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台灣地區國小教師資訊融入英語教學現況調查研究

A Survey Study on English Teachers' Use of Technology in  
Elementary Schools in Taiwan

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## 中文摘要

本調查研究旨在探討台灣地區國小教師資訊融入英語教學的頻率與模式，以及他們感知資訊融入英語教學對於教師教學、學生學習與課程設計方面之效能提升，並且進一步探究影響國小英語教師資訊融入課程決策與做法的主要因素。在量化研究部份，來自全台各地共 1,550 名國小英語教師參與問卷調查，問卷主要希望得知他們使用資訊設備的頻率，使用的資訊設備器材種類、以及其所感知資訊融入教學之效能。關於質性研究部份，來自台灣各地區共 15 名國小英語教師接受個別訪談，訪談旨在收集更多關於他們英語課程中使用資訊設備資源的詳細資料。量化數據以描述統計呈現，而質性研究的訪談則經由錄音、謄寫逐字稿、編碼等程序後加以分析詮釋。量化及質性研究結果均顯示大部分的國小英語教師至少每周使用資訊設備一次以上，而相當高比例的教師認為不論在一般班級教室或在專科英文教室中，電腦和投影機皆屬基本必要資訊設備。其次，大多數的問卷作答者與受訪教師皆同意資訊融入英語教學對於教師教學、學生學習與課程設計均有助於提升效能。最後，影響國小英語教師使用資訊設備的主因之一是他們能否有權使用專供英語課程且配備有電腦與投影機的英語專科教室；此外，國小英語教師所感知資訊融入教學之效能亦會形成教師將資訊科技融入教學之喜好；其他諸如政府教育主管機關補助推動之專案計畫、學校行政體系提供之經費與心理層面的支持、教職同仁之間的團隊精神與團隊合作、以及學校中資訊專家的指導與專業協助，均被視為鼓勵教師使用資訊設備教學之影響因素。

關鍵字：資訊科技使用、資訊科技融入教學、國小英語教師、以英語為外語之教學

## ABSTRACT

This survey study was intended to investigate into the frequency and patterns of IT use among elementary school teachers in their EFL classrooms and their perceived effectiveness of IT integration into their instruction on teachers' teaching, on students' learning and on the curriculum design. It was also aimed to explore further into the major factors affecting their decision making and practices in IT integration into curriculum. For the quantitative research, 1,550 EFL teachers in elementary schools from all over Taiwan were recruited for responding to the questionnaire aimed to find out the participants' frequency of IT use in English instruction and the IT facility they used as well as their perceived effectiveness of IT integration into instruction. As for the qualitative research, 15 EFL teachers in elementary schools from different parts of Taiwan were interviewed individually in order to collect more detailed and realistic data about their actual use of IT resources in their English instruction. The quantitative data was analyzed with descriptive statistics while the interviews were recorded, transcribed, coded, and further analyzed and interpreted. The results of both the questionnaire survey and interview sessions indicated that that the majority of participants used IT resources at least once a week. What's more, a large proportion of them considered computer and projector basic and essential IT facilities whether in an ordinary homeroom classroom or in a special classroom. Next, most of the respondents and interviewees agreed on its beneficial effect whether on teachers' teaching, on students' learning, or on curriculum design. Finally, one major factor influencing EFL teachers' IT use was whether they had ready access to an English classroom exclusively for English courses, which was equipped with a computer and projector. In addition, these teachers' perceived effectiveness also led to teachers' preference in integrating IT into English instruction. Other factors such as promotion projects sponsored by government education authorities, financial and mental support from school administration, great team spirits and teamwork among teaching staff, guidance and professional support from IT expertise in school, were all regarded as influential factors which would encourage teachers to make use of IT in their instruction.

**Keywords:** IT use, technology integration into instruction, English teachers in elementary schools, EFL instruction

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# CHAPTER ONE

## INTRODUCTION

### 1.1 Background

Information technology has become an indispensable part of modern life. In the information age, to cultivate citizens who are equipped with information knowledge and practical capability has become one of the focuses of educational development in many countries. In these countries, in fact, a number of related projects about IT education are serving as foundation stone for their country to step into the 21<sup>st</sup> century (Ministry of Education, 2003). Governments all around the world have already recognized the need to review traditional educational practices and incorporate new technologies with a consistent belief that information technology will increase the efficiency and quality of learning, which is of crucial importance in a learning society (Somekh and Davis, 1997). In the United States, school district reportedly spent increasingly more budget on technology equipment and the student-instructional computer ratio as well as the student-per-Internet-connected computer ratio dropped significantly (Education Week, 2005). In Singapore, two stages of Master Plan for Information Technology in Education were launched in 1997 and 2002. While the former expected all Singapore schools to acquire and integrate technology into their curriculum, the latter provided the schools with overall direction of how schools could create opportunities offered by Information technology for both teaching and learning (Hew & Brush, 2007). In Canada, information technology has become an important feature of Canadian education landscape. Across the country, there was on average one computer for every nine elementary students. A significant majority of Canadian schools were “online” with respect to internet connectivity. Nearly all schools, at all levels, were connected to the internet (Granger et al, 2002). In the U.K. information technology has been designated as a basic skill in their

National Curriculum as well as in National Vocational Qualifications. In England and Wales, there are national curriculum assessment standards for information technology while in Scotland information technology serves as an integral part of the 5-14 curriculum (Somekh and Davis, 1997).

To cope with the world trend in e-learning, education in Taiwan has also gone through revolutionary changes during the past two decades. Starting from the Infrastructure Plan of Information Education, and the TANet to Junior High and Elementary Schools initiated by the Ministry of Education in 1988 to the Project of Expansion of Domestic Demand and Consumption carried out by the Executive Yuan, almost all schools in these two levels have been equipped with computers and the Internet service (Liu, 2002). In Grade 1-9 Curriculum Guidelines in the early 2000s, with a view to cultivating students' computer literacy and enhancing their competence in e-learning, the Ministry of Education has listed use of information technology as part of the core competence of students. Furthermore, it has been made clear that information technology, instead of being taught as an independent subject, should be integrated into the teaching of all subjects (Ministry of education, 2003). What follows are continuous efforts from public as well as private sectors in an attempt to strengthen teachers' computer literacy and their ability to implement information technology in their teaching, including in-service training courses, seminars, workshops, teaching demonstrations, and the cultivation of seed schools and teachers, etc.

With the irresistible trend of globalization and internationalization in progress, English, similar to the Internet, has also been gaining increasing importance, whether in the field of international politics, cross-border trade, scientific research, broadcasting, academic conferencing, teenage culture or fashion (Chang, 2006). As the dominant language for information technology and the internet, which helps build up the interconnected relationship among people around the world, the significance of the

English language as an international language for people to communicate can no longer be denied (Liao, 2004). According to a survey made by the British council, there will be two billion people learning English. Half of world's population, which means about three billions of people, will be able to use English (Power, 2005). With the prevalence and dominance of English all over the world, the incorporation of English learning into the curriculum has aroused tremendous concern among policy makers, educators, students, and parents alike.

Meanwhile, recent research has also proved that technology offers language learners many benefits for the acquisition of English language skills (Warschauer, 2001). Network-based language teaching has also transformed into a new form of Computer Assisted Language Learning, which provides students with more opportunities to learn and to use the target language with a greater variety of authentic materials. In participating in the web-based learning activities such as group discussion or collaborative learning exchange, learners are given the chances to integrate the four language skills, a fundamental goal which is hard to achieve in traditional classrooms. With the communication goal in mind, learners become active participants in learning activities rather than passive recipients (Ting, 2007).

Under the influence of globalization and internationalization, information technology has been regarded as one of the core competences for modern global citizens. To better prepare the citizens with computer literacy to meet the challenges of the information age, the Ministry of Education has officially highlighted the importance of integrating information technology into curriculum in the Grade 1-9 Curriculum Guidelines and even made information technology education one of the six critical issues in the Guidelines. With similar advantages and superiority in terms of their prevalence and popularity all over the world, computer literacy education and English learning seems to make an ideal combination as a way to cultivate students with competitive

abilities. For some researchers, it is not easy to answer the question as to whether technology is a tool for language learning or the other way around (Warschauer, 2002). In other words, the more educators attempt to define the role of information technology in language teaching as well as the role of language teaching in the information technology society, the more the focus of academic research will be directed to how to promote more efficient and effective integration of information technology into English curriculum .

## **1.2 Motivation**

As a result of the vast budget and expenditure to equip schools with computers and information related technology at regional, national or even international level, student-to-computer ratio has been significantly improved and students' connectivity to the Internet has accordingly increased. However, the generous financial investment in large scale infrastructure does not guarantee a thorough change regarding the integration of technology in classrooms (Barron, Kemker, Harmes, and Kalaydjian, 2003). As Cuban (2001) has pointed out in *Oversold and Underused*, those who intend to reform school instruction through information technology hold the optimistic opinion that the increased availability of technology in classrooms will lead to successful integration of information technology into curriculum. According to the result of Cuban's research, not only do relatively few teachers actually apply information technology into their instruction, but there seems to be little change in their teaching pedagogy (Chang, Chu, and Shih, 2007). Not surprisingly, the aforementioned phenomenon can also be held true in large parts of the educational environment in Taiwan. Fortunately, there have been series of academic research devoted to a better understanding of the real situation concerning IT integration into curriculum. Some of the researchers conducted a survey of overall status quo in only a local city or county (Chang and Weng, 2006; Cheng, 2008; Yuan and Lin, 2008; Teng, 2004). Others focused on IT integration into separate core subjects (Shyu and Wang,

2004; Chen, 2005). Still others did pay special attention to the investigation of IT integration into English instructions but at junior high school or higher levels (Shyu, 2009; Chang et al, 2008; Hu, Yueh, & Chang, 2012). Finally, some of them even placed emphasis on studying stage of concern, collaborative learning and other related education theories in interaction with IT integration into curriculum (Huang, 2003; Huang 2007 ). Relatively fewer studies were aimed at a large scale survey of the present situation of elementary teachers' IT integration into English curriculum in Taiwan. Therefore, the study is intended to investigate the issue by conducting an island-wide survey so as to better understand the current situation in elementary schools in Taiwan in terms of teachers' real use of information technology related teaching resources in their instruction.

### **1.3 Purpose of the Study**

In order to form a general picture of how information technology are implemented in the curriculum of one of the most concerned core subjects, English, the present study attempts to carry on a large scale survey, in which the subjects are elementary school teachers all around Taiwan and the instruments include a questionnaire and interviews. With this survey study, the researcher intends to form a more realistic and complete description of the scenario in question. Most importantly, the study may generate pedagogical implications for the educational authorities concerned, schools, and educators as well as insights into future development in this field.

### **1.4 Research Questions**

In the present study, the following research questions will be addressed:

1. How often and how do elementary teachers use technology in their EFL classrooms?
2. For EFL teachers in elementary schools in Taiwan, what is their perceived effectiveness of IT integration into instruction on teachers' teaching, on students' learning and on the curriculum design?

3. For EFL teachers in elementary schools in Taiwan, what are some of the major factors affecting their decision making and practices in IT integration into instruction?

## **CHAPTER TWO**

### **LITERATURE REVIEW**

This chapter includes three major issues concerning IT integrating into EFL curriculum: general introduction to IT integration into subject instruction, a detailed description and analysis of IT integration into curriculum, and literature review on previous studies. In the first part, the researcher will provide a general introduction of technology use in core subject teaching. Next, through reviewing former studies and research, the researcher will make attempts to define the essence and meaning of IT integration into curriculum, or E-learning in a broader sense, give a clearer picture of the modes or patterns of how information technology can be applied in core subject curriculum and then present the problems and difficulty frequently mentioned or discussed in the field of IT integration. Finally the focus will be shifted to a more specific literature review on previous studies regarding IT integration into English instruction as well as research into contributing factors affecting teachers' IT use into curriculum.

#### **2.1 IT Integration into Core Curriculum**

The emergence and rapidly evolving nature of information technology has changed the human communication landscape by enabling new forms of discourse, authorship, and new ways to create and participate in communities (Kern, 2006). Along with language, writing, and print, information technology has been considered the most influential inventions in human communication, all of which have radically altered the way human beings lived, worked, learned, and produced. Compared with the other three human developments, the internet, with its incredibly rapid spread, has been bringing

about more revolutionary changes (Warschauer, 2001). With its global, irreversible advancement, information technology has become more than an optional tool for living (Warschauer, 2002), but rather an essential medium for individual and social development, literacy and language use, and will continue to transform human lives individually, socially, and economically (Azari & Pick, 2005). According to the researchers (Davis, Desforges, Jessel, Somekh, Taylor, & Vaughan, 1997), traditional classrooms in mass education systems are not an ideal learning environment for students, where teachers tend to fail to meet all students' demands for short of space and time. In their beliefs, with information technology, teachers' presentational and organizational roles in traditional classrooms have been changed. By providing an alternative source of knowledge and information, IT integration into curriculum can reduce students' dependence on the teachers, which allows the teachers more time and mental space for quality teaching and learning activities. To a greater extent, it may even shift the responsibility of learning from teachers, as presenters of ready-made materials, to students, as active learners and creative problem solvers. In conclusion, use of IT in classrooms does open up new learning opportunities in education. By means of information and communication technology, the present Information Society can eventually be transformed into a Learning Society (Davis, 1997).

## **2.2 Issues Concerning IT Integration into Curriculum**

### **2.2.1 Concepts and goals**

#### ***Concepts***

With the integration of information technology now being the mainstream trend in education, it is often simplified, narrowly or even mistakenly interpreted as teaching with computers. However, as one of the major arguments for researchers and scholars studying IT use into instruction, the use of information technology in teaching and

learning does not necessarily equal to IT integration into curriculum, which largely depends on how information technology is used to assist, support and enhance the quality of teaching and learning (Garrett, 2009). As a matter of fact, there have been a number of previous studies intended to define the essence of IT integration into curriculum. Some stressed the importance of total combination of IT and teaching by defining IT integration as integrating IT into syllabus, materials and teaching. That makes it an indispensable tool for teaching and learning, an essential part of daily classroom activities, and better yet, a method or a process for teachers and students to find solutions to a question (Chou, 1990; Hang, 1998; Wang, 2000; Weng, 2003). Others tended to put emphasis on its effective enhancement function and regard it as the use of information technology in teaching and learning activities to effectively enhance teachers' teaching outcomes and teaching efficacy as well as to promote students' interest in learning (Lin, 1999; Kuo, 2003). Still others highlighted the cultivation of problem solving capability while viewing technology as an important tool in the design of curriculum, intended to help students solve problems and thus have deeper understanding of the subject to ensure higher level of learning results (Jonassen, 1996; Sprangue and Dede, 1999).

