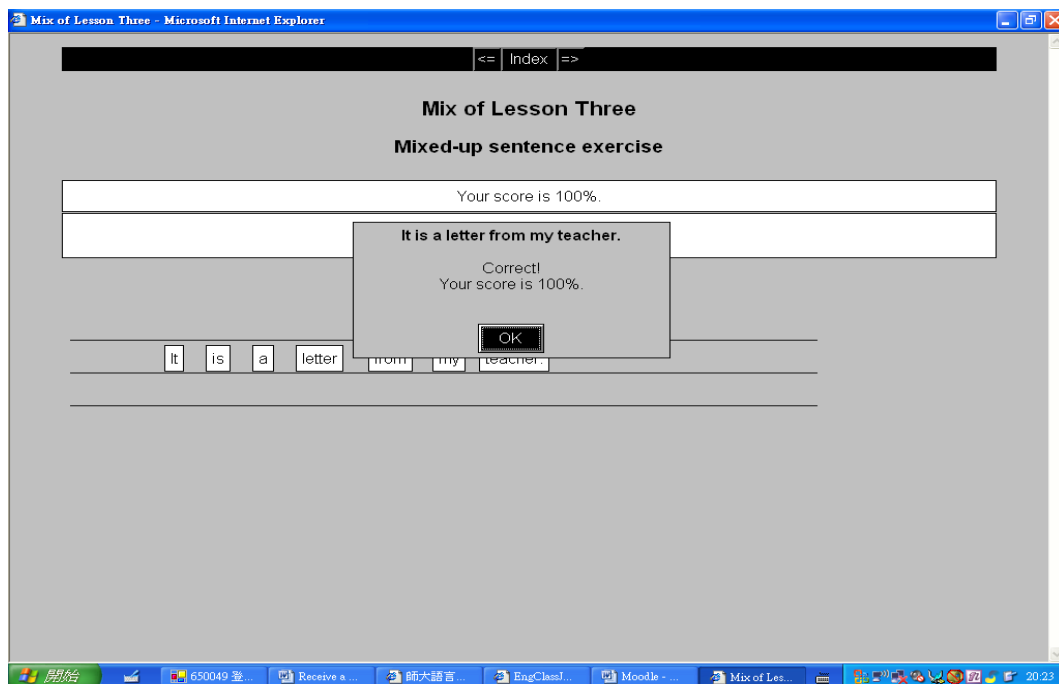


Figure 14. One question of JMix in Hot Potatoes

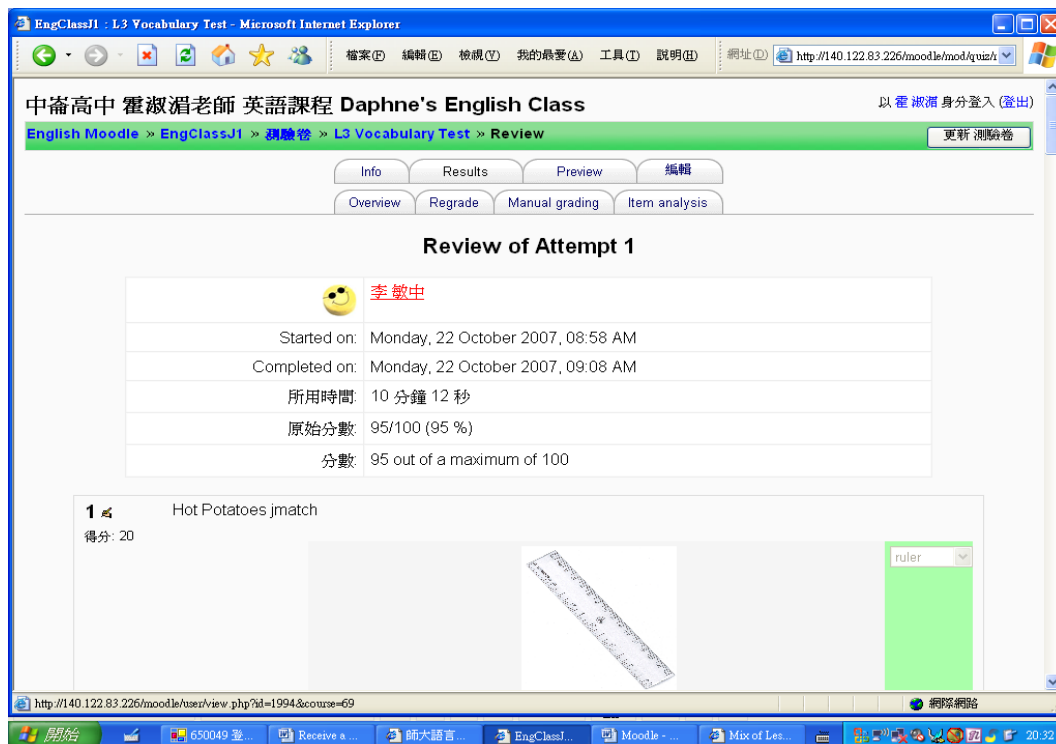


Figure 15. One Student's Score and Time of the Test on Moodle

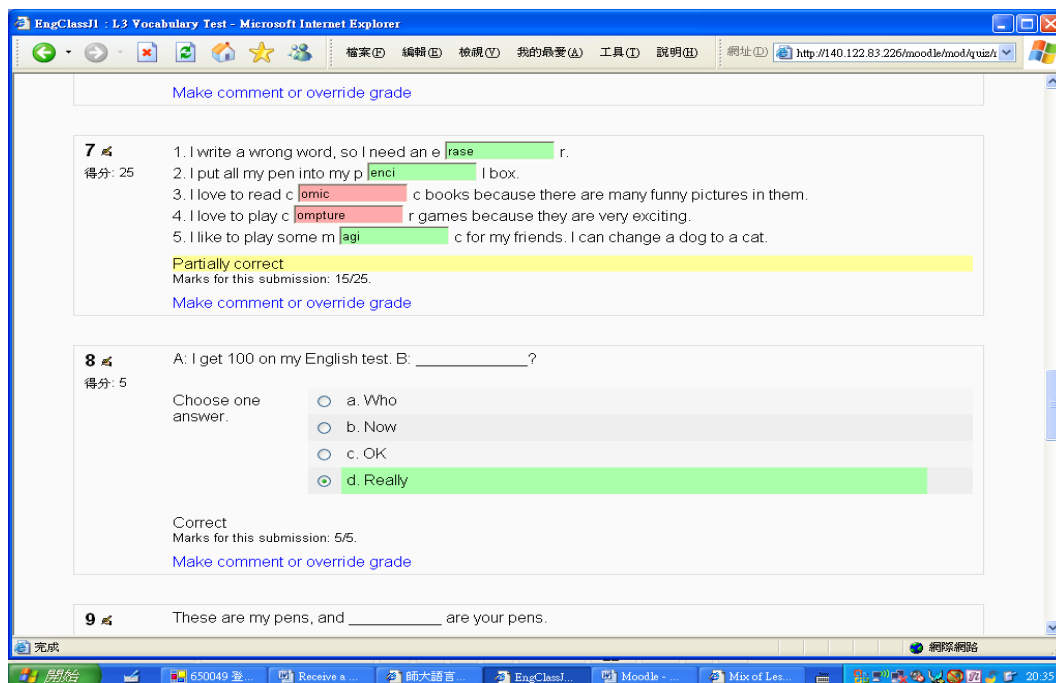


Figure 16. Showing the Right Answer of Each Item on Moodle



Figure 17. The Participants, Time and Scores of the Test on Moodle

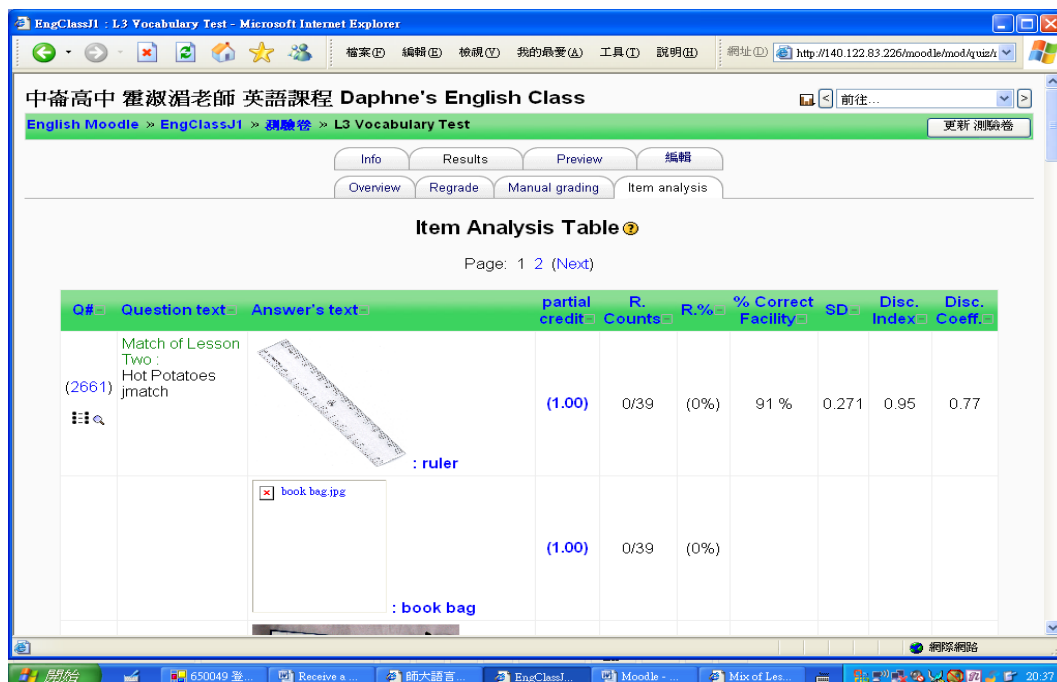


Figure18. The Statistics Data such as Correct Facility on Moodle

For the control group, in the first session of each lesson, the teacher gave each student a worksheet. The worksheet of the control group was the same as that of the experimental group. The worksheet had the explanation, usage and exercises for the words in this lesson. The teacher used the blackboard to explain the worksheet. The students had to finish the worksheet with pens or pencils in class. The teacher encouraged the students to raise their hands if they had any questions and the teacher would answer the questions and communicate with the students face to face.

In the second session, the teacher gave two students one worksheet. The students had to finish their task with their partners. The worksheet of the control group was the same as that of the experimental group. The worksheet was about making sentences for the words of this lesson. The students had to discuss with their partners and make sentences based on the vocabulary. They had to write down their sentences on the worksheet with pens or pencils. After they finished making the sentences, the teacher asked volunteers to write their sentences on the blackboard, so they could share their sentences with their classmates. They had to raise their hands to get the chance of writing their sentences up on the blackboard and each pair could get points for it. After the volunteers wrote their sentences on the blackboard, the teacher asked the other students to find any mistakes in the sentences and asked them to correct the sentences. The students who corrected the sentences correctly could

also get points. If there was no student who knew how to correct the sentences, the teacher corrected their sentences.

