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由創新擴散理論探討大專英文教師
使用電腦輔助語言教學之信念

College English Teachers' Beliefs about the Use of CALL in Taiwan: A
Diffusion of Innovation Theory Perspective

指導教授：廖柏森老師
Advisor: Dr. Po-Sen Liao

研究生：周 彥
Graduate: Yen Chou

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研究生：周 彥

中文摘要

教師信念與教學實踐間關係緊密，且電腦輔助語言教學（CALL）爲時下英語教學一大趨勢，許多研究致力於探討電腦輔助語言教學的成效，然而對於教師對使用 CALL 的信念並未獲得足夠的研究關注。教師既爲教學主體之一，其信念將影響 CALL 在教學上的使用成效，因此瞭解其潛在的影響因素將有助於 CALL 的推廣。有鑑於以往文獻對此議題關注之不足，本研究之主要目的爲調查教師對於 CALL 的信念以瞭解 CALL 在台灣大專院校使用的現況，並藉由創新擴散理論（Diffusion of Innovation）來分析教師教學上的問題與需求。

本研究以全台大專院校的英語教師爲研究對象進行問卷調查與訪談，希望瞭解教師對於 CALL 的看法及實施現況，同時針對教師所面臨的困境及需要協助之處提供具體建議。問卷含有五大類別：相對優勢 (Relative Advantages), 相容性(Compatibility), 複雜性(Complexity), 試用性(Trialability), 與可觀察性(Observability)。回收問卷共計 186 份，有效問卷共計 176 份。另亦針對 9 位大專英語教師進行深入訪談，以便充分反映教師的意見。研究結果發現：(1) 聽力與閱讀爲 CALL 最常運用的教學項目；(2)本研究所調查與 CALL 相關的四項應用領域包含：超/多媒體、E 化教學平台、線上參考工具與學習網站均爲大部分教師所知，且運用在其教學中；(3)每週使用電腦時數在使用 CALL 與未使用 CALL 兩組教師間有顯著差異； (4)問卷中的五大類別均爲教師考量使用 CALL 時的主要因素（M 值 ＞3）;試用性(Trialability)與相對優勢 (Relative Advantages)

分數最高；而試用性(Trialability)與相容性(Compatibility)為預測 CALL 使用率最顯著的兩因素。教師教學所需之配套措施則包括：充分有效的在職訓練、電腦技術方面的支援、軟硬體及時更新、教師社群間的互助合作管道等。對於教學上應用 CALL 的建議如下：教師自身對於科技知識應持續更新、行政者需重視教師的教學風格與需求、教師需謹慎考慮課程性質、學習者的需求與投入重於技術操作。

　　本研究的發現證實 CALL 雖為一流行趨勢，教師在實際教學應用上仍有其諸多考量與限制。若要將 CALL 更成功地運用於英語教學，除了問卷調查中五、大潛在影響因素，尚須將其他相關因素如學習者的參與、課程性質與行政資源充足與否納入考量。

Abstract

Teachers' beliefs play an important role in understanding the actual practices of classroom instruction. CALL is a relatively intriguing area prevailing throughout the last few decades in language teaching and learning. However, most of the literature on CALL has been concerned with the pedagogical effectiveness of different types of technology or computer programs in language teaching. Research on teachers' beliefs about using CALL has often been ignored, resulting in research which explores the link between language teachers' beliefs and their use of CALL is relatively rare.

The present research aims to examine the underlying factors affecting the adoption of CALL in Taiwan based on the theoretical model of "Diffusion of Innovation Theory" proposed by Rogers (1995). A questionnaire partly modified from Martins et al (2004) was administered to 186 college English teachers to identify the possible factors for adopting CALL-related resources as a vehicle to teach English at colleges. Five attributes were explored in the survey, including Relative Advantages of CALL compared with other instructional methods or tools, Compatibility with teachers' existing values and experiences, Complexity to understand and adopt CALL, Trialability of CALL prior to adoption, and Observability of the teaching results. In addition, semi-structured and in-depth individual interviews were conducted to elicit relevant data to make a more comprehensive investigation.

Data analysis of the questionnaires involved descriptive statistics, independent t-test, Chi-square, and logistic regression. The major findings suggested the following: (1) listening and reading were the two language skills with the highest adoption rate of CALL; (2) the four major CALL categories including hypermedia/multimedia, E-learning delivery platform, on-line reference tools and

learning websites were generally known and accepted by most teachers; (3) weekly computer using hours showed significant difference between CALL and non-CALL groups of teachers; (4) among the five attributes in Rogers' theory, Trialability was the most significant factor to predict teachers' adoption rate of CALL.

This study would shed some light on the understanding of language teachers' beliefs about CALL and raise their awareness of the benefits and limitations of using technology in classroom. The results may provide both language teachers and school administrators a different view into teachers' beliefs about the use of CALL. It is hoped that the field of foreign language teaching and learning may also benefit from insights into the potential factors for adopting CALL for English college teachers.

Key words: diffusion theory, CALL, teachers' beliefs, EFL teaching and learning

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CHAPTER 1

INTRODUCTION

GENERAL BACKGROUND

Teachers' Beliefs

In educational research, the earlier attention of belief research has been focused on investigating self and teacher efficacy, causes of teachers' or learners' performance, consciousness and feelings of oneself, specific subject matters and the nature of knowledge (Pajares, 1993). Within the area of the second or foreign language education, learners' beliefs about the nature of knowledge and learning or epistemological beliefs, have been widely investigated. (i.e. Palmer, & Goetz, 1988; Schommer, 1990; Schommer, 1994a; Schommer, 1994b; Horowitz, 1994; Mori, 1999a; Mori, 1999b). There is a lot of evidence to suggest that individuals' epistemological beliefs may have a profound influence on their ways of learning and the result of their learning. Beliefs may contribute to a better understanding and prediction of an individual's learning processes and outcomes.

Since teaching and learning are analogous to the two sides of a coin, some researchers in education have started studying teachers' beliefs as well as learners' beliefs. They attempted to explore to what extent teachers' conceptualization may affect their teaching process. As a result, over the last few decades, there has been a growing research interest within such fields as educational psychology and second language acquisition. The findings from these research supported that teachers' perceptions and attitudes, or more generally, teacher's beliefs are closely related to their classroom teaching behaviors. Furthermore, in the educational literature, teachers' beliefs have been further pointed out as an important predictor to understanding teachers' thinking processes and classroom practices. (Rokeach, 1968;

Nespor, 1987; MacArthur & Malouf 1991; Pajares 1992; Richardson 1996; Sandholtz, Ringstaff, & Dwyer, 1997; Drenoyianni & Selwood, 1998; Donaghue, 2003).

Computer-Assisted Language Learning

Language education is an area with a variety of aspects worth investigation, in addition to the studies of beliefs, Computer-Assisted Language Learning (CALL) has become very popular in recent years. The result has been a wave of enthusiasm of many language researchers and teachers devoting noticeable amount of attention to the study of CALL. Broadly speaking, much of the research on CALL either categorizes the computer as a teaching tool or a catalyst for changing the ways of teaching and learning (Dexter & Anderson & Becker, 1999; Hinostroza & Mellar, 2000; Jones & Paolucci, 1999; McDonald & Ingvarson, 1997).

It is widely accepted that computer and technology have great impact on the process and results of language teaching and leaning. Thus it has resulted in the increased attention to the use of CALL in classrooms. Though CALL is in fact a well-known innovation, there seems to be no general consensus on what the essential knowledge base of the field consists of. As a matter of fact, CALL is a "relatively new, interdisciplinary field of study" that adopted different elements from various areas, such as psychology, computational linguistics, instructional technology, and artificial intelligence and so forth (Levy, 1997, p.47).

CALL is such a complex discipline, which could be further divided into various sub-categories. The categories could range from basic tools (e.g., word processor) to more sophisticated communication tools (e.g., CMC). Thus the progress of CALL as a discipline is essentially a reflection of the development of the technology with time (Levy, 1997). On the whole, the different applications of CALL have been used in several sectors of language education from speech recognition (Aist, 1999), grammar

checker (Tschichold, 1999), multimedia (Kempen, 1999), corpus to databases (Holmes, 1999; Beaudoin, 2004). In the literature about the applications of CALL in language education, it is also worth pointing out that Diffusion of Innovation Theory has also started to be used to explain the potential factors that may influence the adoption of an innovation in a number of areas (Rogers, 1995; Surry 1997).

PURPOSE OF THE STUDY

In the research on second language education, the literature is full of discussions surrounding the definitions of "belief", and scholars have debated its nature and constructs for decades. Obviously, previous studies on teachers' beliefs were generally conducted in the field of educational psychology and teacher training courses in ESL contexts; therefore, the perceptions and understanding of teachers' beliefs in foreign language education are mostly derived from the broader discipline. As a newly developing discipline, foreign language education also needs research directly relating to its research contexts rather than the adoption of results from other more general fields.

With reference to the teaching contexts in Taiwan, we are wondering about the views of English teachers in Taiwan. In order to have a better understanding of the present situations, it is necessary to take a closer look at their thoughts and perceptions about English teaching. Moreover, most previous research was devoted to investigating teachers' beliefs about their students, the nature of knowledge, their subject matters, their own professions, and the relationship between those beliefs and teaching practices, and others. The constructs and the nature of beliefs have been argued and dealt with for several decades, and the values of teachers' beliefs are generally recognized all over the teaching areas.

On the other hand, as the dramatic growth in a relatively new sub-area of language education, CALL brings a promising vision for many language teachers. In educational research, a substantial number of CALL studies have been conducted over the past years, as proven by the number of papers presented at conferences, and there is no sign that this trend will diminish any time soon. Under such a general impression on the development of CALL, however, what are the English teachers' reactions to this newly used medium in Taiwan? There seems to be relatively little evidence in the perceptions and viewpoints of language teachers despite the documented power of computer and technology in language teaching (Pennington, 2004). Research exploring the links between English teachers' beliefs and their use of CALL is usually ignored, and the teachers' perceptions of using CALL have not been given the attention they deserve. It needs to call for much more attention to this issue since teachers' beliefs are an indicator of the successful or unsuccessful practices.

As far as EFL contexts in Taiwan are concerned, while CALL is used and advocated by a lot of language researchers and teachers, it appears that most of the literature to date has been primarily concerned with the pedagogical effectiveness of different types of CALL used in the English classroom. However, this is not to say that any type of innovation could be "delivered" or "distributed" like a commercial product to language teachers (Widdowson, 1993). In Widdowson's opinion, innovation should be diffused in a manner so as to be tailored to meet different pedagogical needs and educational contexts. Teachers are the mediators instead of retailers who aggressively promote the innovation to their target "consumers", i.e. students.

Though some research has been done on teachers' beliefs and perceptions of the use of CALL or other instructional technology, it has been found that the participants

in these studies are generally elementary, middle or high school teachers without the participation of college teachers (i.e. Marcinkiewicz, 1994; Wills & Mehlinger, 1996; Ertmer, 1999; Brent et al, 2002; Hémard, 2003; Liou, 2004,). In reality, colleges are the places where CALL can be more flexibly applied and evaluated, so the college English teachers usually have much more opportunities to try out CALL in their classes. If we can probe into the college teachers' thoughts and perceptions, it will contribute a better understanding of the current state of CALL in Taiwan. In fact, few of the earlier studies were carried out in the classroom of English as a foreign language, and most were conducted in the ESL teaching environments.