### ***Goals***

In addition to the above overall description of IT integration into curriculum, there are also more detailed and refined definitions given to this term. While examining the American experiences and reflecting on Taiwan's own development regarding this field, Sung, Chang, & Hou (2005) divided the goal of IT integration into instruction into two levels: computer-supported instruction and computer-enhanced instruction. The former referred to IT serving as tools in supporting teachers in dealing with routine work at teaching, including preparation and presentation of teaching materials, conducting teaching activities, collecting assignment or keeping records. And the latter focused on the innovative nature of IT and its impact on teachers and students, which could be

evaluated through the teachers' positive adjustment in teaching methods, and, more importantly, students' increased interest and motivation in learning and eventually the better result of their learning achievement. The main difference lied in the fact that computer-supported instruction helped increase efficiency while computer-supported instruction facilitated to improve quality in teaching and learning. In Wang's (2000) observation, the goals of integrating information related technology into instruction fell into three categories. First, since computer science was no longer designated as an independent subject in the Grade 1-9 Curriculum Guidelines, IT integration into each core subject turned out to be the only channels for students to cultivate students' computer literacy. Second, listed as one of ten basic competences of junior high school graduates, another goal of IT integration should be developing students' capability to use information related technology. Third, the eventual goal was to both innovate teachers' teaching strategies and enhance the quality of instruction, which in turn would maximize students' learning effect. Last but not least, in Chang and Weng's (2006) study, they paid special attention to another two core concepts of IT integration: teaching pedagogy and learning achievement. According to them, it was the strategies to help present knowledge, to provide opportunities to practice, and to guide learners in learning that mattered, rather than the mere presentation information. Likewise, the ultimate goal did not point to the learning of pure information technology, but concentrated on the process and result of students' subject learning.

### ***Computer Assisted Instruction V.S. IT Integration.***

In order to help distinguish between such similar terms as Computer Assisted Instruction and IT integration, researchers (Wang ,2000; Chang, 2002; Kuo, 2003) pointed out the major differences between the two terms in their studies aimed at defining the essence of IT integration. Strictly speaking, CAI should be considered a part of IT integration. Unlike CAI, which was seen as the use of a set of specially designed software

to assist teachers' in teacher-centered teaching, IT integration referred to a thorough integration of IT into curriculum, which helped teachers engage students in student-centered learning activities, improve teaching effectiveness, motivate students' learning interest and enhance students' learning achievement. In other words, CAI offered a learning environment for students to learn with the computer while IT integration created opportunities for students to learn from the computer. More importantly, while CAI may only be treated as packaged software to help with teachers' knowledge presentation and students' learning practices, IT integration could not only facilitate students' knowledge construction but also cultivate their computer literacy and IT capability. To be more specific, CAI and IT integration basically played two distinctive roles in the process of teaching and learning. As for CAI, as one of the assisting media or tools for teaching and learning, it was often only used in part of the class hours by offering mechanic learning drills and practices. By contrast, in an IT integration instruction, information technology had to be constantly incorporated into syllabus and thus served as an indispensable tool, a method for teaching and learning during the students' knowledge exploration and construction process. Compared with CAI, which might be easier for teachers to carry out for the limited partial class hours it took, IT integration appeared to be more demanding for teachers since it required teachers' rearrangement and innovation in the whole curriculum for the subject. In the present study, the researcher attempts to investigate on elementary school English teachers' use of IT to enhance the quality of teaching effectiveness and learning achievement and therefore decide to target on IT integration.

### **2.2.2 Modes and levels of IT use**

#### ***Modes***

As the internet began to spread through common classrooms, traditional modes of education are under great challenges and destined to be changed and innovated, paving

the way for the emergence of IT integration into core subject curriculum. A substantial amount of research has been conducted to further explore and analyze the modes of how information technology can be applied in classrooms using a variety of discriminating factors. Both Lin (1999) and Chang (1999) believe that ways of integrating IT into curriculum can be classified into three distinctive modes based on the teaching and learning activities. In Lin's classification, in an IT integrated class, students could search for needed information from available resources so as to make an IT presentation of the assigned topic, work with their peers in order to surf the Internet, searching for answers to the series of more complicated and sophisticated questions designed by their teachers, or work with members from other groups either as a new group or as individuals. As for Chang's theory, the activities in IT integrated courses, teachers should search for all kinds of proper and useful information and carefully integrate it into their lesson plans. They also encourage students to make multimedia presentation in a meaningful way, and build a virtual learning environment for students to do simulation exercises while facilitating students' comprehension by visually presenting abstract ideas or concepts. In addition to describing IT integration in terms of the activities to be conducted in class, Weng (2003) went on to put them into ten different categories, including record keeping, teacher-parent communication, teacher-student interaction, making teaching outlines, outside materials, students' self-learning materials, and most importantly, creating a virtual classroom for students to do on-line learning activities, assignment, and assessment. With the large variety of activities, Weng believed that teachers would have better management of students data and teaching materials, students could engage themselves in problem solving process and on-line discussion, and the communication and interaction among teachers, parents and students would be significantly promoted.

Similar to Weng's categorization, Liu (2002) decided to analyze IT application modes according to the teaching process with specific teaching and learning procedures

and examples of the software being employed. As stated by Liu, in a typical IT integrated class, teachers start with preparation before class and presentation in class, use IT tools to facilitate students' learning, and then set up virtual learning websites for teachers and students to interact with one another through web-based activities like videoconferencing, social network learning, and even collaboration project learning. Apart from the activities and methods mentioned by Weng (2003), Liu extended the list by adding the following: students exploring learning by operating browsers, digital cameras, or microscopes, synchronous teaching or interactive learning across schools or countries through internet videoconferencing and multiple assessment approaches such as self evaluation, peer evaluation, and profile assessment.

While further analyzing the function of IT integrating into curriculum, Chang (2002) then discovered that IT could play four diverse roles in the integration process. With ready-made multimedia presentation software and on-line resources, IT integrated instruction could facilitate students in knowledge construction by assisting them to express their newly learned knowledge, achieve meaningful learning and strengthen their achievement through reconstruction of concept, theories, and beliefs. Moreover, it could also aid students in knowledge exploration by offering opportunities for them to make hypothesis, search for evidence with available resources on the internet, and finally learn to carry out knowledge exploration and to collaborate peers in their quest for the solution to a designed question or problem. Meanwhile, IT integrated instruction also played the roles of helping students learn by doing and through collaborative learning with all sorts of online communication systems and interactive websites. By involving themselves into these web-based resources, students learned to construct their knowledge through constant operation and practice instead of from the knowledge delivered by the teachers. In this instruction style, teachers played the role of coaches to guide students during the

process whereas students either worked together as partners or groups, or interact with one another to achieve a task assigned by their teachers.

After studying different information processing theories, Roblyer (2003) identified two contradicting educational stands taken by experts in this field: Directed Instruction and Constructive Instruction. According to the researcher, in the theory of Directed Instruction, the teacher played the role of a delivery person of knowledge while the student played the role of a passive information recipient, which made the process of learning the delivery of knowledge. In the theory of Constructive Instruction, however, the teacher functioned as a guiding mentor while the student work as an active individual learner, which treated learning as the construction of knowledge. Namely, students under DI (Directed Instruction) mastered learning within limited realm of the subject but grew to have independent capability through CI (Constructive Instruction). Further examined in terms of teaching and learning activities and strategies, DI contained activities such as lectures, demonstration, exercises, and tests with its focus on individual learning and traditional teaching and assessment. On the other hand, CI consisted of group projects, real exploration and work development with special attention given to group learning, liberal exploration of open-ended question, and cultivation of students' problem-solving ability and research skills.

With these carefully analyzed information, researchers were attempting to point out a more practical or applicable direction for educators and teachers to follow if IT integration into curriculum is to be actually implemented in daily classrooms in the nearest future. To expect to be able to elicit results and conclusion that can make real contribution to improve IT use in EFL class in elementary schools in Taiwan, the researcher of the present study made the decision to define IT integration into instruction as a student-centered teaching approach in which teachers, as believers of Constructive Instruction, make deliberate and purposeful use of all sorts of information technology.

The teachers will better prepare teaching materials and class presentation, promote students learning interest by engaging them in active learning activities in an IT environment, and thereby facilitate teachers' teaching as well as enhance students' learning achievement.

### ***Levels***

In addition to studies focusing on the general concept or goals of IT integration into curriculum, another way to analyze teachers' actual use of IT in core subject instruction is to set distinctive standards for different levels of IT use, which makes it easier to identify a teacher's IT use behavior simply with a general description of frequency of use and manners of applying the technology (Barron, Kemker, Harmes, & Kalaydjian, 2003). Over the past decades, researchers (Hall & Loucks, 1977; Apple Computer, Inc., 1995; Moersch, 1999; Wang & Li, 2000) have made continuous efforts to conduct series of research and have thus developed such a system to measure how exactly teachers have been using information technology in the classroom (See Table 2.1).

**Table 2.1 Evolving Versions of Levels of IT Use in Instruction**

Researchers	Levels of IT Use in Instruction
Hall & Loucks (1997) LoU	Level 1 (Nonuse)
	Level 2 (Orientation)
	Level 3 (Preparation)
	Level 4 (Mechanical Use)
	Level 5 (Routine)
	Level 6 (Refinement)
	Level 7 (Integration)
	Level 8 (Renewal)
Dwyer, Rinstaff, & Sandholz (1995) ACOT	Level 1 (Entry)
	Level 2 (Adoption)
	Level 3 (Adaptation)
	Level 4 (Appropriation)
	Level 5 (Invention)

*(table continues)*

**Table 2.2 (continued)**

Moersch (1999)	Level 0 (Non-use)
LoTi	Level 1 (Awareness)
	Level 2 (Exploration)
	Level 3 (Infusion)
	Level 4A (Integration)(Mechanical)
	Level 4B (Integration)(Routine)
	Level 5 (Expansion)
	Level 6 (Refinement)
Wang & Li (2000)	Level 0 (None)
	Level 1 (Separate)
	Level 2 (Additional)
	Level 3 (Supportive)
	Level 4 (Integrative)

As listed in the above table, the higher the level, the more the teacher tends to integrate information technology and also moving from teacher-centered instruction toward more student-centered activities. At level 0 to level 1, teachers don't use IT in classroom and still depend on traditional teaching approaches such as one-way lecturing. Moving toward level 1 to level 3, teachers are beginning to include the element of IT in their instruction with an increasing frequency and proportion. As teachers gradually get used to using IT in the classrooms, they are stepping into level 4 to level 8. It means that they not only engage the students in IT related activities but help enhance students' capability to use IT to find answers, solve problems, finish tasks, and eventually construct their own knowledge system (Barron, et al., 2003; Chang, Chu, & Hsu, 2007). In the present study, the researcher intends to gather information with the instruments of questionnaires, semi-controlled interview. Nevertheless, with the diverse and ambiguous definitions given to levels of IT use by different researchers and scholars, it will be difficult for participants to make a decision on their own perceived level of IT use in the questionnaire. Therefore, if the present study is expected to give an overall generalization

of about real IT use in EFL instruction among teachers in elementary schools, the researchers need to pay special attention to teachers' level of IT use during the process of interview and .

### **2.2.3 Problems and difficulties**

With the rapid advancement of information technology, combination of IT and language teaching has become an inevitable track that language teachers cannot but go on if they expect to increase students' motivation in learning and enhance their learning outcome (Tai, 2006). However, despite the continuous huge budget invested in computers and information related technology around campus, the government's effort in promoting IT integration has not yet resulted in significant improvement in terms of both teachers' instruction and students' learning (Barron, et al., 2003). Why don't teachers want to practice IT integration into their instruction although it has been widely established to be beneficial to students? What are the problems, difficulty teachers are faced with? What future challenges do teachers have to overcome before they can successfully implement information related resources in the classroom? A number of previous studies (Li, 2000; Kuo, 2003; Sung, et al, 2005; Chang & Weng, 2006) conducted to investigate these issues have come up with pretty much similar conclusions with most of the present problems and difficulty of IT integration falling into to the following categories: socio-political, curricular, and personal.

#### ***Sociopolitical***

After the Ministry of Education officially designated IT literacy to be integrated into core subject curriculum in the Grade1-9 curriculum guidelines, it has been falsely taken for granted that students can learn information technology without any basic computer literacy (Sung, et al, 2005). Without adequate background knowledge about this issue, it is hard for the authorities concerned as well as school administration to help promote computer education in schools. On top of that, the society's neglect of computer class,

one of the so-called “non-academic subjects,” resulting from the long prevailing social fanaticism, has also contributed to the slow progress in IT integration into instruction (Li, 2000). Without students’ learning motivation, parents’ expectation and schools’ support, many teachers fail to be aware of the urgent need to implement IT integration. Finally, Kuo (2003) made the observation that an apparent digital divide between urban and rural areas in Taiwan still counts as a major impediment in actualizing thorough IT integration in classroom, the schools in remote areas, in particular. According to him, in spite of the aforementioned large scale national infrastructure plan starting 1998, which indeed shortened the digital divide between cities and countries, schools in rural areas are still lacking in resources for hardware maintenance, teacher training, and instruction design. What’s worse, there are only few computer labs in one school, which significantly reduces the average hours of access to information technology for each student (Li, 2000). These factors altogether necessitate the government’s continuous concerns, efforts, and substantial support to promote IT integration in all classrooms around Taiwan.

### ***Curricular***

According to the Curriculum guidelines, computer literacy should no longer be taught as a single subject, but is required to be integrated into the curriculum of each core subject. To be able to fulfill the goal, teachers of all subjects need considerable amount of training courses so as to upgrade their own computer literacy, adapt their teaching instruction, and even to research and develop suitable teaching and learning materials, let along to spare time for preparation for their core subject and class management. With such heavy burden on teachers’ shoulders, it is almost impossible for elementary teachers to afford the time and energy to improve the capability of implementing IT integration. Designated as one of the important issue in the Grade 1-9 curriculum, no textbooks are especially written and designed to integrate IT into that subject for the benefit of teachers and students. Under the circumstances, enthusiastic teachers will have be exhausted to

create their own multimedia materials, and C.A.I. software or even to set up their own website and blogs in order to put IT integration into ideal practice. Without successful teaching experience in IT implementation, few teachers will have confidence and willingness to make further efforts. Gradually, it falls into a vicious cycle (Kuo, 2003; Chang & Weng, 2006).

### ***Personal***

Success of such an ambitious educational reform as IT integration into curriculum depends largely on the teachers' positive attitude toward it. According to previous survey studies about teachers' perception of IT integration, more than 80 percent of teachers express their positive attitude toward the new direction in education policy (Li, 2000). Surprisingly, only a relatively lower percentage of them have confidence and willingness to carry out the plan. With a view to having a deeper understanding about the factors affecting teachers in IT integration, it is necessary for scholars and researchers to do survey studies. More detailed description about these contributing factors will be presented in the following section.

One of the purposes of the present study is to contribute to IT integration into EFL instruction in Taiwan's elementary schools by making pedagogical implementation and practical suggestions. With this in mind, the researcher hopes to compare the results of the study and the aforementioned problems and difficulties so as to know whether the present situations has been improved and what problems still needs to be attended to and dealt with. What's more, if there are any inconsistency between them, further studies might be indispensable in order to clarify the issue.

### **2.3. Literature Review on IT Integration into Instruction**

In this section, the researcher will present a brief introduction of a number of previous studies investigating IT integration into EFL instruction in different parts of

Taiwan and make comparisons and contrasts among them in the first half. In the second half, the researcher will report on a specific literature review on the contributing factors affecting teachers' IT integration into curriculum, since any study on IT integration into instruction will be incomplete without discussing this issue.