Before the third session, the teacher gave a Hot Potatoes test covering the words in this lesson. She then printed the test out for the students. The test of the control group was the same as that of the experimental group. In the test, there were five kinds of questions: Puzzle Words (JCross), Match (JMatch), Filling in the blanks (JCloze), Multiple Choice (JQuiz) and Unscrambling Sentences (JMix). There were five questions in each part except the Unscrambling Sentences (JMix) which had only one. In the third session, the teacher gave each student one test paper. They had to finish the test with pens or pencils. After the students finished the test, they corrected the test papers for one another. The teacher asked students if they had any questions and the teacher answered the questions in class. Finally, the teacher had to collect the test papers to register the scores of the students.

3.3.3 Post-test

After both groups complete the experiment, the sixty-three students took a post-test to examine score improvement and to see if there was any significant difference between the two groups. There were forty multiple-choice questions about the word usage and twenty-five cloze questions testing the word spelling. The

questions in the post-test were very similar to the questions in the pre-test.

3.3.4 Questionnaire

After the post-test, the sixty-three students had to finish a questionnaire. The questionnaires included three categories of questions—5-point Likert scale questions, multi-multiple-choice questions and open-ended questions. In the 5-point Likert scale questions, there were five questions about their satisfaction with a Tablet PC, three questions dealing with motivation to use a Tablet PC and one question about difficulties they had using a Tablet PC to learn English vocabulary. In the multi-multiple-choice questions, there were two questions about their satisfaction, two questions about the difficulties and one question about the future use of a Tablet PC in English teaching as well as learning. In the open-ended questions, there were two questions about suggestions they would give about using a Tablet PC and the future use of a Tablet PC in English teaching as well as learning.

3.3.5 Interview

At the end of the experiment, the teacher chose four students with two boys and two girls to do the interview. The teacher asked them three questions. The first question was “What are the advantages and disadvantages of a Tablet PC?” The

second question was “Do you think learning English is more interesting with a Tablet PC?” The third question was “Do you think a Tablet PC is helpful in learning English?” Then the four students answered the three questions one after one.

3.3.6 Data Analysis

Finally, the scores of the pre-test, and post-test were analyzed quantitatively. Then the results of the questionnaire were analyzed quantitatively and qualitatively. Finally the answers of the interview were analyzed qualitatively.

3.4 Data Analysis

The scores of the pre-test as well as post-test were analyzed quantitatively, the results of the questionnaire were analyzed quantitatively as well as qualitatively, and the answers of the interview were analyzed qualitatively in this study.

3.4.1 Pre-test

There were forty multiple-choice questions about the word usage and twenty-five cloze questions about the word spelling from Lesson Three to Lesson Six covering total new vocabulary. The aims of the pre-test were to assess the sixty-three participants’ proficiency in the words to be covered and to see whether

there was any significant difference between the two groups before the instruction. The cross-group pre-test score comparison between the experimental group and the control group was done through *Independent Sample T-test*. The result of the pre-test was discussed quantitatively.

3.4.2 Post-test

There were forty multiple-choice questions about the word usage and twenty-five cloze questions about the word spelling. The questions in the post-test were very similar to the questions in the pre-test. The aims of the test were to examine score improvement of the two groups and to see if there was any significant difference between the two groups after the instruction. The cross-group comparison of the scores from the post-test between the two groups was done through *Independent Sample T-test*. And the scores between the pre-test and the post-test of the two groups were compared statistically by using *Paired Sample T-test*. The results of the post-test were discussed quantitatively.

3.4.3 Questionnaire

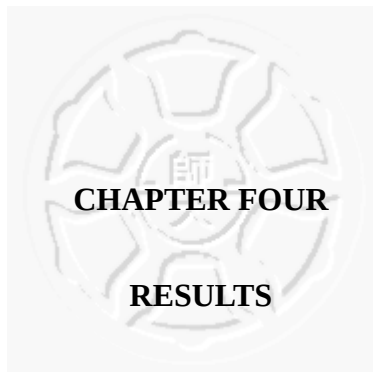
The questionnaires included three categories of questions—5-point Likert scale questions, multi-multiple-choice questions and open-ended questions. In the 5-point

Likert scale questions, there were five questions about their satisfaction with a Tablet PC, three questions about the motivation to use a Tablet PC to learn vocabulary and one question about the difficulties in using a Tablet PC to learn English vocabulary. In the multi-multiple-choice questions, there were two questions about their satisfaction, two questions about the difficulties and one question about the future use of a Tablet PC in English teaching as well as learning. In the open-ended questions, there were two questions about suggestions they would make about using a Tablet PC in English vocabulary teaching as well as learning and the future use of a Tablet PC in English teaching as well as learning. For 5-point Likert scale questions, 5 meant the highest score and 1 meant the lowest score. The mean and its standard deviation for each statement were computed. For multi-multiple-choice questions, the percentages of each choice were computed. For open-ended questions, the answers were discussed quantitatively and qualitatively.

3.4.4 Interview

There were four interviewees in the interview and each interviewee had to answer three questions. The first question was “What are the advantages and disadvantages of a Tablet PC?” The second question was “Do you think learning English is more interesting with a Tablet PC?” The third question was “Do you

think a Tablet PC is helpful in learning English?” The answers of the four interviewees were video taped. Their answers were analyzed qualitatively.



This chapter presents the results of the pre-test, the post-test, the questionnaire as well as the interview. First, the improvements of the experimental group and the control group both in multiple-choice questions and cloze questions are presented. Following that are the comparisons of the mean scores between the two groups in pre-test and post-test. Second, aspects such as the feedback concerning students' satisfaction with Tablet PCs, students' motivation to learn English with Tablet PCs, students' difficulties when using Tablet PCs and the future use of Tablet PCs from the questionnaire are presented. Third, the advantages and disadvantages of Tablet PCs, as well as students' interest and motivation of learning English with Tablet PCs in the interview are presented.

4.1 The Results of Pre-test and Post-test

The experimental and control groups means and standard deviations for the pre-test and post-test are listed in Table 1. There were thirty-two students in the experimental group, while there were thirty-one students in the control group. In the pre-test multiple-choice questions, the mean of the control group (67.74) was slightly higher than the mean of the experimental group (67.06). In the pre-test cloze

questions, the mean of the experimental group (38.91) was slightly higher than the mean of the control group (38.23). After the instruction, the mean of the experimental group (82.03) was higher than the mean of the control group (77.58) in the multiple-choice questions. In the cloze questions, the mean of the experimental group (74.22) was also higher than the mean of the control group (65.65).

Table 1 Means of the Participants' Pre-test & Post-test

Test Types	Topic Styles	Groups	Mean	Std. Deviation
Pre-test	Multiple-choice	Experimental Group	67.06	4.35
		Control Group	67.74	5.35
	Cloze	Experimental Group	38.91	6.06
		Control Group	38.23	6.28
Post-test	Multiple-choice	Experimental Group	82.03	4.59
		Control Group	77.58	5.99
	Cloze	Experimental Group	74.22	4.20
		Control Group	65.65	6.83

Note. Experimental Group: n=32 Control Group: n=31

Table 2 shows that there was no significant difference in the pre-test means

between the two groups in multiple-choice questions, (67.06:67.74). There was no significant means difference for the cloze questions in the pre-test between the two groups (39.91:39.23), either. In the post-test, although the mean of the multiple-choice questions of the experimental group (82.03) was higher than that of the control group (77.58), there was still no significant difference between the two groups. In the cloze questions, the mean of the experimental (74.22) was also higher than that of the control group (65.65), but there was no significant difference between the two groups.

Table 2 Independent Samples T-test Results of the Participants' Pre-test & Post-test

Test Types	Topic Styles	t	Sig(2-tailed)
Pre-test	Multiple-choice	-0.099	0.922
	Cloze	0.078	0.938
Post-test	Multiple-choice	0.592	0.556
	Cloze	1.077	0.286

Note. Experimental Group: n=32 Control Group: n=31

But according to Table 3, the experimental group had a great improvement in the mean of the multiple-choice questions between the pre-test and the post-test. It

reached a significant level of 0.015($p < 0.025$). And in the cloze questions, the experimental group had even a greater improvement as it reached a significant level of 0.000($p < 0.005$). In the control group, even though there was an improvement in the multiple-choice questions between the two tests, it did not reach a significant level (0.240). But in the cloze question, the improvement reached a significant level of 0.007($p < 0.025$).

Table 3 Paired Samples T-test Results of the Participants' Pre-test & Post-test

Test Types	Topic Styles	Groups	T	Sig(2-tailed)
Pre-test	Multiple-choice	Experimental Group	-2.588	0.015*
vs.		Control Group	-1.198	0.240
Post-test	Cloze	Experimental Group	-5.030	0.000**
		Control Group	-2.917	0.007*

Note. Experimental Group: $n=32$ Control Group: $n=31$

** < 0.005 * < 0.025

4.2 The Results of the Questionnaire

4.2.1 5-point Likert Scale Questions about Students' Satisfaction with Tablet PCs

There were thirty-two students in the experimental group, but the effective questionnaire was only thirty-one. There were five 5-point Likert scale statements about students' satisfaction with Tablet PCs in the questionnaire (Table 4 & 5). All the students (100%) agreed that a Tablet PC was light as well as portable, and the mean was 4.64. A total of 67.74% of the students reported that the screen of a Tablet PC was big enough for readers to read, while 22.58% of the students held a neutral attitude and the remaining 9.68% of the students gave negative feedback. The mean of this statement was 3.90. A total of 77.42% of the students gave positive feedback about the convertible screen of a Tablet PC, while 16.13% of the students' attitude was neutral and only 6.45% of the students' attitude was negative. The mean was 4.32. A total of 74.19% of the students thought that it was very convenient to go on the Net wirelessly with a Tablet PC, and 12.9% of the students had neutral attitudes while 12.9% of the students had negative attitudes. The mean of the statement was 4.23. A total of 48.39% of the students considered that the stylus of a Tablet PC was good and easy to use, while 32.26% of the students were neutral and the final 19.35% of the students gave negative feedback. The mean of this statement was 3.45.