English has become a dominant international language in the world; the viewpoints from EFL teachers about the applications of CALL are worth investigating because their perspectives and attitudes will have a profound influence on their students. If we explore this issue in Taiwan, we can have more diverse views on the use of CALL in addition to the ESL perspectives.

In foreign language education, CALL could be treated as a new novelty. In order to explore how Taiwanese English teachers adopt CALL as a teaching innovation, the Diffusion of Innovation Theory is served as a substantially systematic framework for the researchers. The theory could function as a bridge between teachers' beliefs and CALL in that it provides us with an avenue to examine teachers' underlying perceptions about the use of CALL. In fact, Rogers' theory has been extensively used in many different disciplines, but very few language education studies have been conducted based on it.

The inclusion of the Diffusion of Innovation Theory could be used as an alternative to build up a bigger picture of the college teachers' beliefs about the use of CALL. By means of using Rogers' theory, we could examine the current state of and

the potential factors for the adoption of CALL in Taiwan. The theory of the perceived attributes allows us to explore the underlying thoughts held by the language teachers toward the new teaching medium, CALL. By applying this theory as a theoretical framework, we not only can understand the possible factors for adopting or refusing CALL for college English teachers, but also can derive significant information from their beliefs and attitudes. These results could in turn constructively provide useful recommendations for both researchers and language teachers to use CALL efficiently. As mentioned earlier, much attention on CALL has been paid to the practices and evaluations of the computer programs and its technology, with only a paucity of research into teachers' perceptions in terms of Diffusion of Innovation Theory, or more specifically, the theory of perceived attributes. It is hoped that this study could yield some insights on the actual adoption of CALL and the viewpoints about using CALL from EFL college teachers in Taiwan.

MAJOR RESEARCH QUESTIONS

Form the above-mentioned purposes, the present study intends to identify the underlying factors that may support or hinder the adoption of CALL as a teaching tool for teaching English in Taiwan based on the view of Rogers' theory of perceived attributes. The present research would like to investigate what factors are most influential for college English teachers as they decide to apply CALL into their classroom. Thus, the following research questions will be addressed:

1) What language skills are taught with the adoption rate of CALL?

2) What CALL elements are widely used by college teachers?

3) What are the differences between the responses of the CALL and the Non-CALL teacher groups?

4) What factors may affect the adoption of CALL in the college English teaching

contexts?

SIGNIFICANCE OF THE STUDY

By probing into the issue of teachers' belief about CALL and identifying the possible factors for adopting CALL based on the theory of perceived attributes, the present study is intended to serve as a preliminary attempt to study the current situation of using CALL in Taiwan and as a reference for the language teachers to examine the relationship between foreign language courses and the use of CALL.

For those non-CALL teachers, the present study could be conducive to providing a better understanding of college teachers' beliefs about the actual use of CALL in Taiwan and provide more empirical evidence for them to understand the current trend. Moreover, with a more in-depth investigation of the underlying factors for adopting CALL, the findings of the study could offer some significant insights for language teachers and the administrators in Taiwan's colleges to reflect deeply on the trendy issues of CALL. For language teachers, who are the potential users of CALL, the findings could give them more perspectives on language courses design and the roles of CALL in English teaching and learning. Furthermore, administrators in foreign language institutions could have an alternative avenue to find out the needs and policy design suggestions from the teachers. In these ways, both practitioners and executives could cooperate with one another and contribute to the enhancement of foreign language instruction in Taiwan.

THE ORGANIZATION OF THE THESIS

In addition to Chapter 1, which contains the background, purpose and research

questions as well as the significance of the present study, this thesis is organized based on the following structure. In Chapter 2, some important and related studies and issues of teachers' belief, Computer-Assisted Language Learning, and Diffusion of Innovation Theory will be reviewed. The methods, participants, instrumentation, data collection procedures and the pilot study will be addressed in Chapter 3. The results and discussion will be summarized in Chapter 4. Finally, a brief conclusion and the suggestions for the future research will be given in Chapter 5.

CHAPTER 2

LITERATURE REVIEW

The education literature provides a plethora of evidence for the importance of teachers' beliefs and the applications of CALL. In this chapter, some important studies and related issues of teachers' beliefs, Computer-Assisted Language Learning, and Diffusion of Innovation Theory will be reviewed to form a theoretical background for the present study.

TEACHERS' BELIEFS

Definitions of Belief Systems

Since the literature is filled with discussions surrounding the issue of beliefs, it is crucial to examine and review the definitions concerning beliefs before we take a closer look at the studies in various contexts. In addition, different researchers might hold different attitudes and define beliefs in somewhat different ways. Though different researchers may have different opinions on the definitions of beliefs, many researchers argued that the terms should be used as consistently and appropriately as possible once they have been basically and locally defined.

Firstly, beliefs are defined as "a set of conceptual representations which signify to its holder a reality or given state of affairs of sufficient validity, truth and/or trustworthiness to warrant reliance upon it as a guide to personal thought and action" (Anders and Evans, 1994). Moreover, belief systems could be described as "the information, attitudes, values, expectations, theories, and assumptions about teaching and learning that teachers built up over time and bring them to the classroom" (Richard, 1998, p.66). Kagan (1990) categorized teachers' beliefs under the super ordinate term "teachers' cognition". In a broad and loose definition provided by

Kagan, teachers' cognition could include "teachers' self-reflections, beliefs and knowledge about teaching, students and content, and awareness of problem-solving strategies endemic to classroom teaching" (p. 421). However, teachers' beliefs are also referred as "the highly personal ways in which a teacher understands classrooms, students, the nature of learning, the teacher's role in a classroom, and the goals of education" (p.423). There is no precise boundary separating beliefs and other terms; therefore, problems may arise from the inconsistent use of those terms along the same concepts. Besides, Rokeach (1968) described a belief system as "having represented within it, in some organized psychological but not necessarily logical form, each and every one of a person's countless beliefs about physical and social reality" (p.2). To put it differently, beliefs are heuristic propositions that may begin a typical phrase with "I believe…" (p.2). Along the same lines, he also argued that some beliefs are more central than others, which implied that those central beliefs are not subject to change easily. Nespor (1987), on the other hand, addressed that beliefs systems involve "proposition or assumptions about the existence or nonexistence of entities" (p.318). Richardson (1996) further added an element of attitude to the definition: "attitudes and beliefs are a subset of a group of constructs that name, define, and describe the structure and content of mental states that are thought to drive a person's actions" (p.103).

The Important Roles of Beliefs

Teachers' beliefs can inform researchers and educators about how teachers are likely to guide their efforts to implement their teaching practices. Research on examining the teachers' beliefs and the links between beliefs and behaviors has been investigated on several grounds. One justification is due to the conceptual deficiency of the behavioral models, and the other arises from the evident relationship between

these two constructs, that is, teachers' beliefs and practices (Shavelson and Stern, 1981). They have suggested that what teachers do is governed by what they think, and that teachers' theories and beliefs serve as a "filter" through which a host of instructional judgments and decisions are made. The importance of asking teachers to speak out their minds and decision-making processes with regard to their teaching methods was demonstrated in Feiman-Nemser and Floden's (1986) research on the culture of teaching. Since teachers' beliefs have been recognized as a significant issue and predicator for the actual practices in the real classroom, the need to find out the sources of teachers' beliefs has become important. Richardson (1996) also summarized the findings in the literature on learning and suggested that there are three categories of experience which influence beliefs. These categories include personal experience, experience with schooling, experience with instruction and experience with formal knowledge.

What roles, if any, will beliefs play in the field of teaching? In some respects, belief systems could serve as a lens through which we can view both the content of the teachers' development program and their language teaching experiences (Richard, 1998). As many researchers, including Richards et al. (2001) have pointed out, teachers' beliefs play a central part in the teaching process and do affect their practices. Anders and Evan (1994) also further noted that the contradiction between beliefs and practices becomes another reflective process for change in that the inconsistencies are indicative of the possibilities for the acceptance and uptake of new approaches, techniques and activities (Anders & Evan, 1996; Donaghue, 2003). From the perspective of these researchers, the reflective process when properly implemented in teacher education programs will help teachers to modify their understanding of teaching and learning apart from affecting their views of themselves

professionally. The study of beliefs apparently is not only important but also complex for the people who are interested in the issue.

In addition, the importance of personal beliefs to instructional evolution has been reported in a number of recognizable studies as well (Nespor, 1987; Rokeach, 1968; Sandholtz, Ringstaff, & Dwyer, 1997). As for the importance of teachers' beliefs, it is generally believed that teachers' beliefs will greatly influence their teaching practices in the classroom; in other words, beliefs held by teachers may shape their behaviors, and teachers' ways of thinking and understanding are vital components of their practice. Thus knowing how to replace and modify teachers' misconceptions becomes critically important. (Nespor, 1987; Sandholtz, Ringstaff, & Dwyer, 1997).

Methods for Examining Beliefs

In studying the cognitive skills held by teachers, diverse approaches have been employed ranging from questionnaires, interviews, think-aloud procedures, planning tasks to stimulated recall. In addition, other methods employed include written accounts of teachings from journals, case studies and narratives (Richards, 1998). One of the crucial concerns regarding the importance of teachers' thinking process is the difficulty to "get inside teachers' head" in order to understand their beliefs, knowledge, attitudes or values (Feiman-Nemser & Floden, 1986). Since belief systems are an important yet illusive issue, another problem indicated by Nespor (1987) is that the studies on beliefs lacked a "theoretically-grounded model." Furthermore, additional evidence in support of the difficulties in eliciting teachers' beliefs was provided by Kagan (1990). In this review article, the author was in strong agreement with the previous researchers' viewpoints in which teachers' cognition is hard to be accessed directly. Even though the research on teacher' cognition is not in its infancy, the ambiguity of the term is a major problem. The reasons for the

difficulties, according to Kagan, result from the vagueness of results in previous research compounded by the ambiguous definitions of teachers' cognition, that the teachers' beliefs are generally held unconsciously. Also noted were the time-consuming nature of the research methods, the disparate data from the limited scope studies, and the objectivity or lack thereof in the self-report accounts. Along the same vine, Richardson (1996) summarized the findings from previous studies and suggested that the contextualized and classroom experience have a great effect on the change in teacher's beliefs.

Given the nature of beliefs, it can be argued that the most difficult part in eliciting teachers' beliefs lies in how to articulate those subconsciously personal concepts, which by its nature somewhat challenging for most teachers. Moreover, it is impossible for teachers to express their thoughts frankly because beliefs are tightly related to their self-images. Some of them may not exactly present their beliefs for the sake of protecting the positive images of themselves (Donaghue, 2003).

In addition, as Richardson (1996) noted, the measurement of beliefs in recent literature has been shifted toward quantitative and focused merely on teachers' perceptions of classrooms. In other words, beliefs were measured in the way of multiple choice surveys; however, it was criticized as too constraining and often failed to truly represent teachers' beliefs. In more recent research, more qualitative methods have been employed to inductively explore teachers' beliefs.