### **2.3.1 Previous studies on IT integration into EFL classes in elementary schools**

In their process investigation into how an English teacher in an elementary school in Taipei applies technology into her teaching, the researchers (Huang, Liu, Li, Lin & Cheng, 2006) made some interesting statements from their observation. First, the school's policy to set IT integration as their priority plays a major role in her decision to integrate technology into her English classroom. In a school where English teachers can have her own computer classroom, well equipped with information technology, which can be a rare case in Taiwan, the teacher has great confidence in devoting herself to IT integration into her English instruction. For her, on the one hand, technology can facilitate her teaching by increasing students' motivation in participating in class activities with its multimedia effect, offering the students greater opportunities to do self-learning and repeating drills, and serving as ideal media for remedial teaching. On the other hand, technology's failure to meet each individual student's learning need is one of her concerns when using technology in class, especially for classes with struggling students who have little access to IT at home or the physically challenged. In her opinion, unlike the cases in other core subjects taught mostly through the students' native language, Mandarin, it is difficult to ask elementary students to do project exploration or net-surfing in English classes since the task requires a larger English vocabulary. With the bipolar phenomenon turning increasingly serious in elementary English classroom, teachers will have a tougher time designing suitable learning materials to fit individual needs, not to mention creating multimedia ones.

Hsu and Huang (2006) conducted an action research in an attempt to understand the students' attitudes toward digital teaching materials and to discuss the students' opinions and the teachers' introspection upon the teaching instruction. According to the teachers interviewed in the action research, digital English learning materials acquaints the students with IT use and works as tutor in facilitating students' English learning. During the process of using digital learning materials, the roles of teachers have move from an instructor to a facilitator, which means the teacher-centered instruction into their English classes has shifted to student-centered learning. To these teachers' surprise, with the help from digital learning materials, they report to have better achievement in class management and discipline. Nevertheless, the problems concerning the time-consuming characteristics of the production of digital learning materials and uneven computer literacy levels among students deserve more attention from schools and teachers.

Considering IT integration into core subject curriculum has been recognized as the road all teachers in modern society have to take, more and more research efforts have been made to have better understanding about the status quo in schools of all levels in Taiwan. Since the focus of the present study is on the current IT integration in elementary English classrooms, a review on such studies done in the past proves to be beneficial. Through a series of comparisons and contrasts made among the three studies (Teng, 2004; Huang, 2007; Cheng, 2008) with similar focal points on elementary English teachers' use of IT in their instruction, certain insights can emerge as the basis for the design of the present study.

Based on the above comparisons and contrasts made among three recent studies on Taiwanese elementary school English teachers' IT integration into curriculum conducted in different local areas, both similarities and differences can be found among them, which serve as significant basis for the present studies. To begin with, most of the

researchers preferred to do quantitative research by employing a variety of questionnaires, with two of them having qualitative data as triangulation. Next, all of them reported subjects' positive attitude toward IT integrating into English instruction and its effectiveness in enhancing student' learning outcomes. When it came to the pedagogical implications, both Teng and Huang put extra emphasis on the optimistic impact of IT integration accompanied by collaborative learning strategies, which were believed to significantly increase students' confidence by giving them positive reinforcement for their growth and improvement in a cooperative learning environment. Agreeably, all of the studies proposed the same suggestion that authorities concerned and schools should make continuous efforts to support IT related facilitation as well as to host more inspiring and practical training courses for in-service teachers if the goal of IT integration into curriculum were to be achieved. To ensure success in integrating IT into English instructions, English teachers were advised to improve their computer literacy, make flexible use of on-line resources, create digital or multimedia teaching or learning materials through individual effort or collaboration among colleagues, and, most importantly, have confidence and patience during their attempt to integrate IT into instruction. As for their suggestions for future research, both Teng (2004) & Cheng (2008) advised that a closer observation and more qualitative reports need to be carried out so as to generate more fruitful results, which were sure to bring about positive impact on English education in this field. As was often the case with most quantitative research, a larger sample size is always recommended, which motivate the researcher of the present study to conduct a large scale survey study using teachers around Taiwan as subjects. Yet, it was a pity that few of them addressed the issues of participants' thoughts about specific details regarding successful IT integration experiences, such as whether teachers perceived IT integration into instruction to be able to make the content of instruction more diverse, increase interaction among teachers and students, or affect

students' concentration in class, etc., which deserve further clarification in the present study. Following the above implications and suggestions, the researcher of the present study plans to use questionnaires to gather quantitative data, conduct semi-controlled interview to get more detailed statements about teachers' perceptions about their use of IT in class so as to confirm or to clarify some the confusing results found by means of questionnaire and interviews. What's more ambitious would be the huge sample size of participants invited to answer the questionnaires, designated to be distributed to EFL teachers in elementary schools all around Taiwan, at least one participant in each of the Taiwanese elementary schools.

However, further efforts need to be made to give more explanation and interpretation to whether and how certain factors significantly contribute to the success of teachers' use of IT in instruction while others don't. Moreover, most items in the questionnaires focused on identifying influencing factors affecting teachers' decision making of integrating IT into instruction. As a result, the researcher intends to dig into the issue of contributing factors in teachers' IT integration into curriculum through literature review.

### **2.3.2 Contributing factors in teachers' IT integration into curriculum**

As can be observed from recent regional, national or even global initiatives taken to increase students' access to information technology over the past few years, large-scale infrastructure plans around the world has astronomically upgraded IT related resources for educational purposes (Hennessy et al. 2005). Disappointingly, despite these initiatives which have been expected to bring about significant changes in the technological pedagogies in core subject curriculum, the actual practice of IT integration into instruction "has been less than successful." (Zhao & Frank, 2008) With a view to improving IT use in educational settings, tremendous efforts have been made to research on the exemplary practices to enhance student learning with IT. However,

these strategic suggestions do not guarantee successful IT integration without teachers' actual implementation in class. Therefore, an attempt to look into the reasons behind the slow uptake of IT use in schools necessitates the need of a careful investigation to the major factors influencing teachers' IT integration into instruction. Research findings over the past decades have revealed a number of factors which influence teachers' decision to use information technology (or not) in their classrooms with diverse approaches, including literature review (Ertmer, 2010; Mumtaz, 2000), quantitative research (Hermans, Tondeur, Braak, & Valcke, 2008; Inan & Lowther, 2010; Muller, Wood, Willoughby, Ross, & Specht, 2008; Paraskeva, Bouta, & Papagianni, 2008; Petko, 2012; Teo, 2009; Wozney, Venkatesh, and Abrami, 2006), qualitative studies (Donnelly, McGarr, & O'Reilly, 2011; Granger, Morbey, Lotherington, Owston, & Wideman, 2002; Hennessy et al., 2005; Zaniyal, 2012), or mix-method approaches (Baek, Jung, & Kim, 2008; Baylor & Ritchie, 2002; ChanLin, Hong, Horng, Chang, & Chu, 2006; Drent, & Meelissen, 2008; Sugar, Crawley, & Fine, 2004; Zhao et al., 2008;). Since the purpose of the present study is to gain an overall understanding of the status quo of IT integration among EFL teachers in elementary schools around Taiwan, a quantitative research using questionnaires is indispensable for it is impracticable to deal with qualitative data on such a large scale. However, in line with many of the researchers who adopted a mix-method approach, the researcher of the present study also decides to include interview as triangulation for the results generated from the quantitative data.

In Mumtaz's (2000) article reporting on literature review associated with teachers' perception of information and communications technology, he discovered that access to resources, quality of software and hardware, ease of use, incentives to change, support and collegiality in school, school and national policies, commitment to professional learning and background in formal computer training are all having certain impact on

teachers in their tendency of IT use in teaching. On the other hand, according to his review on earlier studies ( Rosen & Weil, 1995; Winnans & Brown, 1992; Dupagne & Hredl, 1992; Hadley & Sheingold, 1993) investigating factors preventing teachers from IT use, a list of discouraging factors emerged, including lack of financial support, computer availability, IT-related teaching experiences, on-site support for teachers using IT or specialist teachers to teach students computer skills, and, most importantly, insufficient time required for successful IT integration into the curriculum (Mumtaz, 2000). With a close examination of an extensive review of previous studies (Chiang, 2002; Wu & Wu, 2002; Chang, 1999; Tsai, 2000; Liu, 2001; Wang, 2000, Hsu, 2002; Huang, 2002; Chen, 2000; Wu, 2002) conducted in Taiwan, the researchers (Chang and Wang, 2006) made the conclusion that factors influencing IT integration into curriculum could be analyzed into the following : teachers' background, computer literacy, and their attitudes, administrative support from schools, professional technical personnel, and colleagues, the computer hardware in schools, the degree to which materials were infomationalized, external environment, student-related factors, and time constraint.

During the quest for the factors affecting teachers' IT use in instruction, scholars and researchers have come up with an incredibly long list of variables that might play an important roles in teachers' decision-making process. Invariably, most researchers tended to categorize the influencing factors into different groups in order to facilitate them in interpreting the research results. In the study (ChanLinnet al., 2006) intended for teachers' reaction towards integrating technology into creative teaching, the researchers concluded that most of the identified factors can be classified into four categories: environmental, personal, social, and curricular. Among the environmental factors, computer facility related issues are the most frequently mentioned. Teachers are also concerned about the available support and management of resources and manpower

offered by the school administration. As for personal factors, a teacher's personality and attitudes are believed to have certain impact on teachers' use of IT in creative instruction. When it comes to social factors, some of the teachers felt that they would have done a better job if they had had supportive companions as well as positive reinforcement from students' achievement, parents' encouragement, and resource support from the community. With regard to the curricular factors, the issues are mainly involved with the goals and instructional setting within a particular subject. Furthermore, considerations about the skills and literacy required from in-class activities and the ways how they should be assessed were also of the great concern. With the aim of understanding what exactly contributed to teachers' successful IT integration, Granger et al. interpreted the perceived factors as belonging to environmental factors, personal characteristics, and ways of learning. Similar to the previous two categorization systems was another way of classifying the determining variables into personal, normative, and contextual factors, which was proposed by Sugar et. al. (2004). Viewing teachers' beliefs about technology adoption as a reasoned and intentional decision-making process, the researchers found that the decisions were mostly influenced by teachers' individual attitudes toward technology adoption while external support from key persons and contextual resources playing insignificant roles. On the other hand, instead of attributing the influencing effect mainly to teachers' individual attitudes, Mueller et al. concluded that four out of the six predictable variables that discriminated teachers who integrated technology into instruction and those who did not had to do with teachers' computer-related experiences such as comfort with technology and positive teaching experience with IT use. By conducting an explorative path analysis and case studies, Drent and Meelissen named teachers who made innovative use IT as personal entrepreneurs, described as teachers who were willing to keep regular contact with colleagues and experts in the field of ICT, and saw

and experienced the advantages of the use IT in curriculum instruction with IT competence complying with their student-oriented pedagogical approaches. Finally, in addition to discovering six factors influencing teachers' use of IT in class such as adaptation to external requests and others' expectation, Baek et. al. deduced that many experienced teachers adopted IT use because of external forces while novice teachers were more likely to apt for IT integration out of their own will.

While reviewing previous literature on surveying influential factors in teachers' IT integration into curriculum, special attention needed to be drawn to the invariable conclusion that the teachers' beliefs and attitudes toward using IT in instruction and their willingness to try innovative teaching approaches did play a crucial role. Consequently, in a number of studies, more efforts were recommended to address the issue on how to lead to positive changes in teachers' beliefs about IT integration if maximal effects were to be observed in teachers' IT use in class. To begin with, with their thoughtful concern that comprehensive IT integration could impose too much burden and thus prove to be an overwhelming task for teachers, Sugar et. al. (2004) suggested that school administrators make more efforts to address teachers' needs and concerns about IT adoption as well as offer considerable amount of personal support and IT resources. Based on the results of a survey study conducted by Paraskeva et al. (2008), individual factors related to teachers' personality, such as computer self-efficacy, self-concept, attitudes, motivation and needs were all regarded as crucial predictors in predicting teachers' IT integration. Nevertheless, researchers like Chen (2008) expressed concern about the difficulty in changing teachers' belief, which were often resistant to change since it might involve challenging their fundamental or long-established core values or considerable reconsideration and rearrangement of their teaching pedagogies, which demanded time and energy. Among such a large number of previous studies on contributing factors in teachers' IT integration into instruction, the

most brief and straightforward analysis might be literature review paper written by Ertmer and Ottenbreit-Leftwich (2010), in which the researchers discussed the variables four groups: knowledge, self-efficacy, pedagogical beliefs, and subject and school culture. Most importantly, they proposed that IT use should not be treated as an add-on option and that teachers should change their mindsets to include the core belief that teaching would not be effective without successful IT integration into instruction. To help teachers with appropriate IT use in class, more emphasis should be placed on providing teachers with more examples of good practices of IT integration and allowing more time, space, and resources for teachers to try out innovations. In the present study, considering that environmental, contextual, or cultural factors might be more difficult to describe or expressed with questionnaires using Likert scale and that teachers' beliefs are concluded to be stronger predictors in their decision-making on IT integration, the items designed in the questionnaires will mainly be focused on individual beliefs about IT use in class, which can be answered according to the participants' own perceptions.

When discussing factors having an impact on Teachers' IT integration, it was not uncommon for researchers to adopt a specific perspective or model in order to provide a more powerful analytical framework (Zhao et. al., 2003) in which the relationship and interaction between or among interlocking influencing factors can be examined more closely. For example, Zhao and his partner decided on taking an ecological perspective in their search for a unified framework to explain why teachers did not use IT in class. Through the ecological metaphor of the zebra mussel invading in the Great Lakes, the researchers established four equivalents in IT integration cases, comparing schools as ecosystem, computer uses as living species, teachers as members of a keystone species, and external educational innovations as invasions of exotic species. With this ecological perspective, the researchers called for an evolutionary approach to change in IT use by going beyond simple identification and correlating factors and focusing more on

interactions, activities, process and practices. In addition to taking a different perspective in investigating factors affecting teachers' IT integration, a number of researchers drew on a specific model or well-established theoretical framework to analyze the factors. Petko (2012) used the 'will, skill, tool' model to account for the variables in IT use and reported that computer and internet appliances were more often used by teachers in class when the teachers had greater IT competence, employed constructivist teaching approaches, and were more convinced of the enhancing effect IT use had on students' learning. To examine the factors affecting teachers' integration of laptops into classrooms, Inan and Lowther developed a hypothesized path model and found that teacher level factors such as teacher readiness and teacher beliefs were strong predictors in successful laptop integration, with all school level factors also having significant indirect impact. Through a qualitative research method including interview and case studies, Donnelly et. al. developed a working framework to categorize teachers' levels of IT integration into four distinctive types, including contented traditionalist, selective adopters, inadvertent users and creative adopters according to their relative positions in the two intersecting continuums.

In a study conducted by Wozney et. al.(2006), the researchers designed a Technology Implementation Questionnaire consisting of 33 belief items falling under three broad motivational categories: perceived expectancy of success, value and cost of IT use. They discovered that expectancy of success and perceived value of IT use were the most influential variables in contributing to teachers' different levels of IT use. What's more, they even reduced their model of IT use in class to a simple teacher motivation equation:  $(.39 \times \text{Expectancy}) + (.15 \times \text{Value}) - (.14 \times \text{Cost}) = \text{Technology Use}$ . Unlike the aforementioned studies which had a relatively smaller sample size, the present study is intended as a large scale survey and is thus expected to generate a clearer profile of IT use among teachers around the island rather than a carefully tested

model or well-thought-out perspective which seems more practical in a study on a smaller scale. Convinced of the predictive power of the above teacher motivation equation, the researcher of the present study will develop questionnaire items aimed at eliciting teachers' personal attitudes toward the effectiveness of IT integration on their teaching (Expectancy), their perceived effectiveness of IT use on students' learning (Value) and concern about whether IT integration can be effectively integrated into curriculum design (Cost). Therefore, the three dimensions including teachers' perceive expectancy, value and cost of IT implementation will form the basis of the design of the questionnaire employed in the quantitative data collection.