Table 4 Means of Students' Satisfaction with Tablet PCs (N=31)

Statement	Mean	Std. Deviation	Maximum	Minimum
a. A Tablet PC is light and portable.	4.64	0.49	5	4
b. The screen of a Tablet PC is big enough to read clearly.	3.90	0.98	5	2
c. The screen of a Tablet PC can be converted 180° , and it is very interesting as well as convenient.	4.32	1.08	5	1
d. Going on the Net wirelessly with a Tablet PC is very convenient.	4.23	1.28	5	1
e. The stylus of a Tablet PC is good and easy to use.	3.45	1.18	5	1

Table 5 Percentages of Students' Satisfaction with Tablet PCs (N=31)

Statement	Opinion	Negative (1 & 2)		Neutral (3)	Positive (4 & 5)	
a. A Tablet PC is light and portable.	Number	0	0	0	11	12
	Percentage	0%		0%	100%	
b. The screen of a Tablet PC is big enough to read clearly.	Number	0	3	7	11	10
	Percentage	9.68%		22.58%	67.74%	
c. The screen of a Tablet PC can be converted 180° , and it is very interesting as well as convenient.	Number	1	1	5	4	20
	Percentage	6.45%		16.13%	77.42%	
d. Going on the Net wirelessly with a Tablet PC is very convenient.	Number	2	2	4	2	21
	Percentage	12.9%		12.9%	74.19%	
e. The stylus of a Tablet PC is good and easy to use.	Number	2	4	10	8	7
	Percentage	19.35%		32.26%	48.39%	

4.2.2 5-point Likert Scale Questions about Students' Motivation to Learn

English because of Tablet PCs

There were three statements about students' motivation to learn English after using a Tablet PC in the questionnaire (Tablet 6 & 7). A total of 70.97% of the students responded that using the stylus of a Tablet PC to write English words and sentences impressed them with the words and sentences, but 22.58% of the students remained neutral while 6.45% of the students gave negative feedback. The mean of this statement was 3.97. A total of 70.97% of the students affirmed that a Tablet PC motivated them to learn English, while 22.58% of the students had neutral attitudes and 6.45% of the students had negative attitudes. The mean of the statement was 4.10. A total of 70.97% of the students agreed that a Tablet PC was helpful in English learning, but 22.58% of the students had a neutral attitude and 6.45% of the students had a negative attitude. The mean of it was 3.94.

Table 6 Means of Students' Motivation to Learn English because of Tablet PCs(N=31)

Statement	Mean	Std. Deviation	Maximum	Minimum
a. I use the stylus of a Tablet PC to write English words and sentences. That impresses me with the English words and sentences.	3.97	1.11	5	1
b. A Tablet PC motivates me to learn English.	4.10	1.08	5	1
c. A Tablet PC is helpful in English learning	3.94	1.00	5	1

Table 7 Percentages of Students' Motivation to Learn English because of Tablet PCs (N=31)

Statement	Opinion	Negative (1 & 2)		Neutral (3)	Positive (4 & 5)	
a. I use the stylus of a Tablet PC to write English words and sentences. That impresses me with the English words and sentences.	Number	2	0	7	10	12
	Percentage	6.45%		22.58%	70.97%	
b. A Tablet PC motivates me to learn English.	Number	1	1	7	7	15
	Percentage	6.45%		22.58%	70.97%	
c. A Tablet PC is helpful in English learning.	Number	1	1	7	12	10
	Percentage	6.45%		22.58%	70.97%	

4.2.3 5-point Likert Scale Questions about Difficulties of Using Tablet PCs

There was only one statement about difficulties in using Tablet PCs in the questionnaire (Table 8 & 9). A total of 54.84% of the students responded that they did not encounter a lot of difficulties when they used a Tablet PC, while 25.81% of the

students remained neutral and 19.35% of the students thought that they encountered many difficulties when they used a Tablet PC. The mean of this statement was 2.42.

Table 8 Means of Difficulties of Using Tablet PCs (N=31)

Statement	Mean	Std. Deviation	Maximum	Minimum
a. I encounter a lot of difficulties when I use a Tablet PC.	2.42	1.31	5	1

Table 9 Percentages of Difficulties of Using Tablet PCs (N=31)

Statement	Opinion	Negative	Neutral	Positive
a. I encounter a lot of difficulties when I use a Tablet PC.	Number	10 7	8	3 3
	Percentage	54.84%	25.81%	19.35%

4.2.4 Multi-multiple-choice Questions about Students' Satisfaction with

Tablet PCs

There were two multi-multiple-choice questions about students' satisfaction with Tablet PCs in the questionnaire. Students could choose more than one options in each question. According to the first question "Do you feel comfortable about going on the Net wirelessly with a Tablet PC? What are the reasons if you feel comfortable about going on the Net wirelessly with a Tablet PC?" (Table 10 &11) Most of the students (96.77%) feel comfortable about going on the Net wirelessly with a Tablet PC, but one of the students (3.23%) feel uncomfortable to use it. For

the reasons of their satisfaction with the wireless Network, a high percentage of the students (77.42%) expressed that they could move and go on the Net, even outside of the classroom. Many of the students (74.19%) appreciated that they did not have to connect any per lines for going on the Net with a Tablet PC. More than half of the students (54.84%) indicated that it was still very convenient to go on the websites out of the school even though they had to log in. Some of the students (38.71%) thought that it was very easy to get on line with their a Tablet PC. A Few of the students (29.03%) considered that the line was not easy to disconnected after getting on line with a Tablet PC.

Table 10 Percentages of Multi-multiple-choice Question A about Students' Satisfaction with Tablet PCs (N=31)

Question a: Do you feel comfortable about going on the Net wirelessly with a Tablet PC?

	Options	Number	Percentage
1.	Yes, I do	30	96.77%
2.	No, I don' t	1	3.23%

Table 11 Percentages of Multi-multiple-choice Question A about Students' Reasons for Satisfying with Tablet PCs (N=31)

Question a: What are the reasons if you feel comfortable about going on the Net wirelessly with a Tablet PC?

Options	Number	Percentage
1. I do not have to connect any per lines for going on the Net.	23	74.19%
2. It is easy to get on line.	12	38.71%
3. The line is not easy to disconnected after getting on	9	29.03%
4. It is convenient to log in for going on websites out of the school.	17	54.84%
5. I can move and get on the Net, even outside of the classroom.	24	77.42%
Others	0	0%.

The second question was “Do you like to use the stylus of a Tablet PC? What are the reasons if you like to use the stylus of a Tablet PC?” (Table 12 & 13) Most of the students (93.55%) like to use the stylus of a Tablet PC, but two of the students (6.45%) do not like to use the stylus of a Tablet PC. For the reasons of satisfactions with the stylus, most of the students (83.87%) indicated that they could choose different kinds of pens to write on the screen. More than half of the students (64.52%) expressed that they could choose pens of different colors to write on their Tablet PCs. About half of the students (58.06%) reported that they could save their handwriting. Nearly half of the students (48.39%) responded that they could use an

eraser to erase a word when they made a mistake. Some of the students (38.71%) said that they could turn their handwriting into text. Only one student (3.23%) had a different opinion from the choices. The student expressed that the experience of drawing a picture on the screen of a Tablet PC was wonderful.

Table 12 Percentages of Multi-multiple-choice Question B about Students' Satisfaction with Tablet PCs (N=31)

Question b: Do you like to use the stylus of a Tablet PC?			
	Options	Number	Percentage
1.	Yes, I do.	29	93.55%
2.	No, I don't.	2	6.45%

Table 13 Percentages of Multi-multiple-choice Question B about Students' Reasons for Satisfying with Tablet PCs (N=31)

Question b: What are the reasons if you like to use the stylus of a Tablet PC?			
	Options	Number	Percentage
1.	I can choose different kinds of pens to write.	26	83.87%
2.	I can choose pens of different colors to write.	20	64.52%
3.	I can use an eraser to erase a word when I make a mistake.	15	48.39%
4.	I can save my handwriting.	18	58.06%
5.	I can turn my handwriting into text.	12	38.71%
6.	Others	1	3.23%

4.2.5 Multi-multiple-choice Questions about Difficulties of Using Tablet PCs

There were two multi-multiple-choice questions about difficulties in using Tablet PCs on the questionnaire. The first question was “Why do you feel uncomfortable about going on the Net wirelessly with a Tablet PC?” (Table 14) Some of the students (38.71%) expressed that it was not convenient logging into websites outside of the school. Not many of the students (19.35%) indicated that the line was easy to be cut off after getting on. Few of the students (16.13%) reported that it was not easy to get on line. Only one student (3.23%) had another opinion. This student reported that it was easy to run out of battery when he tried to get on line.

Table 14 Percentages of Multi-multiple-choice Question A about Difficulties of Using Tablet PCs (N=31)

Question a: Why do you feel uncomfortable about going on the Net wirelessly with a Tablet PC?

Options	Number	Percentage
1. It is not easy to get on line.	5	16.13%
2. The line is easy to be cut off after getting on line.	6	19.35%
3. It is not convenient to log in for going on websites out of the school.	12	38.71%
4. Others	1	3.23%

The second question was “Why do the students feel uncomfortable about the Stylus of a Tablet PC?” (Table 15) More than half of the students (51.61%) reported

that it was not easy to write words on the screen. Not many of the students (29.03%) complained that the words which were written with the stylus were not beautiful. Four of the students (12.90%) offered other reasons. One expressed that the words easily went up where he wanted to write on. Another said that the words often suddenly disappeared. The other two students expressed that the stylus was often out of ink just like a real pen. Only two of the students (6.45%) thought that it was not easy to use an eraser to erase a word when they made a mistake.

Table 15 Percentages of Multi-multiple-choice Question B about for Difficulties of Using Tablet PCs (N=31)

Question b: Why do you feel uncomfortable about the stylus of a Tablet PC?

Options	Number	Percentage
1. It is not easy to write words on the screen.	16	51.61%
2. It is not easy to use an eraser to erase a word when I make a mistake.	2	6.45%
3. The words which are written with the stylus are not beautiful.	9	29.03%
4. Others	4	12.90%

4.2.6 Multi-multiple-choice Questions about the Future Use of Tablet PCs in

English Teaching

In the questionnaire, there was one multi-multiple-choice question dealing with the future use of Tablet PCs in English Teaching (Table 14). The question was

“Which aspects are suitable for teachers to use a Tablet PC in their future English teaching?” Most of the students (77.42%) preferred reading practices (ex: electronic books or articles), and a high percentage of the students (70.97%) preferred vocabulary teaching. Many of the students (67.74%) suggested writing practice, while more than half of the students (64.52%) suggested grammar teaching. Some of the students (58.06%) chose listening practice, and just under half of the students (45.16%) chose dialogue and reading instruction. Again just under half of the students (45.16%) voted for comprehension tests, while not many of the students (38.71) voted for speaking practices. Only two students (6.45%) suggested other future use. One suggested playing English games and the other suggested cooperating with The Educlick System (A student could use a clicker to answer a teacher’s question).

Table 16 Percentages of Multi-multiple-choice Question about the Future Use of Tablet PCs in English Teaching (N=31)

Question a: Which aspects are suitable for teachers to use a Tablet PC in their future English teaching?