Nevertheless, in spite of arguments that teachers' beliefs play a crucial role in the ways teacher conceptualize tasks and learn from experience, relatively little attention has been accorded to the structures and functions of teachers' beliefs about their roles, their students ,the subject matter they teach and the schools they work in (Nespor, 1987). Moreover, the research that does exist on these issues has relied either on very

broad and inclusive concepts or on descriptive frameworks closely bound to specific cases and of limited use for generalization or comparison. Furthermore, when it comes to the language teaching contexts in Taiwan, most literature has been undertaken to investigate language teachers' actions and practices, and learners' perceptions and performance in the classroom, resulting in less attention being paid to look in to teachers' beliefs and perceptions.

COMPUTER-ASSISTED LANGUAGE LEARNING (CALL)

Over the last few decades, within the field of second language education, we have witnessed considerable interest in the research of Computer-assisted Language Learning (CALL). A number of researchers have reviewed the history and developments of computers and technology from different perspectives (Warschauer, 1998; Salaberry, 2001; Zhou 2003; Bax, 2003). Warschauer (1998) divided the history into three major stages: behavioristic CALL, communicative CALL, and integrative CALL. He further classified the approaches to CALL into structural, cognitive and sociocognitive orientations based on the changing nature of computers (Warschauer, 2000). Another representative example is a retrospective article that critically reviewed and analyzed all the papers published in the *Modern Language Journal* since 1916 (Salaberry, 2001). In this article, all the pedagogical and technological resources proposed during these decades were assessed. The author aimed to verify whether the advanced technologies have achieved an equal degree of pedagogical effectiveness and benefits in second language teaching as those did in the overall contexts of human interaction. It is a mirror which leads us to take a glance at the chronological and rapid developments of computers and technology in the past century.

In another illustrative review article which attempted to assess the potentials of technology in language education, Zhou (2003) proposed another avenue for us to witness the popularity of CALL in the past decades. For example, increased attention has been paid to the research of pre-service teacher education (Jones, 2002; Brent et al., 2002; Rilling et al., 2005). In particular, Rilling et al. (2005) drew attention to the integration of the theory and practice of CALL in four graduate-level language teaching courses, and aimed to demonstrate the processes and effectiveness of CALL in language teaching. They further suggested that CALL-related courses could facilitate the novice teachers to apply theories learned into classroom practices.

Definitions of CALL

As suggested by Levy, CALL is a multidisciplinary field. Therefore, the role of CALL in language education is somewhat jumbled and confusing. In Wtatt's view (1987), computers are a potentially practical tool in a language classroom. CALL has become a widespread terminology in the field of second and foreign language education; for the purpose of research, an overall understanding of CALL should be reviewed. In essence, CALL is multidisciplinary facet that comprises a great number of ingredients. Thus, there is little agreement about the meanings of some terms in literature on CALL (Pusack, 1987). Among those terms, such as CAI, CBI, or CALL, are generic so they could be applied to all forms of educational computing not only for use in language education. In order to seek an overall picture of CALL, the jungle of the terms need to be cleared up. Several current and important terms concerning CALL are further provided and discussed below.

Computer-Assisted Instruction (CAI)

Computer-Assisted Instruction (CAI) could be seen as a generic term which may have different connotations. Firstly, CAI involves the use of the computer, usually by

means of a student-computer dialogue in which the student and the computer take turns providing information to each other, and in which that information affects the course of the interaction. It is also called computer-based instruction, computer-enhanced learning, or computer-assisted learning (Hope et al, 1984). The interactivity is also a noticeable feature of CAI as mentioned by Pusack (1987). In his view, CAI usually could be referred to as "interactive teaching program" which derived from traditional CAI with programmed learning concepts (p. 14).

Hypermedia/Multimedia

The emergence of hypermedia contributes a more vigorous resource to the content of CALL. It combines the merely fundamental elements of CALL, such as linear text, with a variety of functions, like animation, digital graphics and sounds. According to Ashworth's definition (1996), hypermedia usually refers to "electronic documents that can access and link together a rich collection of resources in various media" (p. 81). Multimedia are the combinations of sound, video, and other resources. However, hypertext only refers to the linking of texts to text and graphics. It is noteworthy that though Ashworth indicated that hypermedia seems to be more inclusive than multimedia, he generally treats multimedia and hypermedia synonymously.

Databases and Concordancing

With the spread and availability of the Internet, a broad variety of electronic resources have been around in language education. Among these resources, a typical element is databases, which is "a collection of information typically stored on a computer and organized in such a way that it can be processed" (Beaudoin, 2004). The most useful aspects of using databases in language education are the dynamic information processing capabilities. Furthermore, databases in CALL are commonly

used for three main purposes, including reference, management of large websites, and data processing (Beaudoin, 2004). Concordancing, on the other hand, refers to "a mean of accessing a corpus of text to show how any given word or phrase in the text is used in the immediate contexts in which it happens" (Flowerdew, 1996). For language teachers, Concordancing can be used as a linguistic informant, a source of input for teaching, and the input for materials development. To learners, concordancing is also helpful in error analysis, serendipity learning, and inductive reasoning (Flowerdew, 1996).

Computer Networks and Web-based CALL

Although the Internet or World Wide Web (WWW) has existed for nearly 30 years, only recently has its surge of mainstream popularity motivated researchers to acknowledge its educational value (Felix, 2003). This is particularly the case with the rapid technological advances in multimedia, hypermedia, web-based CALL applications and computer-mediated communications. With the advent of multimedia technology and the Internet, the role of computers in language education has been a remarkable issue confronting many researchers and language teachers all over the world. This can be vividly illustrated by the interesting metaphors being "Information Superhighway" and "Orchestra" cited in the introduction of the book edited by Felix (2003, p.8). The latter is more suitable to describe the Internet in that it goes through a process of performance with a specific goal to finish in the end.

To give one illustrative example, one form of CALL called "network-based language teaching (NBLT)", has been shifted attention from the sole usage of computer itself to the connection of the computer and the Internet. In their edited book, Kern and Warschauer (2000) indicated that "NBLT is language teaching that involves the use of computers connected to one another in either local or global

networks" (p.1). Kern and Warschauer (2000) claimed that CALL could be superficially divided into pre-network CALL and NBLT, and these two stages could be roughly distinguished from each other in terms of "networking". The most apparent distinction between traditional CALL and NBLT lies in the focus of the latter is the "human-to-human communication" rather than the applications of different kinds of programs. Chapelle (2000) echoed Kern and Warschauer's view and suggested that NBLT could be seen as one type of broad CALL. Similarly, a computer network, based on Hoffman's (1996) definition, is "a linkage of two or more workstation of software, data and peripheral devices" (p. 56). It is also a comprehensive term to include the Internet, World Wide Web, e-mail, asynchronous and synchronous communication, virtual reality, and the list goes on and on.

With reference to language learning situations, both teachers and students intend to meet an ultimate goal of learning. On-line learning is also another instance of people's endeavor to promote the more effective learning outcomes. Nevertheless, people are generally conscious that they are using something related to the Internet, but they are not necessarily able to define what online language learning is. Felix (2003) attempted to solve this problem in the way of providing a global view of online language learning instead of giving a specific definition. According to Felix, it is generally said online language learning could be classified into two major forms: one is operated as "virtual classroom" in which technology plays the roles of both tutor and tool; the other form is extra activities for class in which technology mainly acts as a communicative tool.

The rapid growth of the Internet and other forms of technology also contributed to the development of Computer-mediated Communication (CMC). Murray regarded Computer-Mediated Communication (CMC) as "the process by which people create,

exchange, and perceive information using networked telecommunications systems (or non-networked computers) that facilitate encoding, transmitting, and decoding messages" (1997, p.1). Also, Warschauer (1997) pointed out five distinguishing characteristics regarding CMC, including text and computer-based interaction, many-to-many communication, time and space independence, long distance exchanges, and hypermedia links. In terms of these features, CMC seems to be a promising and comprehensive medium for language learning.

The Roles of CALL in Language Teaching and Learning

To have a better understanding of computer use in language education, it is necessary to make a distinction between the medium itself, that is, the computer, and the approach or methodology (Wyatt, 1987). Many people are familiar with the term, CALL, but the role of computers needs more elaboration in the area of CALL. There is considerable disagreement among researchers about the roles of computer play in language learning. For the most of part, a computer is regarded as a tool for language teaching and learning and is greatly applied into different language tasks.

Wyatt (1987) argued that a computer could be a more promising element of a wide range of approaches than a limited type of methodology. Levy (1997) adopted Taylor's framework (see Taylor 1980) in which computer plays the roles of tutor, tool, and tutee. The distinction between the tutor and tool is that tutor assumes the ability to "evaluate" student's input. In contrast to tutor, the computer is taught and tutored by teachers and learners. Levy also compares two triangular models of CALL: the Ahmad-model consisting of the learner, language and computer, and Farrington's 'triangular model involving the participation of the teacher, class and computer. In Levy's viewpoints, Ahmad's model emphasizes the role of the computer as a tutor or a 'helpful teacher', while Farrington's model regards the computer as a tool rather

than a tutor with a less dominant role assigned to the computer. The teacher's role in Farrington's model becomes more significant. Meskill (1999) claimed that the efficacy and values of computers would be enhanced if it is successfully integrated into classroom tasks. The cognitive participation and active engagement of learners is a key to the expediency of technological innovations, or the machine itself could not assume the powerful and subservient role in language learning alone.

For many researchers or language teachers, courseware development of CALL is a fundamental issue regarding the role of computer. Generally speaking, there are four categories for the distinction of CALL materials in education which are drills, tutorials, simulations, and management (Pusack, 1987). The material production is closely related to the role of language teachers; however, the roles of CALL have suffered from much criticism. On the one hand, language teachers are expected to participate in the materials development; meanwhile, there is no generally accepted framework by which to guide their work (Levy, 1997).

With regard to the teacher-made instructional materials, it has been pointed out that one of the most serious problems for language teachers in Taiwan is the development of materials. Teachers do not seem to have enough time and support to learn additional technical skills for producing their own materials even though they would like to do so (Kin & Lee, 2003). In their view, they can learn the practical instructional technology skills only through effective workshops and demonstrations so that they can turn their current materials into dynamic forms.

The Advantages and Limitations of CALL

The merits of computers and technology have been indicated in the previous literature. For one thing, the value of technology has been recognized at least as effective as human teachers by many researchers. This point is supported by the

review article written by Zhao (2003). From this perspective, we can realize why there is a rise in the numbers of first and second language studies conducted on the use of computers and technology for language teaching and learning.

However, this idea that computer and technology may enhance teaching quality has also created "mixed feelings" and aroused a variety of reactions. Computers on one hand have drawn a lot of attention and interests from teacher community, but they make teachers worry about the dominate role of technology. If the computer has rapidly and markedly come into the teaching discipline as an educational aid, many educators and researchers are curious about the overtly attractive characteristics of CALL. For example, Kenning & Kenning (1983) claimed that the most distinguishing feature of the computer compared with other pieces of equipment in education like tape recorder is its "interactive capacity" (p. 2). More specifically, computers are able to analyze and correct students' responses which cannot be done by books or other tools.