## **CHAPTER THREE**

### **METHODOLOGY**

This chapter describes a mix-method approach employed in the present study. The research design will be explained first. In the next section, the target population, the reasons for selecting it, the background information of the participants, and the sampling criteria will be offered. Third, the procedures of data collection, including the distribution of questionnaire will be described. In the fourth part, the instrument including one questionnaire for teachers, individual interviews will be briefly stated. Finally, the procedures of data analysis will be presented.

#### **3.1 Research Design**

This study primarily involved a survey, comprised of a questionnaire concerning elementary English teachers' personal background information and their expressed use of IT in English instruction and their personal beliefs about IT integration into instruction. Moreover, in order to probe more deeply into their attitudes and beliefs about IT integration into instruction and gain more specific details about their thoughts on this issue, interviews with individual participants will be conducted as triangulation for the quantitative results.

#### **3.2 Participants**

In this section, a brief description of the target population and sampling criteria for the survey in the present study will be offered.

### **3.2.1 Target population**

In order to have an overall understanding of the status quo about elementary English teachers' IT integration into instruction, with IT education being designated to be integrated into core subject instruction in the Grade 1-9 curriculum guidelines, the present study confines its scope to the investigation of English teachers at elementary schools.

### **3.2.2 Sampling criteria for questionnaire**

According to the statistics released by the Ministry of Education's Department of Statistics in September, 2011, there are a total of 2,659 elementary schools in Taiwan. Considering the limit of time, budget, and capability of the researcher, it is probably not feasible to include all the EFL teachers in elementary schools in Taiwan. Therefore, it has been decided to sample one out of each elementary school in Taiwan for the questionnaire survey. In this way, the results of the survey might be expected to achieve certain degree of representativeness while staying a manageable number to the researcher at the same time.

### **3.2.3 Sampling criteria for interview**

Among the teachers who may express willingness to receive interviews, only 20 will be chosen for the limit of researcher's time and workload. In order for the results of the interviews to be more representative of the real IT use among English teachers in elementary school in Taiwan, if possible, 5 interviewees will be chosen respectively from each of the four different parts of the island, including northern Taiwan, central Taiwan, southern Taiwan, and eastern Taiwan, which will make a total of 20 interviewees. More specifically, there will be five interviewees in each of the four areas, with two interviewees chosen from metropolitan cities in that area, two from an average city, and one from a remote area. Each of the interviews will last about 40 minutes to one hour and will be recorded under the participant's permission for the purpose of later transcription.

### **3.3 Instrument**

In this section, the instruments utilized in the present study, a questionnaire and individual interviews will be briefly discussed.

#### **3.3.1 Questionnaire**

A questionnaire survey was conducted with the participants. The questionnaire includes multiple-choice questions as well as open-ended questions. The questionnaire (see Appendix A) can be grouped into three parts: (1) Participants' perception of IT integration into English instruction in elementary schools according to their actual teaching experiences. (2) Teacher respondents' actual use of IT resources in their English classes. (3) Background information of the participants, including the name, location, and the size of the school they are teaching in, and personal information of their gender, service years.

In the questionnaire, information related teaching resources will be used to refer to information technology, for the fact that the term can be described any electronically assisted instruction, but is most often associated with instruction offered via computer and the Internet and is gaining popularity in the early 2000s (SU, 2008). Instead of "information technology," the term "information-technology resources"(IT resources) is employed through questionnaire in order to prevent participants from interpreting the term with a narrower definition which tends to associate information technology either with mechanical and technological equipment only or with its web-based function only.

In view of the results of literature review made for the present study, the researcher found that questionnaire in most of the previous studies mainly focus on teachers' or students' feelings, belief, or attitudes toward IT integration into instruction in general. Few of the questions are designed to gain deeper understanding of teachers' thoughts about specific details regarding successful IT integration experiences, such as whether teachers think IT integration into instruction can make the content of instruction more

diverse, increase interaction among teachers and students, or affect students' concentration in class. Therefore, the questions designed for the present study by the researcher surround three themes: the effectiveness of IT integration on teachers' teaching, on students' learning, and on curriculum design.

### **3.3.2 Interview**

As is mentioned by researchers of previous studies, the results revealed by the data collected through questionnaire is not sufficient if a more comprehensible description of current IT use in elementary English classrooms needs to be presented. Most of them suggested doing interview both to check the credibility and reliability of the questionnaires and to further analyze the teachers' perceptions which might not be revealed from the limited question items in the questionnaires (LeCompte, Preissle, & Tesch, 1993).

To help better answer the research questions in this study and to provide the study with more detailed information about elementary English teachers' attitudes and perceived use of IT in instruction, the design of interview outlines will (see Appendix B) evolve around the following aspects, including Teachers' demographics, their teaching procedures and use of teaching resources, and teachers' expressed IT use in their English classes.

In the first part, the researcher will try to understand more about demographics of each interviewee in order to see whether there is any connection between demographics of EFL teachers in elementary schools and their expressed use of information technology in teaching and their personal beliefs about IT integration into English instruction. In the second part, to elicit more details about how the interviewee conducts each teaching activity and to get a better understanding of how each kind of teaching resource is incorporated into instruction, the questions will be focused on the teachers' teaching procedures and their use of all kinds of teaching resources. Next, to get more information

about these teachers' perceived effectiveness of IT integration into their instruction on teachers' teaching, on students' learning and on the curriculum design, as well as about the factors affecting teachers' decision making and practices in IT integration into curriculum, the questions in part three will be targeted for teachers' expressed IT use in English Classes. The interviewee will be encouraged to give more elaborate description of why he or she decides to integrate IT into instruction and contributing factors behind the decision. In addition, the interviewee's expected value of the technology as well his or her perceived effectiveness of it on teaching and learning will also be investigated through the series of questions. Finally, to wrap up with the interview, the researcher will try to make a brief summary of the interview and ask of the interviewee whether there is anything he/she wants to add, to clarify, or to explain further. Before formally ending the interview, the researcher will express gratitude and appreciation to the interviewee for making the interview possible.

### **3.4 Data Collection and Procedures**

The present study investigated the English teachers' perceptions of IT integration into instruction with two major data collection methods— questionnaires and individual interviews. In the following sections, the administration of questionnaires and the procedures of teacher interviews will be explained.

#### **3.4.1 Administration of questionnaires**

Upon the time when the final version of the questionnaire for this research is finished, the researcher will begin with the questionnaire administration. Based on the aforementioned sampling criteria, the researcher will send emails to the director of academic affairs, the chief of curriculum section, or the coordinator of English curriculum in all the elementary schools in Taiwan. There will be a letter explaining the purpose of the present study, asking for their permission to be the school representatives in helping the administration of questionnaires to at least one English teacher in each of

the school they are serving. If more than 60% of the representatives agree to help, the researcher will be able to find representatives in at least 1,595 elementary schools in total, a number that will qualify the present study as a large scale survey on current implementation of IT integration in curriculum in elementary English classrooms. While distributing the questionnaires by mail, the researcher will make sure all the documents are properly coded, and that each of them is attached with return envelopes and a letter to the school representatives which explained the purpose of the present study and the time and details about the way to return the questionnaire. Additionally, in order to thank the individual teachers' help in completing the questionnaire, each questionnaire is attached with a small gift. Two weeks later, the researchers express appreciation to the school representatives and politely ask them to mail the completed questionnaires back to the researcher. Hopefully, the percentage of the retrieved questionnaire will exceed 80%, which helps secure the credibility and reliability of the present study.

#### **3.4.2 Procedures of conducting interviews**

In the present study, to be able to make a more realistic description of elementary teachers' use of IT in English classroom, the researcher will conduct about 20 individual interviews with some of the participants. To gather necessary information, the researcher will follow the designated outlines (See Appendix B) when conducting interviews with the participants, but will have to adjust the sequences or wording of the questions according to different responses of each of the interviewees as well as the flow of the conversations with each participant.

#### **3.5 Data Analysis**

To properly process the data of the questionnaires, SPSS (Version 20) will be put to use with participants' responses to all the multiple-choice question items being computed. In addition, results of descriptive statistics of the close-ended questions would be

presented. Furthermore, the interviews will be audio-taped, transcribed and then analyzed for its function as triangulation for refined interpretation of the results of the questionnaires. The coding procedures will be briefly described as follows. First, the transcription of each interview will be reexamined so as to highlight statements made by the interviewees. They can be categorized into different aspects and marked as information data under specific concepts corresponding to those mentioned in the questionnaire, such as education experiences, years of teaching, facilities accessible, reasons behind choice of IT facilities use or non-use, personal beliefs, perceptions about the effectiveness of IT use, etc. Next, highlighted information data from all the transcription records will be extracted from the transcription, organized and further analyzed.



## CHAPTER FOUR

### RESULTS AND DISCUSSION

This chapter presents the results of this survey study. The results of the quantitative data are first presented, followed by the results of the qualitative data. Finally this chapter addresses the research questions.

#### 4.1 Results of Quantitative Data

Of all the 1,761 questionnaires distributed, 1,550 ones were retrieved yielding a response rate of 88 percent. In the study, demographic information of respondents of the questionnaire were examined for better and thorough understanding of all the participants of the survey study so as to make more realistic interpretation of the data.

##### 4.1.1 Demographic information about the participants

Table 4.1 shows the gender distribution of the participants. Among the 1550 respondents, 343 (22.1%) of them were male and 1,207 (77.9%) were female. The ratio is, on the whole, consistent with that of the statistic data about elementary school teachers' gender distribution made by Department of Statistics of the Ministry of education in 2011. Both statistics indicate the fact that female elementary school teachers in Taiwan have long been outnumbering male teachers in elementary schools.

**Table 4.1 Gender of Respondents**

Category	Frequency	Percentage
Male	343	22.1%
Female	1,207	77.9%

Table 4.2 shows the age differences of the respondents. Of all the respondents surveyed in this study, nearly half of them (739, 47.7%) were between the age of 31 to

40 years old, and about a fifth of the total participants (281, 18.1%) were between 21 to 30 years old. That is, about two-thirds of the teacher respondents (1,020, 65%) belonged to the younger generation among teaching staff in elementary schools. This is true to reality, because a higher elementary school teacher attrition and turnover rate had been a common phenomenon in Taiwan.

**Table 4.2 Age of Respondents**

Category	Frequency	Percentage
21~30 years old	281	18.1%
31~40 years old	739	47.7%
41~50 years old	428	27.6%
51~60 years old	100	6.5%
61 years old and above	2	.1%

Table 4.3 shows the majority of respondents (1,050, 67.7%) in the survey study had no more than 10 years of teaching experiences. Nearly one-fifth of them (260, 16.8%) had 11 to 15 years of teaching experience. And about one-tenth of them (136, 8.8%) had 16 to 20 years of teaching experiences, while only a small percentage of them (85, 5.5%) had taught for 21 to 25 years. Only relatively few of the respondents (19, 1.3%) had taught in schools for more than 26 years.

**Table 4.3 Respondents' Years of Teaching**

Category	Frequency	Percentage
5 years and below	369	23.8%
6~10 years	681	43.9%
11~15 years	260	16.8%
16~20 years	136	8.8%

*(table continues)*

**Table 4.3 (continued)**

21~25 years	85	5.5%
26~30 years	15	1.0%
30 years and above	4	.3%

As Table 4.4 indicates, among all the respondents surveyed, only about one-fifth of them (276, 17.8%) were homeroom teachers, who were required, apart from their basic teaching load, to take charge of an individual class. Nearly two-fifths of the respondents (626, 40.4%) were subject teachers, who only had to teach the English subject, unlike the rest of their colleagues who might also have to teach more than one single subject or take care of administrative affairs. In addition, about one-fifth of the respondents (269, 17.4%) were substitute teachers, who were not regarded as official members of the teaching faculty. Part of them might also belong to the substitute teachers in elementary schools recruited through the channel of the 2688 Project. With the special teacher personnel increment project launched by Ministry of Education since 2006, they hoped to help ease the heavy workload for elementary school teachers.

**Table 4.4 Position in School**

Category	Frequency	Percentage
Subject Teacher	626	40.4%
Homeroom Teacher	276	17.8%
Substitute Teacher	269	17.4%
Chief	251	16.2%
Part-time Faculty	93	6.0%
Director	84	5.4%
Member of Consulting Team	29	1.9%

Table 4.5 shows the academic status of the respondents, or highest education, to be more specific. Of all the respondents, only about one-sixth of them (251, 16.2%) had a college diploma in teacher training institutes. And the majority of them (1,299, 83.8%) became teachers through other training raining programs. This might be the result of the large-scaled elementary English pre-service teacher training programs operated in more than 20 universities in Taiwan starting from 1999 and its equivalent programs during the successive years. It was because all the elementary schools in Taiwan were scheduled to begin teaching English in the fifth and sixth grades in 1991. The academic status of the respondents could also be regarded as an indirect result of the diversified and open teacher training policy issued in 1994. Generally speaking, the figures in the table served as a positive sign indicating that the elementary English teachers were qualified for their above-average education level.

**Table 4.5 Highest Education**

Category	Frequency	Percentage
Others	508	32.8%
BA of Foreign Language Major	438	28.3%
MA of English Major	222	14.3%
BA of English Major in Teacher Training Institutions	143	9.2%
Teachers' In-Service 40-Credit Courses	131	8.5%
BA of English Minor in Teacher Training Institutions	108	7.0%
PH.D of English Major	—	—

As can be seen in Table 4.6, almost half of the school (733, 47.3%) where the respondents teach had no more than 12 class and were usually categorized as

small-scaled schools, which might best be explained by the declining birthrate in Taiwan during the past decade.

**Table 4.6 School Size**

Category	Frequency	Percentage
12 classes and below	733	47.3%
13-24 classes	270	17.4%
25-36 classes	208	13.4%
37-48 classes	142	9.2%
49-60 classes	82	5.3%
61 classes and above	115	7.4%

Table 4.7 shows the distribution of the locations of schools where the respondents reported to teach. Of all the 1,550 respondents, about two-fifths of them (620, 40.0%) taught in schools located in municipalities, including Taipei City, New Taipei City, Taichung City, Tainan City and Kaohsiung City. And nearly half of them (752, 48.5%) reported to be teaching in schools located in counties or cities in northern, central, and southern parts of Taiwan. The rest of them (178, 11.5%) taught in schools located in counties or cities in eastern Taiwan as well as in outlying islands.

**Table 4.7 Location of School**

Category	Frequency	Percentage
Municipality	620	40.0%
Northern County/City	299	19.3%
Central County/City	286	18.4%
Southern County/City	167	10.8%
Eastern County/City	136	8.8%
Outlying Island	42	2.7%

In the present study, in order to generate a more sensible result from data analysis, schools where the respondents taught were divided into the following three groups, including metropolitan, township/city, and remote area, as indicated in Table 4.8, based mainly on the type of economic prosperity of each local area and the quality of educational resources each of them enjoyed.

**Table 4.8 Groups of School**

Category	Frequency	Percentage
Metropolitan	620	40.0%
Township/City	752	48.5%
Remote Area	178	11.5%

#### **4.1.2 Frequency and patterns of IT use in English instruction**

##### ***Frequency***

The fourth question in the second section of the questionnaire asks elementary English teachers about their frequency in using IT resources in their English classes and the result is presented in Table 4.9 It shows that over two-fifths (655, 42.3%) teachers used IT resources in each class, while about two-fifths of them (622, 40.1%) used IT resources at least once a week. Teachers who only used IT resources about once a month along with those who seldom or never used IT resources all together counted for about one-fifth of the respondents (273, 17.6%).