Options	Number	Percentage
1. Listening Practice	18	58.06%
2. Speaking Practice	12	38.71%
3. Reading Practice (Ex: Electronic Books or Articles)	24	77.42%
4. Writing Practice (Ex: Vocabulary, Phrase, and Sentence Writing, and Composition)	21	67.74%
5. Vocabulary Teaching	22	70.97%
6. Grammar Teaching	20	64.52%
7. Dialogue and Reading Teaching	14	45.16%
8. Comprehension Test	14	45.16%
9. Others	2	6.45%

4.2.7 Open-ended Questions

There were two open-ended questions in the questionnaire. The first one was “Do you think that it was suitable to use a Tablet PC in English vocabulary teaching this semester? Please write down your thoughts and reasons.” (Table 15) Most of the students (90%) agreed that it was suitable to use a Tablet PC for English vocabulary teaching this semester. They thought a Tablet PC was very interesting and fun. It was a fresh experience for them. They liked their English classes

because of Tablet PCs. They loved to play with Tablet PCs with their classmates in class. They felt relaxed because of this learning style. Besides that, they also mentioned that they loved to write words on the screen and it helped them to remember the words. They thought that a Tablet PC was easy to use, but they thought that it was not convenient to get on line. They also believed that it was good for the environment because they did not have to use any paper. They expressed that they could learn a lot through reading other classmates' sentences broadcasted by Visual Classroom onto their screens. Two of the students (6.45%) held a neutral attitude and they had their opinions. They indicated that learning English well depended on themselves, not Tablet PCs. Sometimes they wanted to go back to the traditional classroom to have their English classes. Only one student (3.23%) indicated that it was unsuitable to use a Tablet PC for English vocabulary teaching during semester. He mentioned that it wasted a lot of his time because he was not familiar with computers. Sometimes he had to wait a long periods of time to get on line. He also complained that the teacher once wasted half of a session to solve computer problems and therefore she had to teach the lesson in a hurry. He thought that the teacher did not express very clearly what she wanted to teach with a Tablet PC and he could not understand the lesson very well in the class.

Table 17 Percentages of Opening Question about Students' Thoughts about Using Tablet PCs in English Vocabulary Teaching (N=31)

Question a: Do you think that it is suitable to use a Tablet PC in English vocabulary teaching this semester? Please write down your thoughts and reasons.

Attitude	Number	Percentage
Positive (Suitable)	28	90%
Neutral	2	6.45%
Negative (Unsuitable)	1	3.23%

The second question was “What is your suggestion for the future use of a Tablet PC in English teaching?” (Table 16). Slightly more than half of the students (54.84%) gave positive suggestions. They affirmed that a Tablet PC was light, convenient as well as interesting and they hoped they could continue to use it in their English classes. They expected the teacher to make better English teaching lesson plans by using a Tablet PC. They suggested that the teacher could design more activities and games for them in class. They even suggested that it would be perfect if the teaching materials could have sound and vocal effects or even movie segments. They hoped that the teacher combined the The Educlick System with a Tablet PC in her class. They also requested that the teacher to give them some free time to get familiar with and play with a Tablet PC after she finished her daily teaching. They suggested that the teacher become familiar with a Tablet PC first before she teaches a lesson with it. Nearly half of the students (45.16%) did not have any opinions. But

two of the students (6.45%) gave negative feedback. They hoped that the teacher would not use a Tablet PC in her class anymore. They indicated that sometimes they could not see the Interactive Whiteboard very clearly in the computer classroom.

Table 18 Percentages of Open-ended Question about the Future Use of Tablet PCs in English Teaching (N=31)

Question a: What is your suggestion about the future use of a Tablet PC in English teaching?

Suggestion	Number	Percentage
Positive Opinion	17	54.84%
None	14	45.16%
Negative Opinion	2	6.45%

4.3 The Results of the Interview

The researcher interviewed four participants with two boys and two girls. Student A was a boy named Li Da Ching; Student B was a boy named Jiang Jia Heng; Student C was a girl named Lin Sz Yu; Student D was a girl named Hung Wan Ting. The researcher asked them three questions. The first one was “What are the advantages and disadvantages of a Tablet PC?” The participants mentioned many advantages of a Tablet PC. They indicated that using a Tablet PC was a fresh experience for them because the screen could be converted 180° and they can write words on the screen (Student C). They tried to write with greater care on the screen because sometimes the teacher broadcasted their screens to others (student A and D).

They felt that it was very convenient to get on the Net wirelessly and to carry a Tablet PC in and out of the classroom (Student D). But they also mentioned some disadvantages of a Tablet PC. They responded that sometimes it suddenly ran out of power (Student D). It was occasionally slow to get on line with their Tablet PCs (Student D). The stylus ink was easily used up just like a real pen (Student B). When a student went to write a word with the stylus, their handwriting easily jumped to a place where they did not want to write (Student B). When a student saved a file, sometimes he or she could not find the file and it disappeared (Student C).

The second question was “Do you think learning English is more interesting with a Tablet PC?” They affirmed that English became more interesting because of a Tablet PC (Student A). They expressed that English class became more fun and active (Student B). They enjoyed cooperating with their classmates on projects (Student A). They were happy with its use during class (Student A and B) .

The third question was “Do you think a Tablet PC is helpful in learning English?” They agreed that they learned English better and quicker because of a Tablet PC (Student A and B). They thought that it helped them to memorize English words and sentences faster (Student A, B, C and D). They hoped that they could use a Tablet PC in English class (Student A, B, C and D).

In addition, they gave feedback about the software program, Visual Classroom

and the platform, Moodle. They indicated that it was very convenient for the teacher to send them a file with Visual Classroom. The teacher could broadcast one student's screen to others, so they could learn a lot from other classmates' assignments. The teacher could also supervise students' screens through Visual Classroom, and thus students did not dare surf the Net in class (Student C and D). Students also expressed that it was wonderful to take a test on line with Moodle. After they finished the test, they could know their scores and the mistakes immediately. It saved the teacher and students' time because they did not have to spend a lot of time correcting the test papers. And the teacher could review and discuss the common mistakes students made according to the statistics and analysis done by Moodle (Student A and B).

CHAPTER FIVE

DISCUSSION

This chapter provides a discussion about the gain of the two groups' vocabulary learning from the experiment. It also provides a discussion about the perceptions of the experimental group after the program.

5.1 The Gain of the Two Groups' Vocabulary Learning

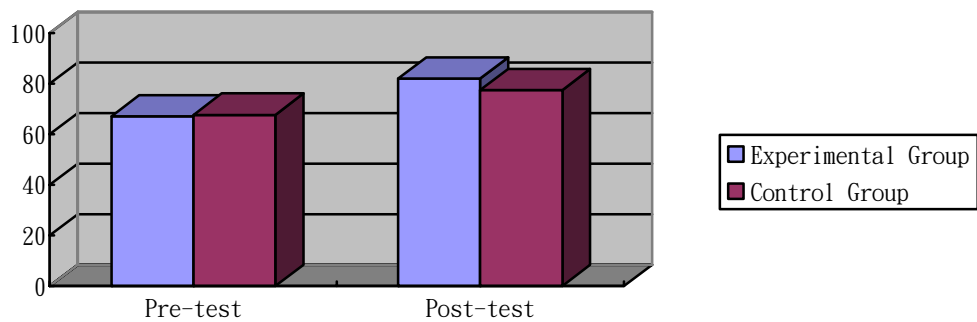


Figure 19. Means of the Multiple-choice questions

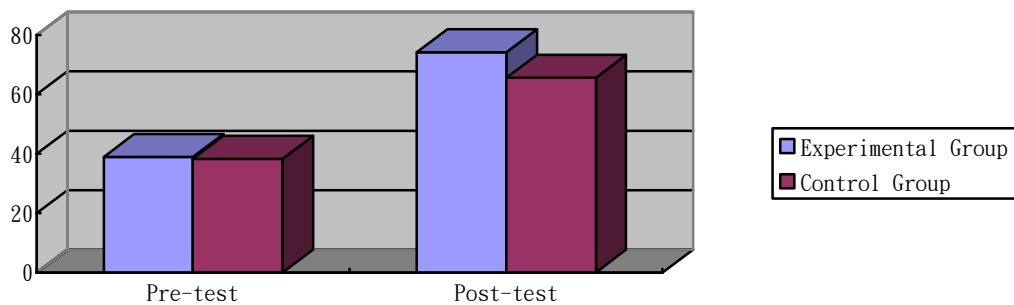


Figure 20. Means of the Cloze Questions

Although there was no significant difference between the experimental group and the control group both in the multiple-choice questions and in the cloze questions of the post-test, the mean of the experimental group was higher than that of the control group by 4.45 in the multiple-choice questions (Figure 19) and the mean of the experimental group was higher than that of the control group by 8.57 in the cloze questions (Figure 20). It seemed that the experimental group improved more in English vocabulary learning. According to the questionnaire, a total of 70.97% of the students in the experimental group agreed that a Tablet PC was helpful in English learning. The scores showed that a Tablet PC was helpful in English vocabulary learning for the experimental group. The result in this study was similar to that in Lin, Liu and Niramitranon's study (2008). It seemed that the use of a Tablet PC enhanced students' English vocabulary learning.

In the multiple-choice questions, the control group did not have a significant improvement in the post-test, but the experimental group did have a significant improvement in the post-test (0.015). It reached 95% level of probability. It revealed that the experimental group learned more English words during the project. A total of 70.97% of the students in the experimental group affirmed that a Tablet PC motivated them to learn English. Applying a Tablet PC to English vocabulary learning was very interesting for them and they concentrated on their English

vocabulary learning more when they used a Tablet PC. Maybe that was the reason why the experimental group had a better performance. Lin, Liu and Niramiranon (2008) also mentioned that students felt English vocabulary was more interesting and easier to learn with a Tablet PC.

In the cloze questions, both the experimental group and the control group revealed significant improvements in the post-test. But the experimental group reached 99% level of probability (0.000), while the control group only reached 95% level of probability (0.007). It seemed that the experimental group had a greater improvement than the control group. The experimental group used the stylus to write English words and sentences, giving them a stronger impression of the words and sentences. A total of 70.97% of these students reported that this made a strong impression on them. Maybe that was the reason why the experimental group improved more than the control group.

The degree of the participants' improvements in the post-test was also affected by the topics. In a cloze question, a student could not guess and fill in the right word if he had not learned that word yet. But, after he learned and memorized it, he could fill in the right word easily. We could easily see a great improvement in the cloze questions after teaching. The mean of the experimental group in the post-test was higher than that in the pre-test by 35.31. And the mean of the control group in the

post-test was higher than that in the pre-test by 27.42. The numbers proved that both groups had significant improvements in the cloze questions. But, in the multiple-choice questions, a student could guess the answer from the options even though he had not learned the word. After instruction, he had to understand the topic and the meaning as well as the usage of the word for choosing the right answer. Maybe this was the reason why neither group showed as much of an improvement as they did for the cloze questions. The mean of the experimental group in the post-test was higher than that in the pre-test by 14.97. And the mean of the control group in the post-test was higher than that in the pre-test by 9.84. Both in multiple-choice and cloze questions, it seemed that the experimental group improved more because of Tablet PCs.

5.2 The Perceptions of the Experimental Group

5.2.1 The Perceptions of the Experimental Group in the Questionnaire

About the experimental group's satisfaction with Tablet PCs, most students in the experimental group were satisfied with the functions of Tablet PCs. They were satisfied with the weight (100%), the convertible screen (77.42%), the wireless Network (74.19%), the size of the screen (67.74%) and the stylus (48.39%) of their Tablet PCs. In comparison with the other functions, the stylus received the lowest

satisfaction from the students. But when the researcher asked the participants why they still liked to use the stylus, the five main reasons were (1) They could choose different kinds of pens to write with (83.87%). (2) They could choose different colors of pens (64.52%). (3) They could save their handwriting (58.06%). (4) They could use an eraser to erase a word when they made a mistake (48.39%). (5) They could turn their handwriting into text (38.71%). Most of the students still felt fresh and interested in the magic pen, the stylus, of a Tablet PC. When the researcher asked the participants why they felt comfortable about going on the Net wirelessly with a Tablet PC, the three main reasons were (1) They could move and get on the Net anywhere, even out of the classroom (77.42%). (2) They did not have to connect any per lines for going on the Net (74.19%). (3) It was convenient to log into websites out of the school (54.84%). These figures show the students really noticed the convenience without the limitation that comes from using a Tablet PC making it fun and easy to motivate the students to learn English vocabulary. The experimental control satisfied with the functions of a Tablet PC; in Chen's study (2004), the participants also satisfied with the functions of a Tablet PC. Most participants in Chen's study indicated that the stylus was easy to use and very helpful, as well as a Tablet PC was very light and easy to be carried anywhere.