As far as learners are concerned, the computer also plays the role of partner, or reference book, offering privacy and amusement. For teachers, it helps them make better use of time and classroom activities (Kenning & Kenning, 1983). Colpaert & Decoo (1999) indicated that two important factors need to be taken into account with regard to the swell of CALL; in other words, the rapid advancement of technological innovations and the public reactions to the fever of CALL. We have found that CALL has been accepted, justified, and even promoted over the years; as a result, more and more products of CALL are available though the commercial success is per se not a valid indication of quality.

It is a commonly held view that the elements of CALL seem to be very promising for language teaching and learning. CALL has its own attractive nature, but

there are also some drawbacks of CALL if we take a closer look at the existing applications in educational contexts. Lacking a theoretical or conceptual framework to direct researcher is one of the major problems among CALL research, which is indicated by Levy (1997). We can also analyze this negative aspect from the perspectives of both teachers and learners. Firstly, teachers are generally discouraged by the limitations of the available authoring tools in spite of that they are aware of the attractiveness generated by CALL (Levy, 1997; Felix, 2003). However, if teachers intend to create their own CALL materials, it will be too time-consuming not to mention the ability to deal with the unexpected problems from predetermined fashion of the computer (Kenning & Kenning, 1983). In practice, unfortunately, whether to use computers or not in a language courses is largely determined by the availability of technical equipment and financial funding.

From the perspectives of learners, they may be discouraged by the technical problems during the computerized courses, because most of the problems cannot be solved immediately. As a result, learners may not pay full attention to the learning process (Kenning & Kenning, 1983).

Teachers' Beliefs about the Use of CALL

It is important to realize that the human teachers can not be completely replaced by the computer. Nevertheless, teachers' roles in CALL, like other general language teaching fields, are usually neglected (Liou, 2004). In some sense, teachers can enhance themselves professionally through reflective practice and active research with the aid of computers. To this point, the question that how the teachers or the practitioners react to the computer still remains unanswered. The wide acceptance of CALL, or certain types of CALL materials among the public does not imply that most teachers are genuinely willing to apply CALL-related resources in their language

teaching processes (Colpaert & Decoo, 1999). Generally speaking, though there has been an abundance of implications derived from the research in such diverse areas as educational psychology and psycholinguistics, the prominent concerns for many teachers are about the dramatic variations and change of technology. (Curtin & Shinall, 1987).

In the literature regarding teachers' reaction to the use of computer, Colpaert and Decoo (1999) pointed out three proactive reasons to explain this much-debated phenomenon; that is, why the claimed popularity of CALL in education cannot truly reflect teachers' applications in their teaching process? Firstly, the training provided for language teachers is not enough to assist them to deal with their students. The second reason is from the impediment of the executive and personal schedules. Without sufficient finance to accommodate and update equipments is another important factor for this problem. On one hand, Levy (1999) illustrated the "vividness" effect, as characterized by Taylor and Thomson (1982, cited in Levy, 1999), and further suggested that the superficial appearance of a program or learning contexts do not sufficiently support the justification of a design and the good understanding of learning. As Levy stated, the task and the learners' engagement matter more than the multimedia devices. On the other hand, some researchers contended that language teachers should be responsible for the access to computer and technology in the teaching community. As a language teacher, Pennington (2003) suggested that it is necessary to become "directly involved in resolving computer issues and deciding the best ways to make use of computer potentials for our own population of students" (p. 306). In Liou's (2004) three-year project, she constructed an online environment for teachers to use, and she analyzed how language teachers adopt technology into their teaching process. She believed that a virtual teacher

learning world could enhance student-teachers' beliefs to be real teachers. Very often, language teachers are encouraged or even forced to keep up with the burgeoning technological movement. However, just reading about CALL without any sufficient contact does not equip the practitioners with the confidence and ability to use the technology (Curtin & Shinall, 1987). Before we accept that the computer and technology are the magical and effective remedy for language teaching and learning, it is necessary to examine what kind of factors that may facilitate or impede teaches to use computers in education, how the teachers perceive CALL, and to what extent they believe in the power of CALL.

The Factors for Adopting or Refusing CALL

Understanding the underlying factors that may be the obstacle for teachers to use computers in the classroom can help both researchers and practitioners gain insights into how to make appropriate use of computers. Many researchers have concerned about the disparity between the actual and expected use of computer and technology. As a result, many studies attempted to explore the potential factors that may affect the teachers or administrators to choose CALL as a form of teaching tool during the decision-making or implementation process (Braak, 2001; Debski, 2000; Egbert, Paulus, & Nakmichi, 2002; Ertmer et al. 1999; Knezek et al. 1996; Lam, 2000; Marcinkiewicz, 1994; Yildirim, 2000; Brent et al. 2002).

Based on the findings from previous studies, a wide range of factors for adopting or refusing CALL have already been identified. For instance, Ertmer et al. (1999) suggested that the underlying reasons for whether or not to use computers range from "internal" to "external" barriers. According to these researchers, internal barriers refer to teachers' beliefs about teaching, computers, classroom practices, and unwillingness to change, all of which are intrinsic to teachers themselves. By contrast, external

barriers are extrinsic and flexible to change. These include the barriers such as lack of computers and software, time pressure, and insufficient technical and administrative support. Their study examined the relationships between internal and external barriers by exploring how teachers' beliefs about technology relate to their classroom practices. They indicated that both barriers are closely associated with the teachers' decisions. In addition to the mechanical and personal variables, Brent et al. (2002) found that the supportive and knowledgeable cooperating teachers are an important factor influencing student teachers' effective use of technology.

An important, albeit often ignored, concern needs to be taken into account is to design the applicable and useable programs; that is, a language learning system is not only has to be effective, but also should be user-friendly and easy to learn (Hémard, 2003). Besides, as suggested in Marcinkiewicz's study (1994), innovativeness, teacher locus of control, relevance to teaching, and teachers' self-confidence in using computers are the relevant variables worth being considered. The general situations appeared to parallel with the statement made by Willis and Mehlinger (1996): teacher education programs, particularly pre-service training, do not equip the teachers with the competent knowledge to work in the classroom with computers and technology. In Pennington's view (1996), a reflective practitioner in education is able to approach reflective practice and cultivate professional expertise by interacting with the problems and by learning from the problem-solving processes. From this perspective, understanding underlying factors affecting the use of CALL could provide some suggestions for improvements in future teaching. Providing thorough pre-service training on the applications of the new medium in language teachers' curriculum is suggested as a better way to solve their problems (Curtin & Shinall, 1987).

DIFFUSION OF INNOVATION THEORY

One can say that computers and technology are the new types of innovation in recent decades. The adoption of CALL in the language classroom is closely concerned with the notion of "diffusion" proposed by Rogers (1995). This view corroborated with the White's argument (1993) that the focus of diffusion in language teaching is with respect to technological change. The term "diffusion" is described as "a process by which an innovation is communicated through certain channel over time among the members of a social system" (Roger, 1995, p.5). The author in his seminal work "*Diffusion of Innovation*" proposed a set of variables to explain the rate of adoption of innovations. Combining with other variables, such as types of innovation-decision, communication channels, nature of the social system, and extent of change agents' promotion efforts, perceived attributes of innovations could possibly affect the rate of an innovation among potential users or consumers.

Rogers' theories have been widely promoted and used in a number of fields, such as environmental degradation, economic development, public health, educational opportunity, and so forth. Take Surry's study (1997) for example, it described how Rogers' theories have been incorporated into the field of instructional technology. Among Rogers' theories of diffusion, four most extensively used theories are Innovation Decision Process, Individual Innovativeness, Rate of Adoption, and Perceived Attributes.

The Theory of the Perceived Attributes

Rogers (1995) pointed out the theory of the perceived attributes can be treated as an indicator to explain the rate of adoption of an innovation, which including five major attributes: Relative Advantage, Compatibility, Complexity, Trialability, and Observability. Based on Rogers' definitions, the first attribute is Relative Advantage,

which refers to the degree to which an innovation is perceived as better than the idea it supersedes. The second one is Compatibility, which means the degree to which an innovation is perceived as being consistent with existing values, past experiences, and needs. The third element is Complexity, which indicates the degree to which an innovation is perceived as difficult to understand and use. The fourth category is Trialability, which relates to the degree to which an innovation may be experimented with on a limited basis. The last category is Observability, which suggests the degree to which results of an innovation are visible to others and to potential users. With reference to the applications of CALL in language teaching, CALL could be regarded as an innovation in that computer and technology are truly a type of innovation. This theory invites us to look from a different perspective at teachers' perceptions of the factors that may affect their use of technology.

Research on Diffusion of Innovation Theory

Though Rogers's theories have been applied as a theoretical model into various research areas; however, such a view has rarely been used in language education to examine to what extent teacher's perceptions of CALL may influence the actual implementation in the teaching context. One of the rare examples can be seen is Bax's review article about the history of CALL (2004). The author not only offered a critical examination of the development of CALL in the past decades, but also proposed an alternative model to shed new lights on the conceptualization and analysis of the history of CALL. As suggested by Bax (2004), the end goal of CALL is to attain a state of "normalization" in which the technology becomes an "invisible" and natural part in everyday life, and then CALL is truly accepted and integrated into language teaching environments. He further suggested that the "normalization" may be attained through adopting and modifying the diffusion of innovations to suit the

particular research and teaching contexts.

Indeed, before the publication of Rogers' book, Markee(1993) and some other pioneer researchers, have argued that a diffusion of innovations perspective could provide as a set of coherent guidelines for language teachers to examine the development of language teaching innovation. Furthermore, this perspective also allowed the researchers to evaluate the actual implementation retrospectively. Based on this framework, both researchers and practitioners could conceptualize either evaluation or development in language teaching. Therefore, some researchers in the field of language teaching called for attention on the adoption of Rogers' theoretical model. The earlier focus on the role of diffusion of innovation and language learning is mainly concerned with syllabus design and teacher development, as affected by the wave of the communicative movement (Markee 1993; White, 1993; Widdowson, 1993).   Then the attention was paid to the different types of teaching instruments and tools. For example, Pennington (2004) provided a more elaborated model based on that of Rogers (1995) involving three consecutive phases for examining the adoption of Information Technology in language teaching. In Pennington's view, the attention of CALL within education has given away from mechanical elements to more interactive applications. However, his model and arguments were based solely on the example of online chatting, which seems to be weak and unconvincing.

Though the discussion on the Diffusion of Innovation Theory is highly pertinent to the study of language education, the direct adoption of Rogers' theory in the field of language teaching and learning is only found in Martins et al's study (2004). In Brazil, these researchers used Roger's theory of the perceived attributes in Diffusion of Innovation Theory as the theoretical framework in order to investigate the underlying factors which influence the adoption of the Internet as a teaching tool at

foreign language schools. They found that the variables of "observability" and "trialability" were the two most important factors for the administrators to determine to adopt the Internet as a teaching tool. Another interesting finding was that language teachers' requests for adopting the Internet have greatly influenced the pedagogical decision. Moreover, administrators at Brazil schools played a key role in the Internet adoption rate. Besides, appropriate training and enough time for exploring in the language classroom were two important components in the innovative process.