**Table 4.9 IT Use Frequency**

Category	Frequency	Percentage
Each class	655	42.3%

*(table continues)*

**Table 4.9 (continued)**

At least once a week	622	40.1%
About once a month	176	11.3%
Seldom	69	4.5%
Never	28	1.8%

**Styles**

The first question in the second part of the questionnaire asks the respondents to identify specific IT resources or facility available in school, and multiple selections are accepted. Table 4.10 shows the type of media available to teachers in IT integration into English instruction. Of all the 1,550 elementary English teachers surveyed, a rather high percentage of them (1,209, 78.0%) had projectors and on-line computers available in school when they were in ordinary classrooms. In terms of their available options in physical environment, about three-fifths of them (943, 60.8%) had access to a special English classroom. And there were also about three-fifths of the teachers (921, 59.4%) able to use an audio or visual classroom. As for the respondents' choices of available IT resources, nearly three-fifths of the teachers (956, 61.7%) could use multimedia software, while about half of them (781, 50.4%) had access to integrate online learning website or digital learning platform or discussion forum into their English instruction. Finally, up to two-thirds of them (1,054, 68.0%) had interactive white board (IWB) available for them to use.

**Table 4.10 IT Facility Available in School**

Categories	Frequency	Percentage
Projector and On-line Computer	1,209	78.0%

*(table continues)*

**Table 4.10 (continued)**

Interactive White Board	1,054	68.0%
Multimedia Learning Software	956	61.7%
Special English Classroom	943	60.8%
Computer/Technology Classroom	921	59.4%
Internet Resources	781	50.4%
Audio/Visual Classroom	710	45.8%
Digital Information Lectern	83	5.4%
Others	24	1.5%

The second question in the second part of the questionnaire asks the respondents to identify specific IT resources or facility they use in their English instruction and multiple selections are accepted. Table 4.11 shows the type of media the teachers adopt in IT integration into English instruction. In terms of their options in physical environment, of all the 1,550 teachers surveyed in this study, over three-fifths of them (1,037, 66.9%) used computers and projectors when they were in ordinary classrooms. However, almost half of them (761, 49.1 %) used special English classrooms. In addition, about one-fifth of them (311, 20.1%) went to Computer classroom, and nearly one-fourth of them (400, 25.8%) had access to audio/visual classrooms. As for the respondents' choices of using IT resources, over half of the teachers (801, 51.7%) used multimedia software, and about half of them (771, 49.7%) integrated online learning website or digital learning platform or discussion forum into their English instruction. Finally, about two-fifths of them (631, 40.7%) employed interactive white board (IWB) in their lectures.

**Table 4.11 IT Facility in Use**

Category	Frequency	Percentage
Computer and Projector in ordinary classroom	1,037	66.9%
Multimedia Learning Software	801	51.7%
Internet Resources	771	49.7%
Special English Classroom	761	49.1%
Interactive White Board	631	40.7%
Audio/Visual Classroom	400	25.8%
Computer/IT Classroom	311	20.1%
Other Facility	55	3.5%
Digital Lectern	33	2.1%

#### **4.1.3 Perceived effectiveness of IT integration into English instruction**

In the survey questionnaire, the fifteen questions in the first part were designed around three themes with the intention to collect data about the teacher respondents' perceived effectiveness of IT integration into elementary English instruction on teachers' teaching, on students' learning, and on curriculum design. And the results of descriptive statistics were also organized into the three different themes and thus presented in this section.

##### ***Perceived effectiveness on teachers' teaching***

As shown in Table 4.12, when asked about teachers' perceived effectiveness of integrating IT resources into English instruction, its unlikeliness to create problems in time management in class got the highest scores, 4.11. Its improbability of increasing teachers' workload got 3.94, but, interestingly, its requirement for more teachers' time in preparation before class also got 3.97, which suggested that a large number of teachers did agree that it took them more time preparing for IT integration into instruction. However, it did not increase their workload, since "the electronic files can

be used repeatedly even for years and, therefore, save her more time instead,” said T15 in the interview. Helpfulness in monitoring students’ learning got 3.88, promoting interaction between teacher and students got 3.91, and promoting teaching efficiency got 3.88. Overall, the mean scores were far above 2.5, almost reaching 4.0, which indicated that teachers in general agree on the effectiveness of IT integration into English instruction.

**Table 4.12 Perceived effectiveness of IT integration on teachers’ teaching**

Question	M	SD
1. I believe use of IT integration into English classes is unlikely to create problems in time management in class.	4.11	.716
2. I believe use of IT integration into English classes does not increase teachers’ workload.	3.94	.694
3. I believe use of IT integration into English classes may help me better monitor students’ learning.	3.88	.676
4. I believe use of IT integration into English classes may promote interaction between the teacher and students.	3.91	.845
5. I believe use of IT integration into English classes can promote teaching efficiency.	3.88	.873
6. I believe use of IT integration into English classes may require more time from me for preparation before class.	3.97	.691

***Perceived effectiveness on students’ learning***

The results of the questionnaires concerning respondents’ perceived effectiveness of IT integration into English instruction on students’ learning are presented in Table 4.13. The item which confirmed respondents’ belief in the effectiveness of IT integration on increasing students’ learning interest and motivation got the highest score 4.35, followed by the item about its improbability to affect students’ attentiveness in class, which scored the second (4.07), then the item asking about its effectiveness on promoting students’ learning effectiveness, which scored the third (4.03). Items about

other dimensions of the effectiveness of IT integration into instruction including having positive influence on teaching effectiveness, meeting the students' learning needs, promoting interaction among students, and helping cultivate students' leaning autonomy, got 3.92, 3.86, 3.76, and 3.53 respectively. With all the scores a lot higher than 2.5, the results of questionnaire indicated that teacher respondents' shared agreement on the positive impact IT integration into instruction has upon students' learning.

**Table 4.13 Perceived effectiveness of IT integration on students' learning**

Question	<i>M</i>	<i>SD</i>
7. I believe use of IT integration into English classes may increase students' learning interest and motivation.	4.35	.731
8. I believe use of IT integration into English classes may promote students' learning effectiveness.	4.03	.825
9. I believe use of IT integration into English classes may promote interaction among the students.	3.76	.898
10. I believe use of IT integration into English classes can meet the students' learning needs.	3.86	.788
11. I believe use of IT integration into English classes has positive influence on teaching effectiveness.	3.92	.656
12. I believe use of IT integration into English classes does not affect students' attentiveness.	4.07	.682
13. I believe use of IT integration into English classes can help cultivate students' leaning autonomy.	3.53	.917

***Perceived effectiveness on curriculum design***

Table 4.14 shows the surveyed teacher respondents' perceived effectiveness of IT integration on curriculum design. Teachers' belief that IT integration into instruction might help promote diversity of their teaching got 4.37, a score which was higher than 4.04, what the other item about whether IT integration into instruction could fit into the curriculum actually got. However, since both figures were over 4.0, far exceeding 2.5, it would be sensible to conclude that the majority of teachers in the survey were convinced that IT integration into instruction had desirable influences on curriculum

design such as helping promote teaching diversity and fitting into the designated curriculum.

**Table 4.14 Perceived effectiveness of IT integration on curriculum design**

Question	<i>M</i>	<i>SD</i>
14. I believe use of IT integration into English classes may help promote diversity of my teaching.	4.37	.737
15. I believe use of IT resources in English classes can be fit into the curriculum.	4.04	.656

#### 4.1.4 Major factors

##### *Encouraging factors*

In order to further investigate into whether and how IT facilities might have an effect on the frequency of teachers' expressed use of IT in English instruction, an independent sampling t-test of the data collected in the questionnaire was conducted to answer this question. Table 4.15 shows that, among all the IT technology enlisted in the questionnaire, only the accessibility to an English classroom, which was exclusively intended for English courses, showed significant differences in the frequency of respondents' expressed IT use in English instruction. As for access to the other IT facilities, none of them showed a significant difference in the frequency of respondents' expressed IT use in English instruction.

**Table 4.15 Relationship between IT facility accessibility and the frequency of respondents' expressed use of IT integration into instruction**

Category	Frequency	<i>M</i>	<i>SD</i>	t value	
English Classroom	N	607	1.94	.986	3.549***
	Y	943	1.77	.872	(0.000)

*(table continues)*

**Table 4.15 (continued)**

Interactive White Board	N	496	1.85	.885	0.428
	Y	1,054	1.83	.939	(0.669)
Computer / Technology Classroom	N	629	1.80	.930	-1.106
	Y	921	1.86	.916	(0.269)
Digital Information Lectern	N	1,467	1.84	.927	1.621
	Y	83	1.67	.813	(0.105)
Audio-Visual Classroom	N	840	1.81	.930	-0.925
	Y	710	1.86	.913	(0.355)
Multimedia Learning Software	N	594	1.86	.911	0.934
	Y	956	1.82	.928	(0.350)
Projector and on-line computer	N	341	1.89	.982	1.233
	Y	1,209	1.82	.904	(0.218)
Online Resources	N	769	1.87	.950	1.516
	Y	781	1.80	.893	(0.130)

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

### ***Discouraging factors***

According to (Mumtaz, 2000), such factors as lack of financial support, computer availability, IT-related teaching experience, on-site support for teachers using IT or specialist teachers to teach students computer skills, and, most importantly, insufficient time required for successful IT integration into the curriculum, might discourage teachers from integrating IT into instruction. In order to explore this issue, the fifth question of the second part of the questionnaire asked respondents about the reasons behind their decision not to use IT in English instruction if they were teachers who tend not to make use of IT in class. Table 4.16 shows that about one-tenth of the respondents (177, 11.4%) didn't use IT in class because of not being provided with IT facility. However, relatively fewer respondents (59, 3.8%) chose not to use IT in English

instruction because of other factors. A very small percentage of them (99, 6.4%) of them were concerned about time limit. What's more, only a small number of them (85, 5.5%) talked about not being provided with IT training courses, and 59 (3.8%) of them were discouraged by their lack of IT knowledge and ability.

**Table 4.16 Reasons behind None-Use**

Category	Frequency	Percentage
No IT Facility provided	177	11.4%
Lack of IT knowledge and ability	59	3.8%
No IT training courses provided	85	5.5%
Time Limit	99	6.4%

#### **4.1.5 Discussion**

##### ***Frequency of IT use***

According to the results of the questionnaire, about two-fifths of the participants (655, 42.3%) reported to use IT resources in each of their English classes, with two-fifths of them (622, 40.1%) claimed to use IT facilities at least once a week. Unlike the findings in some of the previous studies intended for investigation into teachers' actual IT use in English instruction, which only indicated an increasing tendency in terms of IT use frequency (Teng, 2004; Cheng, 2008), the quantitative data of the study had led to a far more comforting conclusion that IT integration into English curriculum had come to become a more common practice among English teachers in elementary schools in Taiwan. Instead of showing a variety of concerns about IT integration into instruction, including unavailability of IT facilities, unfamiliarity with IT use, and lack of technical support from colleagues, a majority of the participants in the present study had made IT use a regular routine in English classrooms.

### ***Patterns of IT use***

To offer a more comprehensive answer to the question of how the participants make use of IT resources into English instruction, specific IT facilities they use can give a clue to their actual patterns of IT use. In terms of the equipment available to them, the results of the questionnaire revealed that about two-thirds of the participants were able to use computers and projectors in an ordinary classroom while only half of them enjoy access to a special English classroom, a classroom exclusively for English classes. Meanwhile, about half of the surveyed teachers had online computer services available to them whereas only one-third of their classrooms were equipped with interactive white board.

### ***Perceived effectiveness of IT integration on teachers' teaching***

The results found in the quantitative data indicated the participants' strong recognition of the effectiveness of IT integration into English instruction on teachers' teaching. They are consistent to the conclusion made by researchers (Lin,1999; Kuo, 2003) who tended to emphasize the effective enhancement function of IT integration into instruction and regarded it as an effective activity to enhance teaching outcomes and teaching efficacy. Instead of referring to the use of IT resources as something that might cause problems for teachers in their English classes, most questionnaire respondents identified it as an ideal way to enhance their teaching efficacy as well as to promote interaction between teachers and students.

### ***Perceived effectiveness of IT integration on students' learning***

The results of the survey questionnaire clearly show that a rather high percentage of respondents believed that IT integration into English instruction could significantly increase students' learning interest and motivation, and thereby help enhance their learning effectiveness and even cultivate their learning autonomy. They also denied its

probability of distracting students' attention or negatively affect their learning achievement.

### ***Perceived effectiveness of IT integration on curriculum design***

Another comforting result revealed by the survey study lied in the teacher respondents' consensus about their belief that IT integration into English instruction could well fit into the curriculum and help promote teaching diversity. Rather than using IT as a random or incidental choice among all the teaching approaches, most teachers chose to integrate IT into their instruction for a specific education purpose, with the belief that it could best fit into the curriculum design of a certain unit.

### ***Major factors***

The results of the quantitative data is consistent to the conclusion made in previous studies, which tended to describe accessibility to computer facilities as the most frequently mentioned environmental factors that encouraged teachers to use IT resources in class. They show that a majority of the participants did have ready access to computer facilities in school. Even teachers in remote eastern Taiwan or off-island areas enjoyed access to computers and projectors. Without a doubt, elementary schools in Taiwan have been well-equipped with basic and essential IT facilities thanks to the increasing budget invested on infrastructure projects over the years, which should be taken as an encouraging factors in promoting IT integration into curriculum.

According to the quantitative data of the first part of the questionnaire, the results were all directed to a positive attitude, affirmative personal belief, about the effectiveness of IT integration into English instruction on teachers' teaching, students' learning, and curriculum design.

## **4.2 Results of Qualitative Data**

In this section, data collected from qualitative research methods, the interviews, will be presented in correspondence with the order in which the results of quantitative research are revealed.

### **4.2.1 Frequency and Patterns of IT use in English instruction**

A summary report of results of the interview regarding the participants' frequency and patterns of IT use will be provided respectively in this section.

#### ***Frequency of IT use***

During the interview, in order for the researcher to gather information about teachers' frequency in using IT in English instruction, each teacher were asked to describe their teaching procedures in detail. Among all the fifteen teachers interviewed, ten of them used IT resources in each English class, while five of them used IT resources in English instruction at least once a week. According to the teachers' statements, on average, elementary students had 1 to 2 English classes a week at the first two years in school and they would have 2 to 3 English classes a week later at the fifth and sixth year. There were slight individual variations among schools as a result of factors such as whether the school had extra budget from local government or whether the school was a key school for the promotion of English education.

#### ***Patterns of IT use***

When asked to identify the IT resources they used in English classes during the interview, all the 15 teachers invariably reported regular use of computers and projectors with either e-book DVD provided by textbook publishers or self-made PPT files being the learning materials, whether their classes were conducted in ordinary classrooms or in a special English classroom. Only one of the teachers added that she had to borrow a portable projector whenever she wanted to use it since there was no projector in the classroom they used, which was unoccupied for the time being. About

the IT resources they adopted, six teachers talked about using IWB regularly in English classes and another had grown accustomed to using the virtual manipulative and interactive white board, since she was informed that it was cheaper than an entity IWB. Among the fifteen interviewees, nine of them indicated that the computers in their classrooms had access to the internet, two of whom even emphasized their wireless network on campus. With these teachers' convenient access to the internet, all of them made use of internet resources, including songs or movie clips from YouTube or other on-line English teaching and learning materials. In addition, three of them made it a habit to recommend English learning websites to their students, and one of them even had her own blog. Apart from the items mentioned above, two teachers mentioned their favorable use of opaque projectors, which came in handy when they wanted to show certain pages in a picture book or share students' work with the whole class.