The experimental group's motivational comments included: The stylus was the

most interesting feature of the offered. A total of 70.97% of the students indicated that writing with the stylus on the screen helped them greatly with learning the English words and sentences. They liked to use the different colored pens. They tried to use an eraser to erase the wrong word when they made a mistake. They concentrated more on their writing when they used a stylus.

Because the students felt interested in and satisfied with its functions, a total of 70.97% of the students expressed that a Tablet PC motivated them to learn English. The students liked doing the vocabulary worksheet with the stylus and then e-mailing the worksheets to themselves for reviewing. They could cooperate with their classmates to make creative sentences. They could share their screens with others through the software program, Visual Classroom. Some students tried to write words with greater care and draw cute pictures for sharing with others. In Lin, Liu and Niramiranon's (2008) as well as Lin's (2007) studies, the participants also remarked it was more fun and helpful cooperate with their classmates. Besides that, in this study, the students liked to have a test on the platform, Moodle. They could obtain their scores and knew the mistakes they made immediately. The teacher could review and discuss mistakes that the students made. The fun of using a Tablet PC, the satisfaction of its functions, the convenience it offers and the creative teaching method all motivated students to learn English well.

A total of 70.97% of the students affirmed that a Tablet PC was helpful in English learning because the functions were quick and easy to use to learn English. The students mentioned that writing English words and sentences with the stylus gave them a stronger impression of the English. They like to e-mail their own worksheet back to their mailboxes, so they could review the worksheet later. They appreciated other classmates' sentences through screen sharing in this way. They could review sentence patterns and learn new patterns by finding classmates' mistakes. They like receiving immediate feedback, knowing their scores and learning their corrections immediately after they had taken a test. This all made a strong impression on how to correct their wrong concepts immediately. All of the above learning methods helped them in learning English. As the students in this study, most of the participants in Lin's study (2007) and Chen's study (2004) also thought that a Tablet PC was very helpful in English learning.

Remarks about the experimental group's difficulties in using Tablet PCs, although about half of the students (58.84%) did not think that they encountered a lot of difficulties when they used a Tablet PC, a few of the students (19.35%) still thought that they encountered too many difficulties. Some of the students felt unsure about getting on the Net. A total of 38.71% of the students suggested that it was not convenient to log in when going on websites outside of school. Some of the students

felt uncomfortable with the stylus. Slightly over half of the students (51.61%) indicated that it was not easy to write words on the screen and a number of the students (29.03%) expressed that the words written with the stylus were not beautiful. Besides these, students also responded that sometimes a Tablet PC would suddenly run out of power. Occasionally, it was slow to get on line, they experienced sudden disconnections and the stylus easily ran out of ink just like a real pen. When a writer wanted to write a word with the stylus, the handwriting easily jumped from one place to another place where the writer did not want to write. The file could disappear when saved. A few of the students were not familiar with computers and found it difficult to follow the teacher's steps and explanations. They spent a lot of time dealing with the problems of a Tablet PC. Even though most of the students liked using a Tablet PC, they encountered some problems. As Chen's study (2004), he found that even though most of the participants had no problem in operating a Tablet PC, a few of the participants (13%) still felt that a Tablet PC was not easy to use.

Comments concerning the future use of Tablet PCs in English teaching, when the researcher asked the participants which aspects were suitable for teachers, the sequence of the options were reading practice (77.42%), vocabulary teaching (70.97%), writing practice (67.74%), grammar teaching (64.52%), listening practice (58.06%), dialogue and reading teaching (45.16%) and speaking practice (38.71%).

Many students mentioned vocabulary teaching. It showed that they affirmed the vocabulary teaching with Tablet PCs this semester and hoped that the teacher could teach vocabulary with Tablet PCs in the future. A lot of students voted for writing practice. It revealed that they enjoyed writing with the stylus on a Tablet PC and hoped that they have more chances to use it in the future. For reading practice, a teacher could assign electronic books for students to read or share great articles with them. In Chen's study (2004), a majority of the participants (78%) indicated that they would use a Tablet PC to read electronic books. Other activities for students to build their grammar included unscrambling words and making sentences. When a teacher trains students' listening, he or she can add voice or sound and movie segments to his or her teaching materials making. The class will be more fun. For dialogue and reading teaching (text teaching), showing the film about a dialogue or reading, sharing a teacher's dialogue and reading revisions with students, asking students questions, and encouraging students to write a summary of a dialogue or reading are all great methods to learn text with a Tablet PC. For speaking practice, it would be interesting and creative to ask students to record their voices reading and answering questions. Then they can listen to their own English speaking later as well as correct their own pronunciation, and the teacher could listen and score their readings. In Lin, Liu and Niramitranon's study (2008) and Lin's study (2007), the

researchers also mentioned that Tablet PCs can be used in other aspects of English teaching and learning, besides vocabulary teaching.

There were two questions in the open-ended question part. When the researcher asked the participants the first question, “do you think that it was suitable to use a Tablet PC in English vocabulary teaching this semester,” most of the students (90%) gave positive answers, affirming the fun, functionality as well as teaching method with a Tablet PC. They also mentioned that the teaching method was environmentally good because they did not have to use any paper. They could revise and print their own worksheets anytime because they had the electronic files. Two of the students (6.45%) gave neutral answers. They believed that learning English well depended on themselves, not a Tablet PC. That was a good viewpoint. If a student did not concentrate on the classes, did not finish the tasks in class, but just played or surfed on the Net, he or she could not learn English well. But, if a diligent student used a Tablet PC well, he or she could learn English faster and better. As in Lin, Liu and Niramitranon’s (2008) study, most participants thought they learned English faster with a Tablet PC. But in this study, one student (3.23%) gave a negative answer. He did not want to use a Tablet PC in his English classes anymore. He mentioned that a Tablet PC wasted a lot of his time because he was not familiar with computers. He spent a lot of time dealing with computer problems. He also

stated that once the teacher had to spend half of a session solving the problems of Tablet PCs and then she had to teach the lesson in a hurry. The teacher did not explain very clearly what she wanted to teach, and her students could not understand nor learn the lessons very well during class. The above statement was a real situation, so the teacher has to be very familiar with Tablet PCs and well prepared before her class.

When the researcher asked the participants the second question, “what is your suggestion about the future use of Tablet PCs in English teaching,” more than half of the students (54.84%) gave positive opinions. The students expected the teacher to make better lesson plans by using her Tablet PC. They anticipated that the teacher could design more activities and games for them. They suggested that the teacher could use The Educlick System and a Tablet PC at the same time. The students wanted to experience different teaching methods in their future English classes. They felt excited and challenged. Nearly half of the students (45.1%) did not have any opinions. Two of the students (6.45%) gave negative feedback. They did not want to use a Tablet PC anymore in their English classes. They felt frustrated about using a Tablet PC and they did not think that they could learn English better with a Tablet PC.

5.2.2 The Perceptions of the Experimental Group in the Interview

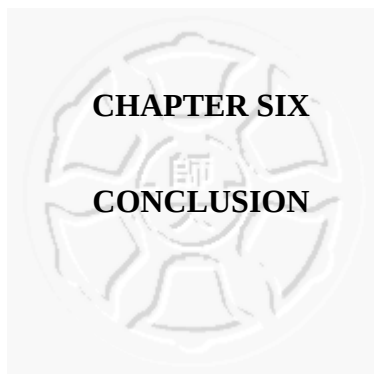
When the researcher asked the four participants with two boys and two girls the first question, “what are the advantages and disadvantages of Tablet PCs,” the students mentioned many advantages and disadvantages about the screen, the stylus, the wireless Network and others. They felt a Tablet PC was convenient, but they also encountered some detailed problems when using it. They hoped the problems can be solved in the future.

When the researcher asked the participants the second question, “do you think learning English is more interesting with a Tablet PC,” they affirmed that English became interesting because of a Tablet PC and their English classes became more fun and active. They enjoyed using Tablet PCs to cooperate with their classmates. Some students who were not interested in or good at English before would now concentrate on their English classes because of Tablet PCs.

When the researcher asked the participants the third question, “do you think a Tablet PC is helpful in learning English,” they emphasized that the stylus of a Tablet PC helped them to memorize English words and sentences. They hoped that they could continue to use Tablet PCs in their future English classes.

The students also gave some feedback about the software program, Visual Classroom and the platform, Moodle. They liked to learn English with Visual

Classroom. They loved to broadcast their screens to each other. They felt it was interesting and helpful for them. But they were worried that their screens would be supervised by the teacher and they did not dare surf on the Net. If the teacher found that a student was surfing on the Net, she could lock his or her screen. They also liked taking tests on Moodle. It saved the teacher and students' time because they did not have to correct the test papers. The students could obtain their scores and corrections immediately. The teacher could review and discuss the mistakes the students made according to the statistics and the analysis of the test provided by Moodle. The students thought that it was very efficient, convenient and helpful for them to learn English.



6.1 Summary of the Findings

6.1.1 The Gain of the Two Groups' Vocabulary Learning

There was no significant difference between the two groups in multiple-choice questions of the post-test. But, the mean of the experimental group was higher than that of the control group by 4.45. There was also no significant difference between the two groups in cloze questions of the post-test. But the mean of the experimental group was higher than that of the control group by 8.57. It seemed that the experimental group had a greater learning response than the control group because of Tablet PCs.

In multiple-choice questions, the experimental group had a significant improvement in the post-test (0.015). It reached 95% level of probability. But the control group did not have a significant improvement in the post-test (0.240). In cloze questions, the experimental group had a significant improvement in the post-test (0.000). It even reached 99% level of probability. Although the control group also had a significant improvement in the post-test (0.007), it only reached 95% level of probability. It seemed that the experimental group learned more than the control

group because of Tablet PCs.

6.1.2 The Perceptions of the Experimental Group

In the questionnaire, most of the students in the experimental group were satisfied with the functions of Tablet PCs. The wireless Network and the stylus helped them a lot. They felt at ease with surfing on the Net and moving around everywhere, even out of the classroom with wireless Network. They were interested in the magic pen of a Tablet PC, the stylus. Writing English words and sentences with a Tablet PC focused them on the English words and sentences. Most of them indicated that a Tablet PC motivated them to learn English. And they also expressed that a Tablet PC was helpful in English learning. But they also encountered some problems when they used a Tablet PC. They thought that it was inconvenient to log in to websites outside of the school. They mentioned that it was not easy to write words on the screen with the stylus. They suggested that other aspects such as reading practice, writing practice and grammar teaching etc. were also suitable for teachers.