Generalizing from the related literature, a gap between teachers' beliefs and CALL could be bridged for more elaborated understanding of teachers' beliefs about CALL. The perceived attributes theory, a subpart of Rogers' Diffusion of Innovation Theory, could offer a theoretical framework for investigating teachers' beliefs about CALL and potential factors for CALL adoption. Through the investigation of college teachers' beliefs about CALL based on Diffusion of Innovation Theory, it is hoped that this research could shed some lights on teachers' perceptions about CALL in Taiwan.
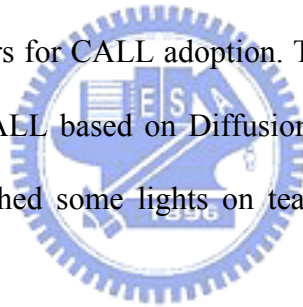
CHAPTER 3

METHOD

In this chapter of research method, both quantitative and qualitative approaches, applied in the present study will be presented and discussed. The first section describes the information on the participants and the sampling criteria. In the second part, instruments including the questionnaire and the interviews will be provided. The third section focuses on the data collection procedures involving the pilot study as well as the formal investigation, and the methods of data analysis will be explained in the last part.

PARTICIPANTS

According to the statistics released by the Ministry of Education in 2006, there are 162 college-level schools around Taiwan, including 70 universities/colleges and 92 universities of science and technology and institutes of technology. In order to search for more specific information on each college, the researcher browsed the websites of most schools via Yahoo search engine. The total of accessible numbers of the schools is displayed in Table 3.1. Moreover, the research also collected email addresses of the target participants provided by the foreign or applied language department of each school, which followed the simple random sampling strategy addressed by Nunan (1992). In this way, the participants were selected at random from the population so that the results could more accurately reflect the whole picture of English teaching situation all over the island. That is, most participants were selected from different geographic areas of Taiwan to ensure that the sample is representative of the population as a whole. A total of 186 college English teachers participated in the current study. Of the 186 questionnaires, 10 were invalid, so 176

valid questionnaires were used for this study.

Table 3.1   Numbers of the Colleges in Taiwan

School Types	Total	Available on Yahoo website
National University	23	15
Private University	27	22
University of Science and Technology	25	24
Institute of Technology	37	28

Source: http://tw.dir.yahoo.com/Education/Education_Unit/Universities/

INSTRUMENTATION

Both quantitative and qualitative research methods were implemented in the present study based on the following stances. Firstly, quantitative method could gather the anonymous participants' opinions from a relatively larger pool of samples. Moreover, it could elicit more full-fledged viewpoints about certain questions once at a time (Nunan, 1992). However, the major weaknesses of quantitative research lie in the low return rate and limited written answers from the respondents (Brown, 2001). In addition to the questionnaire survey, the oral interview could be used as a complementary tool to supplement the quantitative data. It allows more flexibility than the questionnaire in that more profound and rich information would be obtained throughout the interview.   Therefore, these two different research methods were administered in the current study.

Format and Content of the Questionnaire

The questionnaire was composed of three major sections (see Appendix B). The first part was the demographic information of the participants, including gender, age, educational background, location of school, years of teaching experience, weekly computer using hours, CALL availability condition, and the domain with application

of CALL. The second section was a survey on the frequency of using specific CALL-related resources in the teaching practices, including multimedia, E-learning delivery platform, online reference tools, and learning website. The last part was about using CALL in English teaching developed by the researcher based on Martins et al's study (2004).   In the third section, it consisted of 25 items and open-ended questions. The 25 items could be further divided into five major categories, and these items were assessed on the 5-point Likert scale. The five major constructs are classified as follows: (1) Relative Advantage (items 1, 8, 16, 19, 25); (2) Compatibility (items 2, 9, 12, 21, 22); (3) Complexity (items 6, 10, 13, 17, 24); (4)Trialability (items 4, 5, 15, 20 23); and (5) Observability (items 3, 7, 11, 14, 18).

With regard to the content of the questionnaire, as already indicated above, it consisted of 5 major categories which were in accordance with the perceived attributes in Roger's model. The first attribute is Relative Advantage, which refers to the degree to which an innovation is perceived as better than the idea it supersedes. The second one is Compatibility, which means the degree to which an innovation is perceived as being consistent with existing values, past experiences, and needs. The third element is Complexity, which indicates the degree to which an innovation is perceived as difficult to understand and use. The fourth category is Trialability, which relates to the degree to which an innovation may be experimented with on a limited basis. The last category is Observability, which suggests the degree to which results of an innovation are visible to others and to potential users. The five constructs of the questionnaire are displayed in Figure 3.1.

Figure 3.1 The 5 Constructs Contained in the Questionnaire
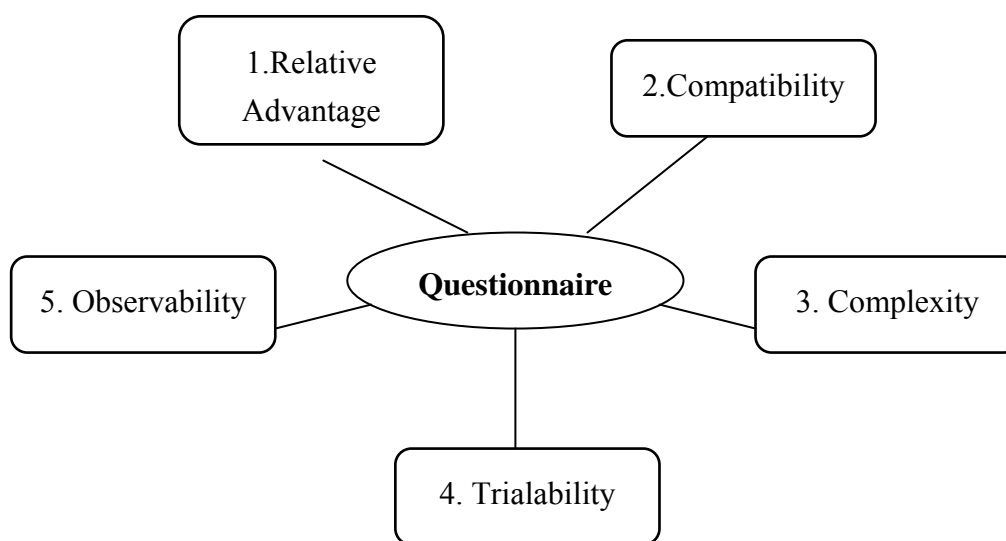
The second section was the open-ended questions concerning teachers' opinions on CALL or anything unmentioned in the previous questionnaire items. The participants were invited to come up with any ideas or viewpoints worth taking into account regarding the issues of CALL. This part was later served as one of the sources of qualitative data to complement the quantitative data.

The Interview Guide

To achieve a more comprehensive and realistic view of the teachers' perceptions, needs, and concerns for CALL adoption, it is necessary to collect data from both the questionnaires and the interviews. With the combinations of two approaches, we not only could enhance the validity and reliability of the questionnaire, but also obtain more in-depth teachers' viewpoints that are not revealed in the questionnaire.

Nunan (1992) classified interviews into three levels in terms of "the degree of formality", including unstructured interviews, semi-structured interviews, and structured interviews. The semi-structured interview was used as in the present study

in that it allows the interview to go in the topic-oriented or issue-based ways. In this type of interview, both the interviewer and the interviewees had more freedom and flexibility to probe into the relevant issues based on some general ideas, resulting in more productive responses.

Before the formal interviews began, the interview questions were piloted with a small sample of subjects to make sure the questions could elicit the information required and contribute more to the depth of the study. There were five general questions for the participants to answer during the interviews. The follow-up questions were carried out according to the responses from the participants. Each interview took about one hour depending on the time available to the participants, and all interviews were audiotaped and later transcribed by the researcher. The proposed interview guides are listed as follows:

1. What kind of attitude do you hold towards the use of CALL in your teaching practices?

2. Since the adoption of computer and technology is a current trend, do you think CALL will indeed enhance your teaching quality? Why or why not?

3. In your own opinion, what are the major advantages and disadvantages of using CALL?

4. In addition to the five major underlying factors in the questionnaire, are there any more factors or reasons for you to accept or refuse CALL?

5. Do you have any suggestions or opinions on using CALL for EFL teachers in Taiwan?

SURVEY RELIABILITY AND VALIDITY

Survey reliability provides information on the consistency with which a survey

measures whatever it is measuring (Brown, 2001), and the reliability coefficient, alpha is one of the most important indicators of a scale's quality. In order to make sure the reliability of the questionnaire, the Cronbach's Alpha was used to measure the constructs in the questionnaire. The Cronbach's Alpha of all the constructs was .95, which implied that the questionnaire was highly reliable. Moreover, the Cronbach's Alpha of the individual category in the questionnaire was shown as follows: Relative Advantage was .87, Compatibility was .78, Complexity was .89, Trialability was .65, and Observability was .88. Generally speaking, the Cronbach's Alpha of the 5 categories indicated that most responses to the items in the questionnaire were reliable.

On the other hand, Survey validity refers to the degree to which a survey measures what it intends to measure (Brown, 2001), but it cannot be proven by the statistics. To enhance the validity of the survey instrument in the present study, the researcher consulted the experts and teachers to review the initial questionnaire items. Through the pilot study, the final version of the questionnaire was completed. Moreover, the information derived from interviews also served as a secondary source of data to establish validity of the survey.

PILOT STUDY

The research developed a draft questionnaire based on Martins et al's study (2004) in March, 2005. Throughout the process of questionnaire development, the researcher's advisor was frequently consulted for the appropriateness and comprehensiveness of questions to achieve a higher validity of the questionnaire. The draft questionnaires were first distributed to three TESOL graduate students to ask their opinions on the wordings and meanings of the questions. Their suggestions were

later adopted for modification.

Afterward, 36 college English teachers took part in the pilot study in March, 2005. They were invited to answer a questionnaire consisting of 25 questions to evaluate whether the items and options were comprehensible and effective in achieving the purpose of the study (see Appendix A). In order to elicit more information on the topic, there was an open-ended section at the end of the questionnaire, and most teachers in this study mentioned that the definition of CALL was too broad and general for them to respond in a more accurate way. They also said that school administrative support was an important factor for them to decide on the use of CALL. Based on their suggestions and the findings of both the preliminary analysis, a formal questionnaire was substantially revised and administered in the current study.

DATA COLLECTION

Two major data collection procedures, questionnaires and interviews, were involved in the present study. They were described in detail in the following section.

Questionnaire Administration

The researcher embarked on the questionnaire administration after the questionnaire was finalized. Based on the sampling criteria aforementioned, the formal questionnaires were sent with the self addressed envelope or hand delivered to the participants in April, 2006. To achieve a better return rate, the questionnaires were also distributed via email and web-based surveys which were reached via a link or pop-up automatically when a user clicked on a given page. The on-line version of questionnaire was delivered to the college English teachers all over the island by email addresses obtained from the school homepages. A letter which explained the

purpose of the study, the instructions to complete and return the questionnaire and the thanks to the teachers was attached with the questionnaire.