#### **4.2.2 Perceived effectiveness of IT integration into instruction**

This section presents results of the interviews concerning participants' perceived effectiveness of IT integration into English instruction. They are again categorized into three parts, inclusive of effectiveness on teachers' teaching, effectiveness on students' learning, and effectiveness on the curriculum design.

##### ***Effectiveness on teachers' teaching***

When it came to their perceived effectiveness of IT integration into English instruction, thirteen of the interviewed teachers gave positive responses to the questions. Among those who believed IT integration into English instruction didn't increase teachers' workload, some preferred to use e-book for its diversified information, interesting pictures, animations and even films with lively music and dance as well as friendliness for users. Others would rather make their own PPT files since they could both tailor make the materials into exactly what they wanted to present in class and save class hours without having to constantly switch between projector mode and

blackboard mode. For those who agreed that IT integration into English instruction could improve interaction between teachers and students and promote teaching efficiency, most of them mentioned their preference in using IWB when they wanted the students to make drill practices or review lessons by playing games. This was because of IWB's interactive function such as touch screen, which could tremendously increased opportunities for teacher to interact with students. Moreover, teachers could make flexible use of the attached smart board or electronic marker to put emphasis on or to highlight certain information on the screen during the lecture without distracting students' attention while switching to the blackboard mode. As for the teachers who stressed the importance of teaching diversity, they thought not only the rich content included in the e-book but also the great variety of English education resources available on the internet could both contribute to the variation in their instruction. Even for teachers who only made occasional use of IT in class like T13 had to rely on the computer to do the job of picture drawing or map making for her when she wanted to make preparation for students to practice asking and giving directions.

In general, the effectiveness of IT integration into English instruction on teachers' teaching was highly recognized by the participants in survey questionnaire and interview.

### ***Effectiveness on students' learning***

During the interview, each of all the fifteen teachers were recorded to have identified the positive influences of integrating IT resources into English instruction more than twice, showing the interviewed teachers' strong tendency to use IT in class with the belief that it benefited students in a variety of aspects. Unlike the results shown in the statistics in Table 4.11, in which IT integration as way to increase students' learning interest and motivation got the highest score (4.35), the beneficial impacts mentioned most frequently by the interviewees was how it could meet students'

different learning needs. IT resources such as e-book, IWB, internet resources, and even tablet computers were referred to as helping English instruction meet students' needs in the following manners. First, e-book had been well developed into nearly an indispensable teaching resource for teachers since it catered to students need to learn with both visual and audio stimulations at the same time. Moreover, the multiple convenient functions attached to e-book programs also explained how it helped teachers meet the students' need. For example, its zooming function allowed students to be able to see images or words on the screen very clearly, including those sitting at the back, especially when the teacher wanted them to focus on a certain piece of information. Apart from that, its option either to make the subtitle invisible or to make it appear on the screen simultaneously with the utterances of sounds turned out to be an ideal way to train students' listening. Next, with various interactive games or lot-drawing programs attached to IWB, students of a kinesthetic learning style were given more chances to participate in interactive activities in English classes, which used to be conducted in a teacher-oriented environment. Finally, for students who expected to listen to native speakers in order to improve their pronunciation and accent, to understand more about foreign culture, or to do extra practices to review taught lessons, the great variety of English education resources available on the internet could certainly satisfy their learning needs. Last but not least, for those who needed remedial teaching, the tablet computer, with customized learning programs or materials installed in it, could meet their special need for individualized education.

As for other benefits IT integration into instruction brought about, increasing students' learning interest and motivation, promoting students' attentiveness, increase learning effectiveness and promoting interaction among students were all included in the list. To begin with, compared to a traditional teacher-centered and a lecture-oriented classroom, teacher's use of e-book resources, which were rich in images with bright

colors and interesting pictures and often accompanied by lively conversation, special sound effect, and pleasant music, could often increase students' learning interest and motivation. Secondly, rather than watching students burying themselves in their respect textbooks on the desk, some teachers said that they preferred to require students to focus on the information projected on the large screen so as to make sure that students were not being distracted or doing things irrelevant to the proceeding activities. Thirdly, in an attempt to reinforce student s' learning effectiveness and cultivate students' learning autonomy, there were also several teachers who highlighted their preference to adopt or adapt online resources as part of students' learning materials or assignments.

According to the interviewees, most of them used IT resources mainly to increase students learning interest and strengthen their learning effectiveness. When some of them tried to get students to do drill practices with PPT slides they made, students responded much more enthusiastically when the pictures were closely related to their real life experiences such as pictures of places near their school or faces of celebrities they were familiar with, such as famous singers or movie stars. With the interactive function attached to IWB, some teachers designed sentence pattern exercises, fitting them into interactive games and thus assessed students' learning effectiveness while they were pleasantly involving in playing interactive games by means of the touch screen function or through the joystick with cheering excitement. What's more, since the display of IT resources being projected such as e-book or self-made PPT slides could be remote controlled with a laser pen or wireless mouse, the teacher, not having to stick to chalks and blackboard, were allowed to be multitasking in class. Namely, they could lecture about the information being displayed on the screen, do extra body language to add emphasis, and still manage to walk around in the classroom to monitor each student's learning all at the same time.

### ***Effectiveness on curriculum design***

When asked to elaborate on their perceived effectiveness of IT integration into instruction during the interview, almost all teachers expressed their common belief that it would not only help promoting teaching diversity but also fit well into the curriculum. What's more, T10, who admitted to have been used to using IT nearly in each class, also referred to game playing with IWB as “an alternative or diverse way of learning assessment,” which could also be interpreted as part of teaching diversity. Coincidentally, all of them made it clear that their decisions of IT use were mostly based on its fitness into the curriculum. First, using e-book to introduce the vocabulary, theme story or conversation, and sentence patterns had been thought of as an ideal way to present the materials because, as mentioned before, it covered virtually everything in the textbook, not to mention the abundant colored pictures, animations, songs, rhymes, and dances and even hyperlink icons to connect to useful websites or other recommended online resources. Some teachers even spoke of the dance film in the e-book as “the savior of teachers who were not good at dancing.” Second, PPT slides for selected units were also considered effective teaching medium that could be tailor-made to fit well into the curriculum. According to T01, she had been so used to making her own PPT files in her teaching career, for she could always made a few minor adjustments to update her electronic files whenever she had come up with new ideas or, only occasionally, when she thought the content offered in e-book was not enough for her students. Interestingly, two teachers, T09 and T14, made comments on the benefits of using opaque projector when they really wanted to display real objects, show pages in a picture book or share work done by students, which were considered great activities fitting into the curriculum.

On the other hand, many of them made positive remarks on the effectiveness of IT integration into instruction on promoting diversity of teaching. Among the benefits they mentioned, online resources was the one nominated most frequently as an effective

media to diversify teacher's teaching. Some of them used resources available on the internet in order to expand students' vocabulary. Others expected students to improve English speaking and listening skills by watching films, listening and singing the songs, or imitating the intonation or accent of the native speakers. And still others counted on films of song, music or performance found on YouTube to offer extra information about the curriculum or to learn more about English culture, such as food, clothing and festivals. Other media such as PPT files, e-book, and IWB were also described as useful resources to add variety and diversity to teachers' teaching. Some of them praised e-book for its abundant and diversified teaching materials, others liked to make PPT files for certain units so as to include whatever they thought appropriate and effective in teaching, and still others used IWB as an entertaining and interactive alternative other than teacher-centered lecturing.

From the interview records, none of the interviewed teachers excluded the use of IT resources from their instruction. In other words, each of them made use of at least one IT resource at different stages in their schedule in a variety of methods for their own purpose. In some of their classes, computer, projector, and screen or IWB even took the place of the blackboard and became the major displayer of the materials they wanted to present. What's more interesting, the blackboard, traditionally treated as the only focus of students' attention had now become an alternative when the teachers wanted their students to pay special attention to the information or to copy it in their textbook.

#### **4.2.3 Major factors**

In this section, elaborated reports on contributing factors pointed out by participants in the interview will be presented, which could be classified into encouraging and discouraging factors under the four categories, including environmental, personal, social, and curricular aspects.

#### **4.2.3.1 Environmental factors**

##### ***Encouraging factors***

Teachers surveyed with accessibility to other IT technology than a special English classroom, including IWB, computer or technology classroom, digital information lectern, audio-visual classroom, multimedia learning software, projector and on-line computer, and on-line resources did not show significant differences in the frequency of their expressed use of IT in English instruction. In other words, whether teachers had accessibility to a special English classroom played a crucial role in how often they choose to use IT in their English classes. The findings of the interview, which is consistent with the quantitative results, also made it clear that teachers enjoying easy and ready access to an English classroom were more willing to use IT more often in their English classes than those who without an English classroom available to them. According to T13, she was not able to use IT in each English class because she would have to adapt to different environment in students' respective homeroom classroom and cope with a variety of technical problems and might thus fail to catch up with her teaching schedule. What's more, T01 pointed out that one major problem for English classes conducted in an individual homeroom classroom was that the elementary homeroom teachers in Taiwan were often required to stay with the class unless they need to teach other classes. Even when students were having classes under other teachers' instruction, the access to the computer in the homeroom classroom still belonged to the homeroom teacher while he or she was there and, in turn, made English teachers denied of accessibility to computer in their English classes. Finally, T08 expressed her expectation by saying that she "would really prefer to carry on her English class in a special English classroom if possible so that she could have better control of the facilities and thus prevent technical problems from happening unexpectedly or too frequently." Of all the fifteen interviewed teachers, ten of them had

access to their own English classroom, with seven of them using IT technology in each of their English classes. When asked about the reasons that discouraged the other three teachers, despite their access to an English classroom, who tended to use IT technology less often, at least once a week, T04 placed more emphasis on teacher's modeling in reading and reciting as well as students' collaborative learning and preferred to use IT resources only as a media for students to share their performance or presentation with other students. For T05, she had difficulty using IT in each class since she had to borrow a portable projector, which may not be available all the time, so as to be able to use the computer in her English classroom. And for T12, she used IT resources at least once a week, instead of in each class, because she was convinced that her students, the majority of whom were low achievers in remote areas, needed more time for practicing and doing individual exercises, rather than listening to teacher's lecture with the fancy IT technology.

In Mumtaz's literature review article, he nominated the following environmental factors such as access to resources, quality of software and hardware, and ease of use as effective factors in encouraging teachers to use IT in class. However, he didn't further specify the IT technology and neither did he explain the reasons behind teachers' decision. Based on the findings of the present study, providing teachers with access to English classrooms was a significantly effective factor which encouraged teachers to integrate IT into English instruction. Speaking of the design of a special classroom for English courses, T01 stressed the importance of computer and projector over that of IWB. That was because she considered the former the basic necessities for IT integration into instruction while IWB only slightly differed in its touch screen function and interactive nature, which could also be achieved with proper design of the PPT files and minor adjustment to the operation. She had started to make her own PPT files twelve years ago when IWB did not even exist. As for connectivity to the internet, some

interviewees preferred downloading needed information before class to getting on-line in class. That way, they could avoid improper pop ups or waste of time searching for appropriate materials on the internet while others choose to integrate on-line resources into self-made PPT files in advance so that there was no need to switch between different modes constantly. Another frequently used IT resource is e-book, a popular multimedia learning software provided by textbook publishers, which was believed to have included such a great variety of materials for use that could tremendously relieve much of the teachers' heavy burden of making preparation before class. Finally, both T08 and T14 mentioned the advantages of having an opaque projector in the classroom for the teacher can show the picture book or students' homework instantly, which not only saved time but was also user-friendly.

#### ***Discouraging factors***

The general findings generated from the interview also excluded the environmental factor, access to IT facilities, from the contributing factors that discouraged teachers from using IT in English instruction. None of the interviewed teachers were faced with such problems as not being provided with a computer and projector. The only environmental factor that might prevent them from making more frequent use of IT is the fact that they were not provided with an English classroom exclusively for English courses. However, teaching in classrooms where the lights needed to be completely turned off or the curtain needed to be drawn, T12 would choose not to use the projector when she thought the focus of the instruction should be on her students. Similarly, T10 would sometimes refrain from using the projector if she had to stand right next to the screen for certain reason because it made her feel uncomfortable when the light of projector shed on her face.

#### **4.2.3.2 Personal factors**

##### ***Encouraging factors***

As mentioned and discussed in earlier section, results in both quantitative and qualitative research shows that all the demographic factors did not have significant difference in the frequency of teachers' IT integration into instruction. Since objective factors about teachers' personal background were excluded from the contributing factors, it is sensible to infer that teachers' subjective opinions, or personal beliefs, about IT integration into instruction might turn out to be the driven force behind their decision on IT use. The conclusions made in both 4.1.3 and 4.2.2 suggest that, whether in the questionnaire survey or in the interview, the majority of respondents and interviewed teachers expressed positive attitude toward the effectiveness of IT integration into English instruction on teachers' teaching as well as students' learning. This might be attributed to the government's effort in launching the campaign to implement IT integration into subject instruction starting from 2003. It had not only gradually planted into elementary teachers the seeds of IT integration into instruction but also successfully led them to a more mature mindset for integrating IT into their instruction.

### ***Discouraging factors***

When asked about the reasons that prevented them from using IT resources in class, many of the interviewed teachers identified some of their concerns when they decided not to use IT in class. However, the influencing factors didn't necessarily have to do with teachers' demographic background. For example, according to the interview reports, teachers in a certain age group did not use IT with the same frequency. Among the three youngest interviewed teachers, only one of them used IT in each English class because she "had been so accustomed to using information technology equipment, unlike some senior colleagues who considered it too troublesome." Both the other two younger teachers preferred to use IT resources only "when teaching certain parts of a single lesson such as reviewing or presenting the answer keys for writing exercises.

Because they considered it “took too much time to present the materials with chalk and blackboard,” they would make use of posters and flash cards instead when they wanted to interact with students. Likewise, they would also use posters and flash cards while “going over the phrases and vocabulary. And when it was necessary, they would use e-book while presenting the theme article and do interactive activities with IWB. As for the five teachers being aged 41 to 50, four of them had made it a habit to use IT resources in each English class because they “enjoyed learning and growing with students,” “took great interest in upgrading their IT ability,” and “believed in the effectiveness of IT integration into instruction.”

As for other discouraging personal factors, statements made by some of the interviewees could also be used as references to address this issue. During the interview, T07, who was not an English major in college and had been since suffering from great anxiety of improving her English proficiency, admitted her reluctance to use e-book. Despite its popularity with other colleagues, she was not familiar with how to operate e-book, so she would rather spend more time in doing preparation for her English instruction than in getting acquainted with how to incorporate it. T15, a 2688 teacher recruited in the teaching staff by means of the 2688 Project, an elementary school personnel increment project launched in 2006, gently conveyed her avoidance of using on-line resources too often in class. She really couldn’t afford the time needed for searching for appropriate materials since she was usually overwhelmed by the heavy workload as a 2688 teacher, who often was required to teach more than one subject in a remote area like that.