In the open-ended questions, most students in the experimental group thought that a Tablet PC was suitable for English vocabulary teaching this semester. They mentioned how this teaching method was good for the environment protection by not

wasting a lot of paper. They gave some suggestions about the future use of Tablet PCs. They expected the teacher to make better lesson plans and design more activities as well as games for her English teaching with Tablet PCs in the future.

In the interview, students mentioned many advantages and disadvantages of Tablet PCs. They mentioned that the convenience of the convertible screen, the wireless Network and the magic stylus, but they also complained about the problems of the battery, the wireless Network and the stylus. They thought that learning English was more interesting with Tablet PCs. They affirmed that English classes became more fun and active with Tablet PCs. They enjoyed cooperating with their classmates, over Tablet PCs. They reported that a Tablet PC was helpful in learning English. They agreed that the stylus of a Tablet PC helped them to memorize English words and sentences. They anticipated using Tablet PCs in their English classes in the future.

They also gave some feedback about the software program, Visual Classroom and the platform, Moodle. They indicated that they learned a lot by sharing screens with others through Visual Classroom and a Tablet PC. They could correct their mistakes immediately by knowing the scores and answers provided by Moodle.

6.2 Pedagogical Implications

According to the results of this research, a Tablet PC motivated and helped students to learn English. It is worth continuing to use Tablet PCs for English teaching for teachers. In English vocabulary teaching, teachers can make more creative plans and design more activities to teach vocabulary. They can also apply suitable software programs to teaching vocabulary.

Besides vocabulary teaching, it would be also great to use Tablet PCs in reading practice, writing practice, grammar teaching, listening practice, dialogue and reading teaching (text teaching), and speaking practice etc. In reading practice, a teacher can assign some electronic books for students to read and share some great articles with students. In grammar teaching, unscrambling words and making sentences are good activities for students to practice grammar. In listening exercises, a teacher can add voice, sound and even segments from movies to his or her teaching materials. For dialogue and reading teaching (text teaching), showing the film about a dialogue or reading, sharing a teacher's revised dialogue and reading with students, asking students questions, and encouraging students to write a summary of a dialogue and reading are all great methods to learn text in textbook with Tablet PCs. During speaking practice, it is interesting and creative to ask students to record their voice reading and answering questions. Then they can listen to their own English speaking

later as well as correct their own pronunciation, and the teacher can then score them.

Teachers can also use other technological equipment such as Interactive Whiteboards and The Educlick System. Teachers using Interactive Whiteboards as a blackboard can show students electronic teaching materials such as PowerPoint or Word files. They can also broadcast different educational websites for students on the Whiteboard. Teachers can write words or memorandums on the screen and then save them so that they can be used again later. Teachers can also use The Educlick System for English teaching where teachers design questions. And then students answer the questions with clickers. Teachers can obtain the student results and review as well as discuss the questions according to the statistical data.

Teachers have to be familiar with technological equipments such as a Tablet PC, The Educlick System and Interactive Whiteboard etc. before using them. They have to overcome problems with technological equipments when using them. Schools should provide teachers with equipment and technical support.

6.3 Limitations of the Thesis

Although there was a great effort of applying Tablet PCs to English vocabulary teaching and learning in Taiwan junior high school in this study, there were still four limitations in this study.

The duration of the research was not long enough. The students in the experimental group used a Tablet PC to learn vocabulary for only twelve sessions (about two months). They spent three sessions learning vocabulary of each lesson. Totally they learned English words from only four lessons. The teacher was hurried to finish the vocabulary of each lesson.

The sample of participants was not large enough, either. There were only thirty-two students in the experimental group and there were only thirty-one students in the control group.

This research focused on junior high school students' English vocabulary learning. Junior high school students were very interested in Tablet PCs, so Tablet PCs were able to motivate and help them to learn English vocabulary. We do not know yet if Tablet PCs will also work on students of other levels in English vocabulary learning.

The study showed that a Tablet PC motivated and helped students with English vocabulary learning. Studies need to examine if a Tablet PC will have the same effect on other aspects of English learning.

6.4 Suggestions for Future Research

First, if the duration of future research is longer such as one semester or one school year, the effect will be more obvious.

Second, if there are more participants possible a couple of hundreds students in each group, the results will be more objective.

Third, we need more research which focus on other levels such as elementary school, senior high school or college etc. In that way we can know if a Tablet PC has the same effect on English vocabulary learning of other levels.

Fourth, we need more studies which cover other English skills such as listening, speaking, reading, writing, grammar, and oral dialogue as well as text reading etc. That way offers a better understanding of how a Tablet PC meets and fulfills the needs of modern day students.

REFERENCES

- Chen, H.J. (2004). Mobile Learning (行動學習科技與英語教學之結合). English Department, National Taiwan Normal University, Taiwan. Retrieved July 31, 2007, from <http://llrc.eng.ntnu.edu.tw>
- Chinnery, G.M. (2006). Emerging Technologies Going to the MALL: Mobile Assisted Language Learning. *Language Learning and Technology*, 10(1), 9-16.
- Chou, C.C. (2004). Digital Classroom Environment for Hearing Impaired Students Communication and Scaffolding Aids. Unpublished Master Thesis. Department of Computer Science and Engineering, Yuan Ze University, Taiwan.
- Corlett, D., Sharples, M., Bull, S. & Chan, T. (2005). Evaluation of a Mobile Learning Organiser for University Students. *Journal of Computer Assisted Learning*, 21, 162-170.
- Facer, K., Joiner, R., Stanton, D., Reid, J., Hull, R. & Kirk, D. (2004). *Savannah: Mobile Gaming and Learning?* 20, 399-409.
- Horng, C.F. (2004). The Usability Evaluation of Mobile E-learning Tool – Taking Cerebral Palsied Children as an Example. Unpublished Master Thesis. Department of Industrial Design, Chang Gung University, Taiwan.
- Hsin, P.Y. (2006). Fostering Children's Spatial Positioning Ability in a Multimedia Game-based Learning Environment. Unpublished Master Thesis. Graduate

- Institute of Information and Computer Education, National Taiwan Normal University, Taiwan.
- Hsu, S.H. (2005). Personalized Intelligent M-learning System for Supporting Effective English Reading Ability. Unpublished Master Thesis. Graduate Institute of Learning Technology, National Hualien Teachers College, Taiwan.
- Huang, C.C. (2003). A Research on The Design and Application of Wireless Formative Assessment Software for the Classroom. Unpublished Master Thesis. Graduate Institute of Information and Computer Education, National Taiwan Normal University, Taiwan.
- Klopfer, E., Yoon, S. & Rivas, L. (2004). Comparative Analysis of Palm and Wearable Computers for Participatory Simulations. *Journal of Computer Assisted Learning*, 20, 347-359.
- Lan, Y.J., Sung, Y.T. & Chang K.E. (2007). A Mobile-device-supported Peer-assisted Learning System for Collaborative Early EFL Reading. *Language Learning & Technology*, 11(3), 130-151.
- Lee, H.L. (2004). An Action Research of the Instructional Design for Implementating Mobile Project-based Learning into Elementary School Science Education. Unpublished Master Thesis. Department of Educational Technology, Tamkang University, Taiwan.

- Lim, K.Y. T. & Wang, J. Y. Z. (2005). Collaborative Handheld Gaming in Education. *Educational Media International*, 42(4), 351-359.
- Lin, C.P., Liu, K.P. & Niramitranon, J. (2008). Tablet PCs to Support Collaborative Learning: An Empirical Study of English Vocabulary Learning. Unpublished. Graduate School of E-learning Technology, National Hsinchu University of Education, Taiwan. Learning Sciences Research Institute (LSRI), University of Nottingham, UK.
- Lin, Y.C. (2007). An Integration and Application of In-class Collaborative Learning Activity by Using Tablet PC. Unpublished Master Thesis. Graduate Institute of E-learning Technology, National Hsinchu University of Education, Taiwan.
- Liu, M., Moore, Z., Graham, L., & Lee, S. (2003). A Look at the Research on Computer-based Technology Use in Second Language Learning: A Review of the Literature from 1990-2000. *Journal of Research on Technology in Education*, 34(3), 250-273.
- McGuire, L. (2005). Assessment Using New Technology. *Innovations in Education and Teaching International*, 42(3), 265-276.
- McKenney, R. R. (2004). The Next Level of Distributed Learning: The Introduction of the Personal Digital Assistant. *The Journal of Oncology Management*, 18-25.
- Mock, K. (2004). Teaching with Tablet PC's. *The Consortium for Computing*

Sciences in Colleges.

- Saville-Troike, M. (1984). What really matters in second language learning for academic achievement? *TESOL Quarterly*, 18(2), 199-220.
- Stockwell, G. (2007). Vocabulary on the Move: Investigating an Intelligent Mobile Phone-based Vocabulary Tutor. *Computer Assisted Language Learning*, 20(4), 365-383.
- Thornton, P. & Houser, C. (2005). Using Mobile Phones in English Education in Japan. *Journal of Computer Assisted Learning*, 21, 217-228.
- Tozcu, A. & Coady, J. (2004). Successful Learning of Frequent Vocabulary through CALL also Benefits Reading Comprehension and Speed. *Computer Assisted Language Learning*, 17(5), 473-495.
- Wikipedia (2007). Willis, C.L. & Miertschin, S.L. (2004). Tablet PC's as Instructional Tools or the Pen is Mightier than the Board! Conference on Information Technology Education Archive. *Proceedings of the 5th Conference on Information Technology Education*, 153-159.
- Wu, H. Y., (2003). On the Design of IRT-based CAT for Mobile Learning. Unpublished Master Thesis. Department of communications Engineering, National Chung Cheng University, Taiwan.
- Zapata, G. & Sagarra, N. (2007). CALL on Hold: The Delayed Benefits of an Online

Workbook on L2 Vocabulary Learning. *Computer Assisted Language Learning*,

20(2), 153-171.

Appendix A

English Book One Lesson Three Worksheet of Vocabulary by Daphne

Class:

No:

Name:

Nouns(名詞)

1. eraser(s) 橡皮擦, 板擦

Ex: I write a wrong word, so I need(需要) *an* _____ to correct(改正) it.

My teacher asks(要求) us to use *an* _____ to erase(擦掉) the words on the blackboard(黑板).

★ erase + r = eraser

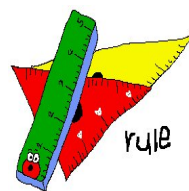


2. ruler(s) 尺, 統治者

Ex: I use a _____ to draw(畫) a line.

He is a great _____ of the country(國家).

★ rule + r = ruler



3. test(s) 測驗, 考試

Ex: We have a _____ in our English class this afternoon.

★ test(測驗), quiz(小考), exam(大考)

★ have a test(有一個考試), take a test(參加考試),
pass a test(通過考試), fail a test(考試不及格)



4. letter(s) 信, 字母

Ex: I get a _____ from my parents.

There are twenty-six _____ in the English alphabet

★ write a letter(寫信), send a letter(寄信), get a letter(收信)

★ letter(字母, 強調個體), alphabet(字母, 強調全體)

5. map(s) 地圖

Ex: You can find(找到) Taiwan in a _____ of the world(世界).