In addition to the on-line survey, the researcher also sent the self addressed envelope with postage to those teachers who preferred hard copies of the questionnaire. Moreover, some were hand delivered to the teachers by the researcher. It is hope that the results could truthfully reflect the current situation of CALL use in Taiwan. However, some emails were rejected for delivery or permanent error of the accounts. The questions about the total number of the questionnaires delivered and the return rate could not be definitely answered. Among the total 186 returned questionnaires, 156 were from online version, 17 from mail, and 11 from personally administered.

Interviews

The oral interviews were later conducted to elicit more in-depth opinions on the issues. Given the nature of the variables under investigation and the resources available to the researcher, 9 college teachers were chosen from the 186 participants to take part in the interviews. A consent form (see Appendices C) was signed and collected before the administration of the questionnaires. All the teachers agreed to participate in the survey. It is hoped that the participants from different areas were representative enough to present information on various aspects of the issues.

DATA ANALYSIS

Statistical Analysis

A 5-point Likert scale ranging from strongly disagree to strongly agree was used to elicit the participants' perceptions of adopting CALL in Taiwan, and the SPSS statistical software package was employed to analyze the quantitative data. First,

descriptive statistics such as means, frequencies, percentages, and standard deviations were computed to summarize participants' overall responses to the questionnaire. Next, Person correlations were calculated to indicate the relationship among the 5 categories. Then the independent sample t-test was adopted to examine the statistical difference between dependent and independent variables. In the present study, the dependent variable is CALL adoption rate, and the independent variables are the five attributes identified in the Rogers' theory; that is, Relative Advantage, Compatibility, Complexity, Trialability, and Observability. Specifically speaking, the independent sample t-test was used to see if significant differences existed between the choices of CALL-use and non-CALL use groups divided by their ages, educational background, years of teaching experience, and weekly computer using hours.

In addition, the Chi-square test was carried out to see if significant differences existed between two groups of teachers divided by the categorical variables, gender and CALL availability. Furthermore, the logistic regression was used to predict the dependent variable, CALL adoption rate, on the basis of categorical independents including the five attributes in Rogers's theory to rank the relative importance of independent variables.

Analysis of the Open-ended Questions

The questionnaire contained open-ended items to elicit additional information that were not included in the questionnaires. The responses to the open-ended questions from the participants were compiled and organized into categories through the method of content analysis.

Analysis of the Interview Data

The interview data were intended to serve as an additional source of information to validate the questionnaire survey. The researcher read all the transcripts first and then identified salient excerpts that illustrated the teachers' opinions on the adoption of CALL through the method of content analysis. This information would be discussed as examples of teachers' beliefs and perceptions of the factors for using CALL and be used to supplement students' responses to the written questionnaires.

CHAPTER 4

RESULTS

The research aimed at investigating the underlying factors for college English teachers to adopt or refuse CALL. In this chapter, the findings from both the questionnaires and the interviews were presented. The first section describes the demographic data of the participants. Section 2 displays the CALL adoption rate in teaching four language skills. Then the next section illustrates the frequency of the different sub-elements related to CALL. From section 4 to section 7, the responses to the 25 items in the questionnaire are analyzed in detail. Since the target population could be divided into two major groups, CALL use group and non-CALL use group, the focus of the analysis was on the comparisons of these two different groups. Moreover, the result to determine the percentage of variance in the CALL adoption rate explained by the five attributes in Roger's theory is also indicated in this section. From section 8 to section 9, the results from the teacher interviews are analyzed and summarized

BACKGROUND INFORMATION OF THE PARTICIPANTS

As mentioned in the previous chapter, the participants were randomly selected from different areas of Taiwan. The demographic data of the participants are shown in Table 4.1. To sum up, the majority of the participants (76.1%) were female. Most of the participants were at their thirties to fifties with a master or doctoral degree. Their teaching experiences were mostly ranging from 6 to 15 years.

Table 4.1   Personal Information of the Participants

Category	Number	Percentage
Gender		
Male	42	23.9 %
Female	134	76.1 %
Location of School		
Northern Taiwan	65	36.9 %
Central Taiwan	60	34.1 %
Southern Taiwan	46	26.1 %
Eastern Taiwan	5	2.8 %
Age		
20-30 years old	9	5.1 %
30-40 years old	70	39.8 %
40-50 years old	68	38.6 %
More than 50 years old	29	16.5 %
Educational background		
Bachelor	3	1.7 %
Master	83	47.2 %
Doctor	88	50.0 %
Years of teaching experience		
0-5 years	36	20.5 %
6-10 years	50	28.4 %
11-15 years	47	26.7 %
15-20 years	24	13.6 %
More than 20 years	19	10.8 %

On the other hand, the data including weekly computer using hours, the administrative resources, and the state of CALL adoption were also surveyed on the questionnaire. As shown in Table 4.2, the majority of them (90.3%) use the computer more than 10 hours each week, and almost all of the schools provided the CALL-related resources with a slight exception (4.5%). More than 80% of the teachers have already adopted CALL into their English teaching courses.

Table 4.2   CALL Relevant Data of the Participants

Category	Number	Percentage
Weekly Computer Using Hours		
Less than 10hrs	17	9.7 %
10-20hrs	70	39.8 %
20-30hrs	38	21.6 %
30-40hrs	25	14.2 %
More than 40hrs	26	14.8 %
Availability of CALL at School		
Yes	168	95.5 %
No	8	4.5 %
Adoption of CALL		
Yes	149	84.7 %
No	27	15.3 %

The Application of CALL in Four Language Skills

Table 4.3 outlines information on the use of CALL to teach four language skills. To describe the data in Table 4.3, a point worthy of note pertains to the overlapping nature of the respondents; in other words, a person who uses CALL-related resources in one of the skills may incorporate CALL into the other skills simultaneously. Some teachers may exclusively apply CALL into one language skill, and others may use CALL in the four language skills. What is notable in this table is that listening and speaking showed the first and second highest values followed by writing and speaking. Among the 176 language teachers, the majority of them (71.6%) stated that they apply CALL into teaching listening, and a number of teachers (60.2%) indicated that CALL could be connected to reading instruction. However, less than half of the teachers (44.3%) claimed that CALL was used in their writing courses, which is lightly higher

than the percentage of the application of CALL in speaking (43.2%).

Table 4.3   The Application of CALL in the Four Skills Teaching

Skills	Numbers (N=176)	Percentage
Listening	126	71.6%
Speaking	76	43.2%
Reading	106	60.2%
Writing	78	44.3%

THE USE OF CALL CATEGORIES

The descriptive statistics including frequency, mean and standard deviation of the different CALL categories in the questionnaire is given in Table 4.4. The respondents assessed the frequency of using each category based on a scale from (1) never, (2) rarely, (3) sometimes, (4) often to (5) always. The main findings are briefly summarized below. In general, the mean of the on-line reference tools is the highest among the four categories (M=3.52), followed by E-learning delivery platforms (M=3.17). With regard to the frequency of each category, Hypermedia or Multimedia was sometimes used by more than 40% of the teachers, and about 28% of them used the tools very often. About 43% of the teachers mentioned that they were utilizing E-learning delivery platforms, but 22.8% of them never used this type of tool. However, over 52% indicated that On-line reference tools were used as a part of teaching, which is the highest among all categories. Finally, Learning websites were sometimes used by about 27% of the teachers and 37% of them often or used learning websites all the time.

Table 4.4   The Descriptive Statistics of Using CALL in Different Categories

Categories	1	2	3	4	5	M	S.D.
(1) Hypermedia/ Multimedia	17.6%	13.6%	40.9%	23.3%	4.5%	2.99	1.01
(2) E-learning Delivery Platforms	22.8%	13.6%	21%	27.8%	14.8%	3.17	1.31
(3) On-line Reference Tools	14.8%	8.5%	24.4%	36.4%	15.9%	3.52	1.10
(4) Learning Websites	18.7%	17.6%	26.7%	27.3%	9.7%	3.09	1.17

Note. 1= Never; 2= Rarely; 3= Sometimes; 4= Often; 5= Always

DESCRIPTIVE STATISTICS OF THE FIVE ATTRIBUTES IN THE QUESTIONNAIRE

This section displays the detailed analysis of the participants' responses to the 25 items in the questionnaire, which focused on exploring the current situation of using CALL in two different groups of teachers: CALL group and non-CALL group. The means and standard deviations were computed on the participants' responses to the items in each factor and are presented in Table 4.5. Due to space limitation, this section only summarizes highlights of each category rather than treat each item exhaustively. As indicated in Table 4.5, Trialability stands out as the highest (M=3.85) among the 5 attributes, then followed by Relative Advantage, Compatibility, Observability, and Complexity.

Table 4.5　Means and Standard Deviations for the 5 categories in the Questionnaire

Attributes	Mean	S. D.
Relative Advantage	3.84	.64
Compatibility	3.72	.62
Complexity	3.60	.79
Trialability	3.85	.53
Observability	3.60	.69

THE CORRELATIONS AMONG THE FIVE ATTRIBUTES

The Pearson Correlation was then computed to reveal the degree of relationship between the social data of the participants and the 5 attributes. The results of the correlational analyses presented in Table 4.6 shows significantly strong correlations among all the 5 attributes in the questionnaire, and the correlation coefficients are greater than or equal to .55. It also displays that computer using hours are significantly and positively associated with the five categories in the questionnaire, but they are negatively correlated with the availability of CALL at school. When we looked more closely at Table 4.6, years of teaching experience are only significantly correlated with Observability, but no significant correlation was uncovered between years of teaching experience and the other measures. Furthermore, the CALL availability was negatively but not significantly correlated with the five attributes.

Table 4.6 The Correlations among Measures of the Major Variables in the

Questionnaire

Variables	1	2	3	4	5	6	7	8
1. Years of teaching experience	1							
2. Computer using hours	-.06	1						
3. CALL availability	-.03	-.13	1					
4. Relative advantage	.08	.20**	-.09	1				
5. Compatibility	.17	.16*	-.14	.81**	1			
6. Complexity	.09	.26**	-.10	.70**	.75**	1		
7. Trialability	-.02	.17*	-.13	.60**	.57**	.55**	1	
8. Observability	.16*	.23**	-.07	.76**	.76**	.80**	.57**	1

*$p<0.05$.　　**$p<0.01$.

THE IDEPENDENT T-TEST AND CHI-SQUIRE BETWEEN CALL AND

NON-CALL GROUPS

The Relationship between CALL Adoption Rate and Demographic Data

The results in Table 4.7 reveal the relationship of CALL adoption with

demographic data between the teachers in CALL group and non-CALL group. The

three variables about the participants' background are treated as continuous variables

in the questionnaire; in other words, the figures of Age, Educational background,

Years of teaching experience, and Weekly computer using hours were transformed

into the scale ranging from 1 to 5 (see Appendix B). Take the variable "Age" in Table

4.7 for example. The age in CALL Group is 2.67, which means the overall age of the

participants in this group is around 40 years old. The other variables in Table 4.7 were

treated in the same way. The CALL group was slightly younger than non-CALL

group. The teachers in CALL group were a little more senior and had higher educational background than those in non-CALL group. However, the first three variables, age, educational background and years of teaching experience, were indicated to be no statistically significant difference between CALL group and non-CALL group.