#### **4.2.3.3 Social factors**

##### ***Encouraging factors***

In the present study, regarding social factors about IT integration into instruction, statements made by interviewed teachers could be presented as references for a deeper

understanding of this issue. To start with, T03, an energetic, enthusiastic and devoted elementary school teacher with 24 years of teaching experiences, who had been teaching English for eleven years, attributed her willingness and satisfying experience in integrating IT into instruction mainly to support from school administration and great team spirits and teamwork among teaching staff. The school she taught in was appointed by local government as focus school for promotion of elementary English education, which offered them sufficient budget for necessary facilities and extra English class hours. Therefore, English teachers in their school were provided with a well-equipped and well-arranged English learning environment and allowed more freedom in integrating IT resources, such as multimedia learning software or hyperlinks on school's webpage to English learning websites, into their English instruction. Moreover, working as a team of five English teachers, they could come up with a well-thought-out plan to carry out. What's better, with support and assistance from their colleagues, computer teachers in particular, they were able to go as far as allowing each student 10-15 minutes per week to practice what they had learned from English teachers with IT technology in computer class, an exemplary case of team teaching. According to another teacher, T1, who had been a faithful user of IT in English instruction for eleven years, one of the two major reasons for her to make regular use of IT in English class was that she herself was a member of the English Curriculum and Instruction Consulting Team for elementary English teachers in Taipei city. The other reason was that she was teaching in a school which had been appointed by local government education authorities to be focus school for promotion of IT integration into subject instruction many years ago. In addition, she had gained a lot of substantial help and guidance from her colleagues who then knew more about information technology and were willing to share their actual experiences of IT integration into instruction with her. In spite of the fact that they might be teaching different subject,

she could always manage to adapt what she had learned from teachers of other subjects into appropriate English teaching materials for her own use in class. Finally, she attributed her need to keep on updating her skills as well as materials regarding IT integration into instruction to the fact that she would have visiting teachers to her class from time to time with the purpose of watching her demonstration of IT integration into elementary English instruction.

From the above reports about the statements made by the interviewed teachers, more has been revealed about the positive effect of support from government and school administration as well other teaching staff on IT integration into instruction.

### *Discouraging factors*

In terms of social factors that might discourage teachers from using IT in English instruction, T01, for several times, mentioned that there were only limited opportunities for subject teachers to attend in-service training courses targeted for guiding English teachers in more skillful use of IT in English instruction. Namely, in-service training courses on IT integration into instruction were not always intended for English teachers. More often than not, the instructors or lecturers were teachers of other subjects than English, and, therefore, what teachers learned there could not be applied to their English instruction without professional guidance. Many teachers often ended up feeling disappointed by in-service training that were not meant for English teachers. In addition, when talking about difficulty in IT integration into English instruction, T05, who was teaching in a school where the majority of students were from aboriginal family, uttered her sincere hope to gain more support from parents. These parents often complained about teacher's emphasis on English learning and, therefore, refrained from supporting their children in participating English learning activities, which they considered an invasion of foreign culture as well as a waste of time.

#### **4.2.3.4 Curricular factors**

##### ***Encouraging factors***

The results and discussion in 4.3.3 suggest that a large number of teachers believed in the effectiveness of IT integration into English instruction on promoting the diversity of curriculum and agreed that it could be well fit into the scheduled curriculum. The tendency could also be observed from the findings of the interview sessions in the present study, which indicated most teachers' preference in using IT resources to diversify as well as to facilitate their teaching. Better yet, it could be interpreted as a comforting outcome yielded from the fact that teachers' professional teaching ability had made it a basic and indispensable requirement. They needed to be able to adopt the most appropriate media to present the materials and find an ideal way to fit it into the curriculum after taking the curriculum and all the available options into careful consideration. Therefore, there seems to be no need for lengthy discussion about the curricular factors in future attempts to investigate into the factors contributing to IT integration into English instruction.

##### ***Discouraging Factors***

Next, with regard to curricular factors that might prevent elementary teachers using IT in English class, no teachers held the opinion that they would decide not to use IT in their English instruction because of its negative influence on the curriculum design or development. However, T12 would sometimes choose to skip IT integrated activities because of time limit or poor quality of some of the songs in the e-book. Instead of viewing IT integration into instruction as an option that might have an effect on their curricular design in an undesirable way, many of the interviewed teachers emphasized their positive attitude toward it and stressed their careful consideration about when to use IT and which IT technology to use in order to best facilitate students in learning.

#### **4.2.4 Discussion**

##### ***Frequency***

In the interview, some of them even expressed their strong preference for integrating IT into their instruction as well as their heavy reliance on IT facilities to present the teaching materials. One teacher went as far as saying that she would have great trouble conducting her English class if IT facilities were to be unavailable to her since the design of her teaching schedule mainly involved the use of computer and interactive whiteboard.

##### ***Patterns of IT use***

According to the statements made by the interviewed teachers, ten out of fifteen of them reported to have a special English classroom for them to use, with all of the others having computers and projector in use in an ordinary classroom, homeroom classroom in most cases. Among the five teachers in the list, three of them had their classes in a special English classroom while two of them needed to go to the students' homeroom classroom. From the conclusion drawn from results generated from all the instruments mentioned above, a considerably large number of the teacher participants were willing to make use of IT resources in their English classes as long as they had ready access to IT facilities.

As for the media they tended to integrate in their English instruction includes e-book, multimedia CD provided by textbook publishers, self-made power point slides, ready-made or adapted version of interactive games via IWB, a variety of on-line resources, and even self-made video-taped films. Through e-book, teachers had little difficulty in presenting learning materials such as vocabulary, story plots, sentence patterns, and even phonics chants and songs to the students. Best of all, most of the content in the e-book are accompanied by multimedia effects like sounds, music, pictures, and animation. As for what the e-book might not have included, many of the

interviewed teachers reported to have made a habit of making power point slides of their own in order to present extra information or offer more chances for students to practice using the vocabulary or newly learned sentence patterns. In the slides, they could often add elements that cater to the students' common interest or relate to their life experiences. Apart from the presentation of materials, hands-on practices were also crucial in English teaching and learning process. Therefore, interactive games via IWB served as one of the best incentives for elementary school students. Some teachers would make use of the ready-made software like lot-drawing program or smart board function. They wanted to add some fun into their practicing exercises while teachers with higher computer literacy could even go a step further to adapt certain programs into interactive game-like exercises for students to learn through playing games. With the program, they just had to substitute the content for students to practice different parts of the materials. In addition to the materials included in the curriculum, information on the internet was also a great source of teaching and learning materials. In schools located in metropolitan areas, where students generally had higher English learning achievement, in order to satisfy their stronger learning needs, teachers usually needed to spare more efforts searching for a greater variety of on-line resources to offer the students extra information. However, in schools located in remote areas, where students might lack learning motivation or were reluctant to learn English, teachers also felt the need to find proper materials, such as interesting short films, songs, or information about festivals, to both educate and entertain them. Several of the interviewed teachers expressed their preference for video-taping the students' performance in class, which were often used for students to share and exchange group performance among peers. In a word, for participants of the interview, e-book and power point slides were adopted mostly for the presentation of materials. Interactive

IWB games provided students with fun learning activities whereas on-line information offered additional educational resources for teachers.

Hopeful as the above mentioned descriptions about teachers' frequency and various patterns of use of IT resources might seem, their actual level of use might not be as promising. Examining the ways in which the participants made use of IT resources, most of them were indeed making great attempts in including the elements of IT in English instruction with an increasing frequency and proportion, which, measured by the evolving versions of Level of IT Use in Instruction, only fell on level 1 to level 3. The main reason is that most of them were only observed to engage the students in participation in IT related activities. However, relatively few of them had gone so far as to help enhance students' ability of using IT resources to find answers, solve problems, and eventually construct their own language knowledge system. Although many of the surveyed teachers seemed to have moved a step forward from teacher-centered methods toward student-centered strategies, they still had a long way to go if the goal of higher level of IT use in elementary English instruction were to be achieved

#### ***Perceived effectiveness of IT integration on teachers' teaching***

Despite the fact that many teachers also found it time-consuming to do preparation in integrating IT into their instruction, they still perceived its effectiveness since they found electronic files to be able to be stored properly and used repeatedly. Likewise, most the interviewees of the present study also made invariable comments on their positive attitude toward the effectiveness of using IT resources in their English classes. The comments were based on the fact that they found it could help create a more smooth flow of class activities, achieve greater teaching diversity, and lead to better interaction between teachers and students. With rich contents included in the e-book as well as multiple functions attached to it, teachers could count on it while presenting vocabulary, stories, feature article, sentence patterns, and even songs and chants to the

students without having to switch between IT mode and blackboard mode. Meanwhile, through the great variety of materials and information IT resources could offer, teachers were able to diversify their teaching and add richness and colorfulness to their class activities. Finally, with the interactive nature of the programs for computer and IWB games and exercises, students were given more chances of learning by doing (or playing games) and thus having more positive interaction with their peers as well as the teacher. Moreover, teachers' flexible use of IT resources had had a satisfying effect on teachers' teaching, which could be proven by the hard evidence that most students got rather enthusiastic and excited when IT integrated activities were being conducted, with their full concentration on the instruction and active participation in the activities.

#### ***Perceived effectiveness of IT integration on students' learning***

Similarly, a majority of the interviewed teachers expressed their positive comments on IT integration into English instruction. The only difference was that most of them praised it mainly for its effectiveness on helping teachers meet students' diversified learning needs. To be more specific, both the multimedia effects and interactive functions of IT resources managed to satisfy students of different learning styles and catered to students having multiple intelligences. Moreover, the flexible and adjustable nature of IT resources also contributed a lot for teachers to take care of students' special personal needs by placing emphasis on specific stimulation channels or focusing on different parts of language skills.

#### ***Perceived effectiveness of IT integration on curriculum design***

In addition to the more conventional teacher-lecturing, use of posters and flash cards, collaborative learning, IT resources also served as another useful alternative, with which teachers were able to achieve the teaching objectives of certain units, whether it was to introduce new vocabulary or to acquaint the students with sentence patterns. When the teachers were convinced that IT resources could be the best medium

to get the message across, such as the time when they wanted to introduce theme stories, teach phonics, or demonstrating chants and songs, they would not hesitate to make use of it. Moreover, most of them found IT resources could come in handy when they expected to make a change in their class activities or offer extra cultural information to the students. All in all, for the majority of the participants in the survey study, IT integration into English instruction was definitely an ideal option not only to help diversify their teaching but also to fit well into their curriculum design.

***Major factors: environmental***

None of the teachers interviewed mentioned any concerns about not having proper computer facility in use.

However, some of them did expressed their concern about the poor quality of on-line service as well as the expectations they had of the school administration to speed up in replacement and renewal of their existing facilities. The quantitative data in 4.1.4 could also reveal the fact that there were still about half of the elementary school needed to be provided with on-line services in their classrooms. Speaking of classrooms, there was one interesting result that deserves special attention. That is, teachers' shared expectation to have access to a special English classroom exclusively for them to conduct English classes. According to several teachers who had to conduct English classes in the students' respective homeroom classroom, they would often hesitate in making the decision to integrate IT into their lesson plans since they might not be given full access to the computer in the classroom, not to mention their uncertainty about the condition of the facilities in each of the classrooms. Consequently, it seemed a more feasible solution to spare efforts in assuring each English teacher a classroom where they could make free use of IT facilities whenever they want to.

***Major factors: personal***

Coincidentally, the statements made by the interviewees also confirmed their strong beliefs in the positive influences of IT use on English teaching and learning. Therefore, it seemed sensible to infer that, in most cases, teachers' personal belief in the effectiveness of IT use served as an encouraging factors in persuading them to integrate IT in their English classes. As for some of the teachers who might refrain from using IT resources, discouraging factors mainly focused on their lack of computer knowledge or ability, and poor computer literacy. Other reasons might only be presented in certain rare cases, in which the teacher prefer demonstrating by herself to using IT facility, or where the teacher found the use of IT to be ineffective or even distracting.

***Major factors: social***

In the previous study (ChanLinnet al., 2006) intended for investigation into teachers' reaction towards integrating technology into creative teaching, the researchers identified the following factors, including supportive companions, positive reinforcement from students' achievement, parents' encouragement, and resource support from community, as influential variables. The results of the qualitative data of the present study also lead the researcher to similar conclusions, except for fewer cases in mentioning encouragement and support from parents, which is probably due to the cultural differences in the educational structure. In Taiwan, or Chinese community in a larger sense, traditionally, it is uncommon for parents to take active roles in influencing teachers' education decision-making, which might be taken as a hint of parents' distrust toward the teachers. Other than that, most of the encouraging social factors were also nominated by the participants when they talked about how such social factors as support from school administration and colleagues with computer skills or higher level of computer literacy, positive feedback from students, and even the public's expectation of teachers concerning IT integration into core subjects.

Nevertheless, there were also interviewees making complaints about in-service training programs targeted on IT integration into instruction and its failure to meet the needs of elementary English teachers. Due to the diversified natures existing in different core subjects, it would be rather difficult for them to apply what they had been informed of to actual English classes if the experiences came from teachers of another subject like math, science, or even geography.

***Major factors: curricular***

In line with the results of quantitative data, the interview and observed teachers invariably referred to use of IT resources as being able to diversify the teachers' teaching as well as to well fit into the curriculum design. Most of them were convinced that integrating IT resources into their English instruction would successfully help promote the diversity of teaching methods and activities on condition that they chose proper media for the right unit at a right time. With their familiarity with the distinctive features of different multimedia effect, teachers could always manage to achieve their planned teaching objectives by adopting appropriate IT resources.

## **CHAPTER FIVE**

### **CONCLUSION**

In this section, major findings of the present study will be summarized and organized so as to answer the four research questions first. Then improvements for government authorities and educators will be presented next. Finally, limitations and suggestions for future study will be provided.

#### **5.1 Summary**

The purpose of the present study is to investigate into how IT integration into instruction is implemented in classrooms. A mix-method approach was conducted, including a large-scale questionnaire survey of 1,550 teachers around Taiwan as quantitative research, interview sessions with 15 teachers from metropolitan cities, township, and remote areas. Quantitative data collected were analyzed with descriptive statistics. Records of interview sessions will be transcribed, coded, interpreted, and provided as triangulation for the quantitative results. The major findings are summarized as follows.

First, with respect to the frequency of teachers' IT integration into instruction, conclusion drawn from both the questionnaire survey and interview sessions indicates that the majority of respondents use IT resources at least once a week, many of whom even make regular use of IT resources in each English class. As for the question of how teachers integrate IT into English instruction, a large number of respondents and interviewees considered computer and projector basic and essential IT facilities whether in an ordinary homeroom classroom or in a special classroom. Other IT facilities that are popular among them are e-book provided by textbook publishers, self-made PPT teaching files, interactive teaching and learning activities by using IWB, and on-line

English learning resources related to the scheduled curriculum such as MV of English songs and film clips found in YouTube.

Secondly, with regard to teachers' perceived effectiveness of IT integration into instruction, the participants agreed on its beneficial effect whether on teachers' teaching, on students' learning, or on curriculum design. In terms of their perceived effectiveness of IT integration into instruction on teachers' teaching, they were convinced that it was unlikely to cause them problems in class management, and would not either require them more time for preparation before class or increase their workload. About their perceived effectiveness of IT integration into instruction on students' learning, they held the opinion that it would increase students' learning interest and motivation as well as promote their learning effectiveness, instead of negatively affect their attentiveness in class. Furthermore, IT integration into English instruction could also meet students' needs and thus reinforce their learning effectiveness. As for their perceived effectiveness of IT integration into instruction on curriculum design, they thought that it would help promote teaching diversity and could be well fit into scheduled curriculum.