★ read a map(看地圖)

6. clock(s) 時鐘

Ex: There is a _____ on the wall(牆).

★ clock(時鐘), watch(手錶)



7. watch(es) 手錶, 觀賞(動詞)

Ex: I wear(穿, 戴) a _____ on my hand.
I like to _____ TV at home every night.
★ watch a movie on TV, see a movie in the theater

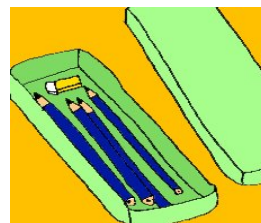
8. magic 魔術

Ex: I love to play some _____ for my family.
★ magician (魔術師)

△ 複合名詞

9. classroom(s) 教室

Ex: We clean our _____ every day.
★ class + room = classroom
★ classmate(同班同學), class leader(班長)

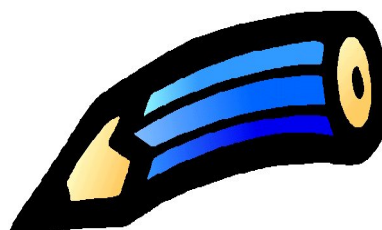


10. pencil box(es) 鉛筆盒

Ex: I put my pens, pencils and eraser in
my _____.
★ pencil(鉛筆), pencil case(鉛筆盒)

11. book bag(s) 書包

Ex: I put my books and notebooks in
my _____.
★ school bag 書包



12. notebook(s) 筆記本

Ex: I take a note(做筆記) with my _____.
★ note + book = notebook

13. comic book(s) 漫畫書

Ex: I love to read _____ on the weekend
(週末).
★ comics 漫畫

14. computer game(s) 電腦遊戲

Ex: I love to play _____ after
school.

Adjectives(形容詞)

15. these 這些

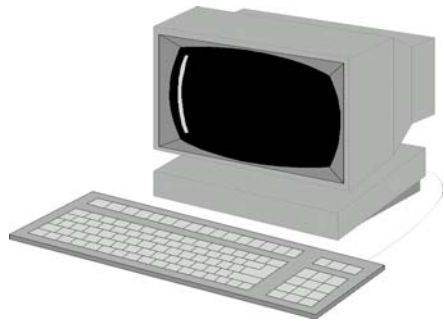
Ex: _____ comic books are very funny(有趣的).
_____ are my comic books.

★ ex: *This is my comic book.*
These are my comic books.

16. those 那些

Ex: _____ computer games are very interesting(有趣的).
_____ are my computer games.

★ ex: *That is my computer games.*
Those are my computer games.



Adverbs(副詞)

17. really 真的

Ex: We are _____ sorry.
We _____ like you.

A: Daphne is eighteen years old. B: _____?

★ ready(準備好的) ex: I am ready for the test.

18. now 現在

Ex: We are studying English _____.

★ before 以前



Preposition(介係詞)

19. for 給..., 爲了...

Ex: This present(禮物) is _____ you.
I am late _____ school.

20. from 從...來

Ex: I get a letter _____ my friends.
He works _____ morning to night.

Appendix B

PowerPoint of Making Sentences for L4 Vocabulary

Please make sentences
for the following words.

- 1. dining room:
- 2. kitchen:



Please make sentences
for the following words.

- 3. elephant
- 4. top



Please make sentences
for the following words.

- 5. big
- 6. where



Please make sentences
for the following words.

- 7. behind
- 8. maybe



Please make sentences
for the following words.

- 9. in front of:
- 10. over there:



Appendix C

English Book One Lesson Five Worksheet of Making Sentences by Daphne

Class:

No:

Name:



Please make sentences for the following words.

1. museum:
2. something
3. touch
4. listen
5. dirty
6. so
7. oops
8. all right
9. take a picture
10. see a movie



Appendix D

L6 Vocabulary Test

1 🐞

得分: 20

Hot Potatoes jmatch



選擇...



選擇...



選擇...



選擇...





選擇...



2 🎮

得分: 5

the opposite of fast

回答:

3 🎮

得分: 5

What you have to do with the place which is very dirty

回答:

4 🎮

得分: 5

the third day of a week

回答:

5 🎮

得分: 5

the meal you have to eat at noon

回答:

6 🎮

得分: 5

the second day of a week

回答:

7 🗑️

得分: 25

1. The fifth day of a week is T y.
2. I was born on May 1st, so this day is my b y.
3. I eat my b t at home with my family before I go to school.
4. The fourth day of a week is W y.
5. The last day of a week is S y.

8 🗑️

得分: 5

I alway _____ my homework at 6:00 after school.

Choose one answer.

- ☐ a. make
- ☐ b. do
- ☐ c. don't
- ☐ d. draw

9 🗑️

得分: 5

A: Yesterday is Friday. So what day is _____?

Choose one answer.

- ☐ a. day
- ☐ b. night
- ☐ c. today
- ☐ d. afternoon

10 🗑️

得分: 5

A: I clean the window and you wash the car, OK? B: _____.

Choose one answer.

- ☐ a. I see
- ☐ b. Look

- ☐ c. Oops
- ☐ d. Listen

11 🗑️

得分: 5

I already drink a lot of juice, but there is _____ a lot in the bottle.

Choose one answer.

- ☐ a. too
- ☐ b. still
- ☐ c. ready
- ☐ d. not

12 🗑️

得分: 5

Katty works from 7:00am to 7:00pm, so she is very _____.

Choose one answer.

- ☐ a. early
- ☐ b. late
- ☐ c. busy
- ☐ d. lucky

13 🗑️

得分: 5

Hot Potatoes jmix [I now. making a am cake]

回答:

Appendix E-1

Pre-test

Multiple-choice questions (單選題): Please choose the correct and suitable answer. Each question 2.5 points

1. Mickey: I get 90 on my math test. Mimi: _____? You always get only 60 on your math tests.
(A. Ready B. Really C. Also D. Too)
2. I want to draw a line(畫線), so I need a _____.
(A. book bag B. notebook C. letter D. ruler)
3. These are my books and _____ are your books.
(A. that B. those C. this D. it)
4. Miss Fok: Why are you late _____ school? Kelvin: I woke up at 7:30.
(A. from B. for C. at D. in)
5. Bill: Where do you come _____? David: I come _____ America(美國).
(A. on B. in C. for D. from)
6. Betty: We are lost(走失) in this forest(森林). Lillian: Let's look at the _____ and find out the exit(出路).
(A. map B. mat C. box D. test)
7. A: What time is it? B: Let's look at the _____ on the wall(牆壁).
(A. watch B. clock C. map D. magic)
8. The tiger is hiding(躲) _____ the tree. No wonder nobody(沒有人) sees it.
(A. beside B. behind C. next to D. in front of)
9. Sasha: I didn't do well on my Chinese(國文) test.
Sky: _____ you have to study harder(更用功).
(A. Hello B. Bye C. Maybe D. Monday)
10. The sound(聲音) of a cat is _____.
(A. meow B. bark C. hey D. ring)
11. My family love to watch TV in the _____.
(A. kitchen B. bedroom C. living room D. park)
12. Sunny: Where is my ball? Candy: It is _____.
(A. nothing B. over there C. right D. now)
13. My school is _____ my house, so I just have to take(花費) 10 minutes to go to school.
(A. near B. far C. over D. on)

14. A _____ is a ferocious(兇猛的) animal(動物) and it eats a lot of weak(弱小的) animal.
(A. tiger B. bird C. elephant D. monkey)
15. Don't _____ the pictures on the wall. It is very expensive(昂貴的)
(A. eat B. shout C. look D. touch)
16. Grandpa: Tom, close the window, please. Tom: _____ .
(A. Thank you B. You are welcome C. No way D. All right)
17. Ben and Ken _____ at school, so they both get hurt(受傷).
(A. play B. fight C. eat D. sleep)
18. My family go on a picnic(野餐) and _____ a lot of _____.
(A. make, cakes B. make, wishes C. take, pictures D. take, bath)
19. A: You are very angry(生氣的) with me. Did I say or do _____ wrong?
(A. something B. nothing C. idea D. rule)
20. He is a great painter(畫家). He can _____ very well.
(A. read B. draw C. play D. sing)
21. I like Harry Potter(哈利波特). Let's go to _____ in the theater.
(A. sing a song B. fly a kite C. see the movie D. play a game)
22. I am very _____, so I need to take a bath.
(A. noisy B. quiet C. dirty D. clean)
23. Please _____ the traffic rules(交通規則) on the street.
(A. play B. sing C. follow D. break)
24. _____ is Monday, so yesterday(昨天) was Sunday.
(A. Tomorrow B. Today C. Now D. This)
25. A: Sorry, I am late. I was sick this morning. B: Oh, _____. That's OK.
(A. I see. B. happy C. no way D. you are wrong)
26. I have to _____ my room because it is very dirty and messy(凌亂的).
(A. wash B. keep C. clear D. clean)
27. I play basketball at school and I sweat(流汗) a lot. Now I have to _____.
(A. wash my car B. take a bath C. make a wish D. cut a cake)
28. You look so tired(疲憊的). _____ with you?
(A. What is it B. What is wrong C. How are you D. How about you)
29. She is not a fast runner(很快的跑者), so she is a _____ runner.
(A. quick B. quiet C. slow D. snow)
30. The day after Monday is _____.
(A. Tuesday B. Friday C. Sunday D. Wednesday)
31. The day before Sunday is _____.

- (A. Friday B. Saturday C. Thursday D. Tuesday)
32. Her father is already(已經) 55 years old, but he is _____ very handsome(英俊的).
- (A. not B. still C. also D. ready)
33. I take a note(做筆記) in my _____.
- (A. book bag B. notebook C. map D. test)
34. I wear(戴) a _____ on my hand when I take(參加) a test, so I can controlled(控制) the time well.
- (A. watch B. clock C. map D. letter)
35. There are many fish in the _____.
- (A. bed B. tree C. river D. bus)
36. I am very hungry(飢餓的), so I want to eat some _____.
- (A. lion B. door C. sofa D. cookie)
37. When I go into the convenient store(便利商店), the _____ asks me what I want.
- (A. place B. clerk C. idea D. father)
38. The baby is sleeping. Please don't _____ in the room, or you will wake him up(吵醒他)
- (A. read B. sleep C. shout D. smile)
39. Daphne is very _____. She even doesn't have time to sleep.
- (A. dirty B. clean C. busy D. easy)
40. I like to eat my _____ with my classmates at 12:00 at school.
- (A. breakfast B. lunch C. dinner D. night snack)

Appendix E-2

Pre-test

Class:

No:

Name:

文意字彙 Please spell the words according to the following sentences
and write them down in the blanks. Each question is 5 points.