In terms of weekly computer using hours, the non-CALL group was more likely to spend less hours on computers compared to the CALL group. The independent sample t-test showed that there was a significant difference between these two groups (p<0.05). In general, all the variables in both groups were not significantly different from each other except for the weekly computer using hours.

Table 4.7 CALL Adoption and Demographic Data between CALL Group and non-CALL Group

Variables	CALL Group (N = 149)	non-CALL Group (N = 27)	Statistics
Age	2.65 (.81)	2.74 (.81)	t =-.53
Educational background	2.52 (.55)	2.44 (.58)	t = .60
Years of teaching experience	2.66 (1.23)	2.63 (1.39)	t = .12
Weekly computer using hours	2.93 (1.23)	2.41 (1.15)	t =2.13*

*p<0.05.

Note. The above results are treated as continuous variables in the questionnaire.

The Relationship between CALL Adoption Rate, Gender and CALL Availability

Furthermore, in order to examine whether gender and CALL accessibility have a relationship with CALL adoption between CALL and non-CALL groups, the Chi-square test was conducted and the results are shown in Table 4.8. The males in CALL group, compared to the females in the same group, reported a higher rate of adopting CALL (88.1%, 83.6% respectively), however, the data indicated that there

was no statistical significance between two.

Meanwhile, the results from CALL group indicated that the number of teachers who adopt CALL is more than that of teachers who never use CALL at school with CALL resources. It showed significantly higher CALL adoption rate in call group in terms of CALL availability (87.5%, 12.5% respectively; p<0.001). In other words, if a school provides CALL-related resources for teachers, more than 87% of the teachers would become CALL users and only 12.5% of them will not use CALL. Similarly, if teachers are from a school without CALL-related resources, the percentage in the non-CALL group is significantly higher than the CALL group (75%, 25% respectively; p<0.001). In sum, the CALL adoption rate will increase with the CALL availability.

Table 4.8   Gender and CALL Availability between CALL and non-CALL groups

Variables	CALL Group (n = 149)	non-CALL Group (n = 27)	Statistics
Gender			
Male	37 (88.1%)	5 (11.9%)	χ^2 =. 48
Female	112 (83.6%)	22(16.4%)	
CALL availability			
Yes	147 (87.5%)	21 (12.5%)	χ^2 =22.97***
No	2 (25%)	6 (75%)	

***p<0.001.

THE LOGISTICS REGRESSION OF THE FIVE ATTRIBUTES

To determine which, if any, of the predictors affect CALL adoption, a logistic regression including each variable respectively was conducted. The independent variables included in the model respectively were: Relative Advantage, Compatibility,

Complexity, Trialability, and Observability. Individually, each of these variables was significantly correlated with CALL adoption. The results of logistic regression analysis are reported in Table 4.9.

The model of "Relative Advantage" was significantly different from the null model (Modelχ2 = 17.37, df=1, p<0.001). Respondents reported higher scores on Relative Advantage in the CALL group than the non-CALL group. This factor was able to predict an increase in CALL adoption by 33%.

Similarly, the model of "Compatibility" was significantly different from the null model (Modelχ2 = 18.22, df=1, p<0.001). Respondents reported higher scores on Compatibility in the CALL group than the non-CALL group. This factor was able to predict an increase in CALL adoption by 37%.

Moreover, the model of "Complexity" was significantly different from the null model (Modelχ2 = 16.11, df=1, p<0.001). Respondents reported higher scores on Complexity in the CALL group than the non-CALL group. This factor was able to predict an increase in CALL adoption by 25%.

In addition, in the model of "Trialability" was significantly different from the null model (Modelχ2 = 15.44, df=1, p<0.001). Respondents reported higher scores on Trialability in the CALL group than the non-CALL group. This factor was able to predict an increase in CALL adoption by 40%.

At last, the model of "Observability" was significantly different from the null model (Modelχ2 = 19.14, df=1, p<0.001). Respondents reported higher scores on Observability in the CALL group than the non-CALL group. This factor was able to predict an increase in CALL adoption by 34%.

In conclusion, the model of logistic regression verified that the variables Trialability and Compatibility were the ones that best supported the acceptance of

CALL for the college English teachers in Taiwan.

Table 4.9   Respective Logistic Regression on Relative Advantage, Compatibility,

Complexity, Trialability, Observability

Variable	Beta	Standard error	Odds ratio (95CI%)
Relative Advantage	.285***	.076	**1.33** (1.146~1.544)
Compatibility	.314***	.081	**1.37** (1.169~1.604)
Complexity	.222***	.059	**1.25** (1.112~1.403)
Trialability	.338***	.093	**1.40** (1.169~1.683)
Observability	.292***	.074	**1.34** (1.159~1.547)

***p<0.001.

RESULTS FROM THE OPEN-ENDED QUESTIONS

The open-ended questions, as listed in the questionnaire (See Appendix B), were developed to investigate a more comprehensive picture of the application of CALL in language learning. They are listed as follows:

(1) If you use any CALL-related items unmentioned above, please illustrate in the following section.

(2) Please provide any further comments about the present study or CALL issues here.

More Areas of Language Teaching with CALL

Among the 186 participants, sixteen shared more opinions on the CALL application into different aspects of language teaching. Some of their answers overlapped one another; therefore, these responses were classified into two categories. Firstly, CALL could serve as a platform of providing extensive learning and displaying students' portfolios and a communicative channel for teachers and learners.

Besides, CALL was also applied into other subjects, such as translation, vocabulary, or other academic disciplines, including TESOL, linguistics, and literature.

The Suggestions for Using CALL

The participants revealed more viewpoints on the second open-ended question. Their opinions had much to do with the doubts, the difficulties, and concerns regarding CALL, which are shown as follows.

In terms of doubts, although some teachers had a positive opinion on the trendy phenomenon on CALL in that they witnessed the benefits from CALL in their classrooms, most teachers were actually skeptical about the "magic power" of CALL; that is, they questioned whether CALL is an inseparable part in language teaching. Some believed that pedagogy with CALL should be designed on the basis of the nature of the courses; more specifically, the instructors should lay more emphasis on how to get students engaged in learning rather than follow the craze for CALL blindly. Secondly, some teachers suggested that there is no inevitable relationship between the use of CALL and the higher quality or efficiency in the teaching processes.

In the same sense, those teachers who were suspicious of CALL called for the more empirical evidence and pedagogical experiments to convince them of the effectiveness of CALL. What is more, the concept of CALL needs more clarification for teachers since some do not have a good understanding of its defining characteristics.

The difficulties of using CALL were repeatedly pointed out in the open-ended questions by the teachers. To sum up, the difficulties ranged from basic to sophisticated level of the CALL applications. Their problems included the technical problems, time issues, the interaction between teachers and students, learners' motivation, and so forth.

The teachers also mentioned their needs and concerns for CALL. They believed that the successful incorporation of CALL into language teaching depended on a well-organized development framework and full support from administration and teaching community.

RESULTS FROM INTERVIEWS

The interview questions, as listed in previous chapter, (also see Appendix C) were developed to gain more insights into the issue of the factors for CALL adoption. Among the 186 participants in the questionnaire, nine of them were selected to take part in the interviews. Among these nine interviews, six of them were conducted face to face, and two were through Skype, and one was with telephone. The background information of the 9 interviewees is shown in Table 4.10 (coded as Teacher A, B, C, and so forth).

Table 4.10   Background Information of the Interviewees

Category \ Teacher		A	B	C	D	E	F	G	H	I
Gender	Female	˅	˅	˅	˅	˅	˅	˅	˅	
	Male									˅
University Type	National	˅	˅	˅	˅	˅	˅	˅		
	Private								˅	˅
Years of Teaching Experience	Less than 5 years				˅		˅			˅
	6~10 years	˅	˅						˅	
	10~15 years							˅		
	15~20 Years									
	More than 20 Years			˅		˅				
Location of the School	Northern Taiwan	˅	˅	˅	˅	˅	˅	˅		
	Central Taiwan								˅	
	Southern Taiwan									˅
Date of the Interview		Mar. 21, 2006	Mar. 27, 2006	Mar. 29, 2006	Mar. 23, 2006	Apr. 6, 2006	Apr. 9, 2006	Apr. 11, 2006	Apr. 13, 2006	Apr. 13, 2006

In all, the data from interviews were consistent with the results from the questionnaires, especially with the responses in the open-ended questions, as presented in the previous part. In this section, the information provided by the interviewees is classified into 5 categories. The first category is concerned with the teachers' attitudes toward CALL, and the following category is about the advantages and disadvantages of using CALL. Category 3 discusses the effectiveness of CALL

for language teaching and learning and then the potential factor for using CALL is illustrated in category 4, and the suggestions for EFL teachers on using CALL are presented in the last category.

Teachers' Attitudes towards CALL

Question1: What kind of attitude do you hold towards the use of CALL in your teaching practices?

Generally speaking, the interviewees held different attitudes toward the trend. Most teachers would combine CALL with their teaching if CALL could contribute to their students and serve their teaching purposes.

> The niche of CALL is that it could complement the traditional teaching methods or classroom limitations. Teachers should not treat CALL elements exhaustively without considering its necessity. (Teacher A)

> I regard CALL as a tool which cannot replace the role of teachers because it is a subordinate, but not indispensable part in my classroom. I am not a tech person, so I only choose those basic elements and functions to meet my students' needs. (Teacher B)

> I do not reject using CALL; but I also do not think CALL could substitute for the classroom instruction. The interaction between teachers and students is very important. I am not sure how many students could learn a language through self-study. (Teacher C)

Besides, some of the interviewees had a more definite view on the use of CALL because computers and technology could fulfill the idea of boundless learning environment. The use of CALL also stimulated language teachers to acquire new information and knowledge of different areas because "laziness is a universal human nature and lifelong learning is a must" (Teacher F).

> I take a positive attitude toward CALL in language teaching in that it makes learning go beyond the space-time limitations. Learners could access to information at any time and any places, even though we should deal with the unexpected problems sometimes. (Teacher E)

Generalizing from the above data, CALL has truly embedded with language teaching and learning; nevertheless, the extent it connects with teaching is determined mostly by teachers' perceptions of CALL. No matter how effective CALL is, it is often served as a secondary element in teaching practices for most teachers.

The Effectiveness of CALL in Language Teaching

Question 2: Since the adoption of computer and technology are a current trend, do you think CALL will indeed enhance your teaching quality? Why or why not?

In response to the current trend, the interviewees shared their own experience on using CALL and explained how CALL facilitated their teaching. Generally speaking, CALL indeed to some extent adds more varieties to teaching, such as the audio and visual effects, more authentic linguistic inputs or cultural information, the extensive learning resources, the channel for teacher-student interaction, and so on. However, it is noteworthy that teachers observed different effects of CALL according to how much teachers are engaged in using CALL.