Thirdly, when it comes to major factors to influence elementary teachers' decision to use or not to use IT resources in English instruction, the results were classified into encouraging factors and discouraging factors. The former list started with teachers' ready access to an English classroom which is exclusively meant for English courses and equipped with at least IT facilities such computer and projector, while others like IWB or opaque projector only served as optional alternatives. Next, these teachers' perceived effectiveness certainly led to their preference in integrating IT into English instruction. In addition, social factors, including promotion projects sponsored by government education authorities, financial and mental support from school administration, great team spirits and teamwork among teaching staff, guidance and professional support from IT expertise in school, were all regarded as influential factors

which encourage teachers to make use of IT in their instruction. Finally, since most teachers held positive attitude toward the effectiveness of IT integration into instruction on curricular design, , they now went a step further to come up with a proper decision on when and how to use certain selected IT resources to best facilitate their teaching.

## **5.2 Improvements**

Based on the results of the present study, improvements are provided to authorities concerned, school administration staff, and educators so as to benefit teachers' teaching and students' learning with regard to the approach of IT integration into English instruction in elementary schools in Taiwan.

First of all, despite the fact that most elementary schools were well equipped with IT facilities, a number of teachers were still reluctant to integrate IT into their instruction. The major reason was that they had no access to an English classroom exclusively for their English classes. With such an ideal IT integration environment, they could have better control of the IT facilities and thus prevent technical problems from affecting the flow of English classes. What's more, English teachers in elementary schools also refrained from using IT facilities when they had to go to homeroom classroom. Generally speaking, in a homeroom classroom, access to computer seemed to be dominated by homeroom teachers, who were required to stay with their students unless they needed to teach somewhere else. Under such circumstances, a second on-line computer might serve as a remedy. Therefore, providing EFL teachers in elementary schools with access to a specialized classroom which could be managed by themselves was proven to be a great incentive to encourage teachers to make commitment to IT integration into English instruction.

Second, in order to meet teachers' need and expectations for more inspiring in-service training courses with respect to IT integration into English instruction, it is

recommended that both the guidelines and the examples presented in the training courses should be based mainly on EFL curriculum in elementary schools. By doing so, EFL teachers in elementary schools would have less difficulty adapting experiences shared by teachers of other subjects into materials appropriate for them to use. Also, it would increase their willingness to participate in in-service training.

Third, with increasing popularity of e-book among EFL teachers in elementary schools, efforts should be devoted to improving the design of e-book. For one thing, it would be easier for teachers to make more flexible use of its multiple functions in class. For another, they would be more likely to adapt the content of the e-book into their own teaching files. Moreover, feedback from e-book users, such as fitness of the songs or dance, appropriateness of the extra materials, and more flexibility in playing the songs, should be taken into careful considerations. What's more, solutions to the problems and suggestions should be presented so as to keep teachers' confidence and preference in using it.

Fourth, compared to teachers at higher educational levels, EFL teachers in elementary schools seemed to have heavier workload. Not only were they required to teach for more class hours, but most of them were assigned to teach students at multiple grades. Needless to say, it required them a lot more time to prepare before class, not to mention the tremendous physical strength demanded for keeping energetic young children in order. What's worse, there were usually relatively fewer English teaching staff in an elementary school, which meant they had fewer members to share the otherwise proper amount of workload. In remote areas, an incredible large percentage of EFL teachers in elementary schools were substitute teachers or 2688 teachers. Since these struggling teachers had to spare a lot of efforts striving for a stable job, it was too demanding to expect them to fully devote themselves to teaching innovation. As many interviewed teachers had pointed out, it did take teachers relatively more time to

prepare for IT integrated teaching materials. It required considerable amount of time devoted to upgrading computer literacy, searching for needed information, and integrating the materials into curriculum. As a result, how to make fair adjustments to their workload and improve the structural problems of teaching personnel in remote areas should also be viewed as one of the priorities if more creativity and innovation regarding IT integration into instruction were to be expected from them.

### **5.3 Limitations and Suggestions for Future Research**

In the present study, both the issues addressed and the methodology adopted for the quantitative and qualitative research left a lot to be desired, due to the following limitations. Suggestions to fill up the gap are also provided as follows.

First, since the present study is intended as a large-scale survey, whether the sampling can be representative of the actual pool of elementary English teachers in Taiwan virtually determines the significance of the study. However, the researcher's failure in finding the official statistic data as a reference can offer researchers for future studies an insight into a better sampling strategy. Furthermore, the design of the questionnaire in future studies also deserves more careful consideration about the questions as well as the question items. For example, some interviewees raised their doubt about whether they should check the item "English classroom" if the English classroom they had in school was not equipped with IT technology. Others couldn't make a decision on the items about their frequency of IT use, since they thought there should be other options between "in each class" and "at least once a week," such as "nearly each class" or "every other class." In addition, items designed as answers responding to respondents' highest education in the third part of the questionnaire lack predictive power because some of the items seemed to be overlapping in some way and so should be refined so as to generate more meaningful results.

Secondly, in the study, grouping of location of school remained a tough decision to make. In the questionnaire, the respondents were required to identify the location of their school as in metropolitan cities, northern, central, southern, or eastern Taiwan, and off-island areas. Next, due to the convenience of data analysis, the researcher decided to regroup the location of school into metropolitan city, township or city, and remote areas while analyzing the data. However, after doing the interview, the researcher found it difficult to decide how to group some of the respondents' schools located in the remote areas, though belonging to a large metropolitan city. Therefore, a more sophisticated system or criteria for the grouping of locations of schools would be highly recommended.

Finally, despite the increasing popularity of tablet computers or other mobile devices among modern people, relatively few participants made mentions of their experiences of using them. Actually, according to one of the interviewees, tablet computers were ideal for teachers to carry out individualized teaching and for students to do remedial self-learning. Consequently, further exploration into the field of mobile devices should be included in future research on the issue of IT integration into subject instruction.

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## **Appendix A**

### **Technology Integration Questionnaire**

Dear participants,

This questionnaire has three sections and consists of 4 pages. Please mark **ALL** your answers on the accompanying **Answer Sheet** on the last page. Please check the most appropriate response when answering the close-ended question and record your personal comments to the open-ended questions in the space provided in the last section of the answer sheet. After you have completed your responses, please kindly return both the questionnaire and your answer sheet to the researcher by mail. Thank you for your participation.

## Section I

### Your Views on IT Integration into Curriculum

**Instruction:**

*Using the scale provided below, please rate the extent to which you agree or disagree with the following statements regarding Technology Integration into Curriculum:*

Statements	Disagree	Totally			Totally	Agree
Rating	1	2	3	4	5	
1. I believe use of IT integration into English classes is unlikely to create problems in time management in class.						
2. I believe use of IT integration into English classes does not increase teachers' workload.						
3. I believe use of IT integration into English classes may help me better monitor students' learning.						
4. I believe use of IT integration into English classes may promote interaction between the teacher and students.						
5. I believe use of IT integration into English classes can promote teaching efficiency.						
6. I believe use of IT integration into English classes may require more time from me for preparation before class.						
7. I believe use of IT integration into English classes may increase students' learning interest and motivation.						
8. I believe use of IT integration into English classes may promote students' learning effectiveness.						
9. I believe use of IT integration into English classes may promote interaction among the students.						
10. I believe use of IT integration into English classes can meet the students' learning needs.						
11. I believe use of IT integration into English classes has positive influence on teaching effectiveness.						
12. I believe use of IT integration into English classes does not affect students' attentiveness.						
13. I believe use of IT integration into English classes can help cultivate students' learning autonomy.						
14. I believe use of IT integration into English classes may help promote diversity of my teaching.						
15. I believe use of IT resources in English classes can be fit into the curriculum.						

## Section II

### How You Use IT in Your English Class

**Instruction:**

*Please answer the following questions according to your present teaching situation. You are free to check more than one item while answering all the questions except Question 4.*

<b>1. Please check any of the following IT technology available in your school.</b>
<input type="checkbox"/> English Classroom (Classroom exclusively for English courses)
<input type="checkbox"/> Computer Classroom / Technology Classroom
<input type="checkbox"/> Audio-Visual Classroom (Special classroom with multimedia facilities)
<input type="checkbox"/> Ordinary Classroom with overhead projector and on-line computer
<input type="checkbox"/> Online Resources (English learning website/ digital learning platform/online forum)
<input type="checkbox"/> Interactive White Board
<input type="checkbox"/> Digital Information Lectern
<input type="checkbox"/> Multimedia Learning Software
<input type="checkbox"/> Others: _____
<b>2. Please check any of the following IT resources you use in English classes.</b>
<input type="checkbox"/> English Classroom (Classroom exclusively for English courses)
<input type="checkbox"/> Computer Classroom / Technology Classroom
<input type="checkbox"/> Audio-Visual Classroom (Special classroom with multimedia facilities)
<input type="checkbox"/> Ordinary Classroom with overhead projector and on-line computer
<input type="checkbox"/> Online Resources (English learning website/ digital learning platform/online forum)
<input type="checkbox"/> Interactive White Board
<input type="checkbox"/> Digital Information Lectern
<input type="checkbox"/> Multimedia Learning Software
<input type="checkbox"/> Others: _____
<b>3. How often do you use IT resources in English classes?</b>
<input type="checkbox"/> In each class
<input type="checkbox"/> At least once a week
<input type="checkbox"/> About once a month
<input type="checkbox"/> Seldom, probably once a semester
<input type="checkbox"/> Never
<b>4. Check any of the following reasons behind your decision not to use IT resources in English classes?</b>

<input type="checkbox"/>	Not being provided with IT facilities
<input type="checkbox"/>	Lack of knowledge in IT technology and ability to operate IT facilities
<input type="checkbox"/>	Not being provided with training courses in IT use
<input type="checkbox"/>	None of them because I use it very often.
<input type="checkbox"/>	Not being able to afford the time learning and using IT resources
<input type="checkbox"/>	Others: _____

### Section III

#### Personal Information

**Instruction:**

Please check in each square () according to the present situation and fill in each blank carefully.

<b>1. I now teach in _____ elementary School in _____ City/County.</b>
<b>2. The school is located in</b>
<input type="checkbox"/> (1)Metropolitan Cities in Taiwan (Taipei City, New Taipei City, Taichung City, Tainan City, and Kaohsiung City)
<input type="checkbox"/> (2)Cities or Counties in Northern Taiwan. (Keelung City, Taoyuan County, Hsinchu County, Hsinchu City, Miaoli County)
<input type="checkbox"/> (3)Cities or Counties in Central Taiwan. (Chuanghua County, Nantou County, Yunlin County)
<input type="checkbox"/> (4)Cities or Counties in Southern Taiwan. (Chiayi City, Chiayi County, Pingtung County)
<input type="checkbox"/> (5)Cities or Counties in Eastern Taiwan. (Ilan county, Hualien County, Taitung County)
<input type="checkbox"/> (6)Cities or Counties Off Taiwan Islands (Lienchiang County, Kinmen County, Penghu County)
<b>3. School Size:</b>
<input type="checkbox"/> (1)No more than 12 classes
<input type="checkbox"/> (2)12-24 classes
<input type="checkbox"/> (3)25-36 classes
<input type="checkbox"/> (4)37-48 classes
<input type="checkbox"/> (5)49-60 classes

<input type="checkbox"/> (6) More than 60 classes
<b>4. Gender:</b>
<input type="checkbox"/> (1) Male
<input type="checkbox"/> (2) Female
<b>5. Age:</b>
<input type="checkbox"/> (1) 21-30 years old
<input type="checkbox"/> (2) 31-40 years old
<input type="checkbox"/> (3) 41-50 years old
<input type="checkbox"/> (4) 51-60 years old
<input type="checkbox"/> (5) Over 60 years old
<input type="checkbox"/> (6) Others: _____
<b>6. Years of Teaching</b>
<input type="checkbox"/> (1) No more than 5 years
<input type="checkbox"/> (2) 6-10 years
<input type="checkbox"/> (3) 11-15 years
<input type="checkbox"/> (4) 16-20 years
<input type="checkbox"/> (5) 21-25 years
<input type="checkbox"/> (6) 26-30 years
<input type="checkbox"/> (7) More than 35 years
<b>7. Highest Education:</b>
<input type="checkbox"/> (1) BA of English Major in Teachers' Training Institutions
<input type="checkbox"/> (2) BA of English Minor in Teachers' Training Institutions
<input type="checkbox"/> (3) BA of Foreign Language Major
<input type="checkbox"/> (4) Teachers' In-Service 40-Credit Courses
<input type="checkbox"/> (5) MA of English Major
<input type="checkbox"/> (6) PH.D of English Major
<input type="checkbox"/> (7) Others: _____

## **Appendix B**

### **Outlines for the Interviews**

#### **Part 1 Teachers' Demographics**

Q1: Would you please tell me your name?

Q2: Where do you teach?

Q3: How long have you been teaching English in an elementary school?

Q4: What subjects and which grade do you teach in the past and for the present?

Q5: Are you a homeroom teacher, subject teacher, or do you have an administration post at school?

Q6: Can you tell me your studying experiences as a student before you become a qualified full time teacher?

#### **Part 2 Teachers' Teaching procedures & Use of Teaching Resources**

Q1: Can you describe your usual teaching procedures in teaching a lesson?

Follow-up Questions:

1. How do you conduct each of the teaching activities in class?
2. How do you incorporate each kind of teaching resources into instruction?
3. Why do you arrange your English instruction like this?
4. What do you expect your students to learn in each activity specifically?

Q2: What teaching resources do you have in the classroom?

Follow-up Questions:

1. How do you incorporate each of the teaching resources into English teaching in class?
2. Why do you decide to use or not to use a specific kind of teaching resource in the English class?

### **Part 3 Teachers' IT use in English Classes**

Q1: Do you use any IT facility to facilitate your English instruction in class?

**If yes,**

Follow-up questions:

1. Do you decide to integrate IT into instruction?
2. What are the contributing factors behind your decision of IT use?
3. What information technology do you use in English instruction in class?
4. How is the technology used to facilitate or to improve the quality of teaching and learning?
5. What is your expected value of the technology and your perceived effectiveness of it on teaching and learning?
6. Do you have other concerns for IT integration into instruction?
7. What are your students' reaction to IT integration into instruction?

**If not,**

Follow-up Questions:

1. What are the possible reasons for the lack of IT facilities in your school?
2. What is your comment on the lack of IT facilities in your school?
  3. How you manage to reach the goal of English teaching without use of IT?
  4. Instead of IT, what other teaching resources are available for use to assist teaching and learning in English classes?
5. Could you talk more about the students' feedback about your teaching approach?

Q2: Is there any other information technology that you want to incorporate into your teaching in the future?

Follow-up Questions

1. Why do you expect to incorporate the information technology into your teaching in the future?
2. How do you expect that information technology to be integrated into I instruction?
3. What is your expected effectiveness of that information technology?

#### **Part 4 Conclusion**

Step 1: Before we end the interview, please allow me to make a brief summary of our interview today.

Step 2: Is there anything you want to add, to clarify, or to explain further?

Step 3: Thank you for your participation in this interview. I really appreciate your generous help with this research project. Thank you so much!