1. When you write a wrong word, you need an e_____r to correct(改正) it.
2. C_____c books are fun(有趣), so I love to read them.
3. He is sitting at his desk and playing c_____r games (遊戲).
4. She can change(變) a pen into a rabbit(兔子), so she can play m_____c.
5. I put all my pens and ruler(尺) in my p_____l box.
6. The dog is in back of(在...後面) the cat, so the cat is in f_____t of the dog.
7. My family eat dinner in our d_____g room together(一起) every evening.
8. Mom makes lunch in the k_____n.
9. An e_____t is a big animal(動物) and it has a long nose(鼻子).
10. A m_____y loves to climb(爬) trees and eat bananas(香蕉).
11. Don't run and shout(喊叫) in a m_____m.
12. Vivian is very b_____l, so many boys love her.
13. Daphne does not talk too much(不說太多話), so she is very q_____t.
14. I want to eat something(一些東西) because(因為) I am very h_____y.
15. Irene: Happy b_____y! This gift(禮物) is for you.
Angela: Thank you! How do you know I was born(出生在) on December
(十二月) 27th.
- 16 I wake up(起床) e_____y, so I am never(永不) late.
17. I sometimes(有時候) eat my b_____t at school in the morning.
18. The day after Wednesday(星期三) is T_____y.
19. L_____n! Mary is playing the piano(彈鋼琴) in the living room(客廳).
20. The day before Saturday(星期六) is F_____y.

Appendix F-1

Post-test

Multiple-choice questions (單選題): Please choose the correct and suitable answer. Each question 2.5 points.

1. Don't _____ the pictures on the wall. It is very expensive(昂貴的)
(A. look B. touch C. shout D. eat)
2. Bill: Where do you come _____? David: I come _____ America(美國).
(A. in B. for C. from D. on)
3. The day after Monday is _____.
(A. Sunday B. Friday C. Wednesday D. Tuesday)
4. When I go into the convenient store(便利商店), the _____ asks me what I want.
(A. clerk B. father C. idea D. place)
5. Mickey: I get 90 on my math test. Mimi: _____? You always get only 60 on your math tests.
(A. Too B. Ready C. Also D. Really)
6. Betty: We are lost(走失) in this forest(森林). Lillian: Let's look at the _____ and find out the exit(出路).
(A. mat B. map C. test D. box)
7. I want to draw a line(畫線), so I need a _____.
(A. letter B. notebook C. ruler D. book bag)
8. The tiger is hiding(躲) _____ the tree. No wonder nobody(沒有人) sees it.
(A. behind B. beside C. in front of D. next to)
9. These are my books and _____ are your books.
(A. this B. that C. those D. it)
10. The sound(聲音) of a cat is _____.
(A. bark B. meow C. ring D. hey)
11. A: What time is it? B: Let's look at the _____ on the wall(牆壁).
(A. watch B. map C. clock D. magic)
12. My family love to watch TV in the _____.
(A. bedroom B. living room C. park D. kitchen)
13. Please _____ the traffic rules(交通規則) on the street.
(A. follow B. play C. sing D. break)
14. A _____ is a ferocious(兇猛的) animal(動物) and it eats a lot of weak(弱小的) animals.

- (A. elephant B. monkey C. tiger D. bird)
15. Miss Fok: Why are you late _____ school? Kelvin: I woke up at 7:30.
(A. at B. from C. for D. in)
16. Daphne is very _____. She even doesn't have time to sleep.
(A. clean B. dirty C. easy D. busy)
17. Grandpa: Tom, close the window, please. Tom: _____.
(A. You are welcome B. All right C. Thank you D. No way)
18. I like to eat my _____ with my classmates at 12:00 at school.
(A. dinner B. lunch C. night snack D. breakfast)
19. Ben and Ken _____ at school, so they both get hurt(受傷).
(A. fight B. sleep C. eat D. play)
20. A: You are very angry(生氣的) with me. Did I say or do _____ wrong?
(A. nothing B. something C. rule D. idea)
21. Sunny: Where is my ball? Candy: It is _____.
(A. now B. right C. nothing D. over there)
22. He is a great painter(畫家). He can _____ very well.
(A. draw B. play C. sing D. read)
23. Sasha: I didn't do well on my Chinese(國文) test.
Sky: _____ you have to study harder(更用功).
(A. Monday B. Maybe C. Hello D. Bye)
24. I like Harry Potter(哈利波特). Let's go to _____ in the theater.
(A. fly a kite B. play a game C. sing a song D. see the movie)
25. _____ is Monday, so yesterday(昨天) was Sunday.
(A. Now B. This C. Today D. Tomorrow)
26. I wear(戴) a _____ on my hand when I take(參加) a test, so I can control
(控制) the time well.
(A. clock B. watch C. letter D. map)
27. A: Sorry, I am late. I was sick this morning. B: Oh, _____. That's
OK.
(A. no way B. you are wrong C. I see D. happy)
28. My school is _____ my house, so I just have to take(花費) 10 minutes to
go to school.
(A. far B. near C. on D. over)
29. I have to _____ my room because it is very dirty and messy(凌亂的).
(A. clear B. clean C. wash D. keep)
30. My family go on a picnic(野餐) and _____ a lot of _____.
(A. make, wishes B. take, bath C. make, cakes D. take, pictures)
31. She is not a fast runner(很快的跑者), so she is a _____ runner.

- (A. quiet B. snow C. quick D. slow)
32. The day before Sunday is _____.
(A. Saturday B. Thursday C. Friday D. Tuesday)
33. I play basketball at school and I sweat(流汗) a lot. Now I have to _____.
(A. make a wish B. cut a cake C. wash my car D. take a bath)
34. You look so tired(疲憊的). _____ with you?
(A. How are you B. How about you C. What is wrong D. What is it)
35. I take a note(做筆記) in my _____.
(A. notebook B. map C. test D. book bag)
36. There are many fish in the _____.
(A. bus B. river C. tree D. bed)
37. Her father is already(已經) 55 years old, but he is _____ very handsome(英俊的).
(A. ready B. not C. also D. still)
38. I am very hungry(飢餓的), so I want to eat some _____.
(A. door B. lion C. cookie D. sofa)
39. The baby is sleeping. Please don't _____ in the room, or you will wake him up(吵醒他)
(A. shout B. smile C. sleep D. read)
40. I am very _____, so I need to take a bath.
(A. quiet B. noisy C. clean D. dirty)

Appendix F-2

Post-test

Class:

No:

Name:

文意字彙 Please spell the words according to the following sentences and write them down in the blanks. Each question is 5 points.

1. I want to eat something(一些東西) because(因為) I am very h_____y.
- 2 I wake up(起床) e_____y, so I am never(永不) late.
3. C_____c books are fun(有趣), so I love to read them.
4. I put all my pens and ruler(尺) in my p_____l box.
5. Vivian is very b_____l, so many boys love her.
6. I sometimes(有時候) eat my b_____t at school in the morning.
7. My family eat dinner in our d_____g room together(一起) every evening.
8. The day after Wednesday(星期三) is T_____y.
9. Mom makes lunch in the k_____n.
10. When you write a wrong word, you need an e_____r to correct(改正) it.
11. An e_____t is a big animal(動物) and it has a long nose(鼻子).
12. The day before Saturday(星期六) is F_____y.
13. A m_____y loves to climb(爬) trees and eat bananas(香蕉).
14. She can change(變) a pen into a rabbit(兔子), so she can play m_____c.
15. Don't run and shout(喊叫) in a m_____m.
16. He is sitting at his desk and playing c_____r games (遊戲).
17. Daphne does not talk too much(不說太多話), so she is very q_____t.
18. Irene: Happy b_____y! This gift(禮物) is for you.
Angela: Thank you! How do you know I was born(出生在) on December (十二月) 27th.
19. L_____n! Mary is playing the piano(彈鋼琴) in the living room(客廳).
20. The dog is in back of(在...後面) the cat, so the cat is in f_____t of the dog.

Appendix G

問 卷

班級：_____ 姓名：_____ 性別： ☐ 男 ☐ 女

1. 請對下面各項敘述表示意見，並圈選你的同意度，其中
「1」 代表極不同意 「2」 代表不太同意 「3」 代表沒意見
「4」 代表有點同意 「5」 代表非常同意

(A)對 Tablet PC(平板電腦)的滿意度

a. 平板電腦很輕，方便攜帶。

1 2 3 4 5

b. 平板電腦的螢幕夠大，方便閱讀。

1 2 3 4 5

c. 平板電腦的螢幕可 360 度轉向，很有趣也很方便。

1 2 3 4 5

d. 使用平板電腦作無線上網很方便。

1 2 3 4 5

e. 平板電腦的手寫筆很好用。

1 2 3 4 5

(B)Tablet PC(平板電腦)引起學生學習英語的動機

a. 使用平板電腦的手寫筆來書寫英文單字及句子，我對該英文單字及句子印象非常深刻。

1 2 3 4 5

b. 平板電腦能引起我學習英語的興趣。

1 2 3 4 5

c. 平板電腦對英語學習有幫助。

1 2 3 4 5

(C)使用 Tablet PC(平板電腦)之困難。

a. 我在使用平板電腦時，遇到很多困難。

1 2 3 4 5

2. 請就下面各項敘述，圈選符合你的狀況，可複選。

(A)對 Tablet PC(平板電腦)的滿意度

a. 你覺得平板電腦的無線網路好用嗎？

1. 好用 2. 不好用

若好用，其原因是什麼？

1. 不必接線便可以上網。 2. 連線很容易。
3. 連線後不容易斷掉。 4. 欲連至校外網站時，需取得認證，
但也十分方便。
5. 可以到處走動上網，甚至可到戶外。 6. 其他：

b. 你喜歡使用平板電腦手寫筆嗎？

1. 喜歡 2. 不喜歡

若喜歡，其原因是什麼？

1. 可選擇不同種類的筆書寫。 2. 可選擇不同顏色書寫。
3. 寫錯可用橡皮擦擦掉。 4. 可把自己的字跡存起來。
5. 寫完可把字轉換成手打字。 6. 其他：

(B)使用 Tablet PC(平板電腦)之困難。

a. 平板電腦的無線網路不好用的原因是什麼？

1. 不容易連上線。 2. 連線後容易斷掉。
3. 欲連至校外網站時，需取得認證，非常麻煩。 4. 其他：

b. 平板電腦手寫筆不好用的原因是什麼？

1. 不好書寫在螢幕上。 2. 寫錯字，不容易擦掉。
3. 寫出來的字很醜。 4. 其他：

(C)對於平板電腦使用在未來英語教學上之建議。

a. 未來若再使用平板電腦於英語教學上，你覺得可使用於哪些方面？

1. 聽力練習。 2. 說話練習。
3. 閱讀練習：可上網閱讀電子書或文章等。 4. 書寫練習：書寫單字、片語、
句子，作造句、作文等練習。
5. 單字教學。 6. 文法教學。
7. 課文教學。 8. 授課後之綜合測驗。
9. 其他：_____

4. 請根據下列敘述，做精簡回答。
- a. 你覺得此處運用平板電腦於英語單字教學上，用得恰當嗎？請寫出你的想法及為什麼。
- b. 對於未來運用平板電腦於英語教學上，你有什麼建議？

Thank you very much!

Appendix H

Questions of Interview

1. What are the advantages and disadvantages of Tablet PCs?
2. Do you think learning English is more interesting with Tablet PCs?
3. Do you think a Tablet PC is helpful in learning English?