> I have always been CALL user so I cannot compare the differences of CALL and non-CALL in teaching. It is convenient for me; that's why I use CALL. There is no arbitrary connection between CALL and good teaching outcomes. For me, using CALL is not so easy because I have to go through the processes of complicated design and preparation. (Teacher E)

> It is difficult to measure how much CALL could contribute to teaching quality in a quantitative manner, so I cannot definitely claim that CALL enhances my work. The successful teaching is decided partially by the learners' efforts. I try my best to use different resources to involve students into language learning more, but the effects should be tentatively reserved. (Teacher C)

As shown above, teachers confirmed that CALL in fact complements the traditional classroom in various respects. Nevertheless, the incorporation of CALL

implies that teachers have to overcome the potential problems. For example, there was a serious problem in which "learners tend to be interested in the classes with CALL at the beginning, but their curiosity will diminish in a couple of weeks later" (Teacher I). The opinions of the interviewees helped to clarify that the commonly recognized popularity of CALL needs to be reconsidered. The issues are closely related to the question addressed in the next category.

The Advantages and Disadvantages of Using CALL

Question3: In your own opinion, what are the major advantages and disadvantages of using CALL?

Though the role of CALL has been recognized by the interviewees, most teachers found it impossible to use CALL without bothering by its problems. From its advantages, "CALL creates a potential power for both teachers and students to perceive the promising picture of extensive learning beyond the classroom" (Teacher A). Besides, CALL provides learners with "varied inputs, self-paced tutorial materials, the portfolio of learning process, cultural exposure and global view and understanding" (Teacher E).

Considering the disadvantages of CALL, some teachers thought that operation and technical problems of CALL would affect the flow of class instruction and increase more workload for them. Most teachers believed that the shortcomings of CALL have a lot to do with the learners' involvement. As a matter of fact, the tool itself is neutral; however, "if the learners lack autonomous learning abilities, teachers cannot expect CALL alone to achieve good learning results" (Teacher E). On the other hand, teachers are greatly concerned with the administrative support from school.

> Teachers are not familiar with computers and technology, which is an obstacle for them to
> use CALL. We are likely to feel frustrated even give up if there is no supportive team

available. (Teacher H)

How to instruct students to use the CALL-related resources wisely is a big challenge for teachers, because teaching students how to make good use of the resources is more important than showing them the materials. But it takes a long time for student themselves to absorb and organize the information. (Teacher B)

Teachers have to search for and try on software beforehand, or we cannot convince students to use those resources; however, teachers will have more teaching loading in this aspect. (Teacher D)

In general, the interviewees benefited some advantages from using CALL; however, they encountered some difficulties or limitation simultaneously. How to strike a balance between the strengths and weaknesses of CALL is a critical point for language teachers.

The Potential Factor for Using CALL

Question 4: In addition to the five major underlying factors in the questionnaire, are there any more factors or reasons for you to accept or refuse CALL?

The findings in this question were in line with the factors mentioned in the questionnaire. For most teachers, the frequency of using CALL depends on the setting of the external environment, the reliability of the instruments, enough technology training, administrative facilitation, learners' feedback, and the like.

Some confusion may arise if we overuse CALL in the classroom since some teachers do not agree that language programs should implement with CALL in language laboratories. (Teacher I)

Teaching styles are an important factor for this issue. Some teachers who are low-tech have no confidence in using technology, but some are highly curious about the innovations. Take myself for example. I will be overwhelmed and confused by the large amount of

information, so it is not urgent for me to try those elements until I need them. (Teacher B)

According to their responses, it was found that making CALL more user-friendly and time-saving could increase the teachers' willingness to give it a try. The problems and concerns differed from school to school in that the resources are not the same with all colleges.

The Suggestions for EFL Teachers

Question 4: Do you have any suggestions or opinions on using CALL for EFL teachers in Taiwan?

In addition to sharing their own experiences and opinions on using CALL, the interviewees also reported their suggestions for to other EFL teachers and their expectations of CALL in the near future. It could be a useful and practical reference for all college teachers in Taiwan. For most teachers, "the intensive training courses and orientation on CALL-relates resources are needed most (Teacher F). They also called for more elaboration on the essentiality of CALL to construct a more consistent definition for language teachers (Teacher A; Teacher G).   Apart from the external support, some points are marked as follows:

The essentials of teaching would not be changed by adopting CALL; it could serve as an assistant rather than the critical part in language teaching. (Teacher B)

Compared to work alone, a teaching group could help a lot for better utilizations of CALL. The discussion and collaboration among colleagues with the sufficient promotion from the administration will have a deep and positive influence on the frequency of using CALL. (Teacher C)

If possible, language teachers should promote more intercultural communication and interaction to create a global vision and diverse opportunities for Taiwanese students. With

the facilitation of technology, the worldwide learning environment will be promising.
(Teacher D)

The results from the teacher's interviews were identified in this section. From the information on CALL-related issues provided by the participants, the successful adoption of CALL requires the collaboration of many aspects. In reality, CALL has already received a great deal of attention among college English teachers.

CHAPTER 5

DISCUSSION AND CONCLUSION

The results from both the questionnaires and the interviews are presented in the previous chapter. In this chapter, the findings are discussed in depth to address the research questions mentioned in the first chapter. Through answering those questions, it is hoped that a more comprehensive picture of the current situation of using CALL could offer a better understanding of the state of language teaching with CALL. In addition, the implications from the study, suggestions for language teachers and administrators and the recommendations for future research in the field are also addressed. In the last section, the conclusions of the present study are summarized.

DISCUSSION OF THE FINDINGS

In this section, there are eight major themes: (1) the language skills with the most adoption of CALL; (2) the common elements of CALL; (3) the differences between the CALL and the non-CALL groups; (4) the potential factors affecting adoption of CALL; (5) more discussion of the important findings are discussed as a whole; (6) teachers' perspectives on CALL; (7) teachers' perspectives on learners; (8) teachers' perspectives on administrators. The four research questions proposed in the first chapter are answered based on the first four themes, including:

1) What language skills are taught with the most adoption rate of CALL?

 2) What CALL elements are widely used by the college teachers?

3) What are the differences between the responses of the CALL and the non-CALL teacher groups?

4) What factors may affect the adoption of CALL in the college contexts?

The Skills with the Most Adoption Rate of CALL

Based on the data collected from the questionnaires and the teacher's interviews, among the four language skills, CALL was most frequently used in listening instruction, and the second most commonly used in teaching reading. As suggested by the results, the receptive skills such as listening and reading received more assistance from CALL.

A plausible interpretation is that these two skills are closely concerned with the receptive processes involving the decoding of messages (Flowerdew, 1994; Wolvin and Coakley, 1996); CALL could provide more comprehensible and diverse inputs, such as more authentic audio and visual information to facilitate learning listening and reading. Teachers could take advantage of CALL to make up for the inadequate language exposure in an EFL context, where English is usually learned and used within classrooms. The more opportunities for students to expose to listening and reading inputs, the more exercise and practice learners could receive. The other explanation may be found in the responses from teachers in the interviews. Some teachers mentioned that they used multimedia software to give students diverse types of inputs, like authentic speech, cultural messages; in this way, EFL students could have more opportunities for acquiring more language inputs from the real world, which is the most encouraging function served by CALL-related resources.

On the other hand, writing and speaking are the productive skills that require learners to transform their thoughts into either written or spoken forms. A good deal of the cognitive process should be done by learners themselves rather than relying on the supplementary tools or materials. Consequently, the percentages of using CALL in writing and speaking were apparently lower than those in receptive skills. However, if taking a closer examination of the difference between writing and speaking, it is

found the percentage of writing is a little higher than speaking, and this quantitative data could be further supplemented by the teacher's interviews. In many respects, the very general contrasts between speaking and writing relate to that the nature of speaking runs directly counter to the written forms, particularly considered the static, planned and decontextualized features pertaining to writing (Hughes, 2002). Some teachers stated that speaking was excluded to the adoption of CALL because they had no idea about how to put CALL into practical use in speaking class. For example, one teacher remarked that conducting the speaking courses in a language laboratory was somewhat awkward with earphones. She believed that students would prefer face-to-face communication to exchange information with a real interlocutor instead of the machine.

The Common Elements of CALL

A summary of the frequencies and percentages of using CALL subcomponents is displayed in Table 4.4. In terms of the general look, it has to be marked that online reference tools like dictionary were most frequently used as a teaching instrument, whereas E-learning delivery platform was the highest category that never used by most people among the four categories. Furthermore, the means of the four major categories including hypermedia/multimedia, E-learning delivery platforms, on-line reference tools and learning websites were near or over 3, which showed that they were generally known and accepted in the teaching discipline. Since there are no clear distinctions among the four sub-categories, it is impossible to conclude which one is most popular among language teachers. But none of the components mentioned in the questionnaire was never or rarely used by teachers. In general, these four categories of CALL are frequently used by language teachers. The sub-classification of CALL in the present study could generally shed some lights on the current administration of

CALL in Taiwan.

Moreover, the results from the interviews suggested that different teachers have different attitudes toward subcategories of CALL depending on the resources available to them, the needs and types for the courses, and the personal preferences for the elements. Given the comprehensive nature of CALL, the combination of several elements into teaching is normal for all the teachers because it is impossible to merely use one category in teaching practices.

The Differences between the CALL and the non-CALL Groups

Since the numbers of teachers in CALL and non-CALL groups are greatly different from each other, with CALL group of 84.7% and non-CALL group of 15.3%, it was found that the means of the demographic variables between these two groups were no statistical significance. If we take a closer look at the data in Table 4.7, there was no statically significant interaction between the first three demographic variables of CALL and non-CALL groups.

One reason for no statistical significance may lie in the small size of the non-CALL group. In the present study, only 27 college teachers did not adopt CALL into language teaching, which implies that the numbers of this group are too limited to compare with CALL group. Moreover, another possible reason may be that teachers' age, educational background and years of teaching experience actually have little to do with their teaching decision-making. To people's common impression, younger or junior teachers may be more open-minded toward innovative technology; however, the findings here could provide more empirical evidence to clarify the myth. Moreover, whether teachers' adoption of CALL or not may beyond the intrinsic factors of teachers themselves, more extrinsic causes should be taken into account, such as the administrative support, learners' characteristics, and the like, which would

be further endorsed by the statements from teachers' interviews.

Among the four variables, weekly computer using hours was the only variable proven to be significant in Table 4.7. Compared to the first three variables aforementioned, weekly computer using hours has a strong connection with a person's style and behaviors. A plausible interpretation is that the amount of time used on the computer reflects the personal habits or the extent of reliance on the computer and technology. The more they spent time on the operation of the computer, the more likely they would integrate CALL in their teaching. Along the same vein, the total computer using hours may partially show the extent how teachers master the manipulation of CALL; that is, a teacher who is familiar with or good at operating CALL, they would like to spend more time with computers. As a result, the weekly computer using hours turned out to be significantly correlated to CALL adoption rate.

The Potential Factors Affecting Adoption of CALL

Generally speaking, an item mean greater than 3 indicates that specific statement described in the item is highly agreed by the participants. An item mean between 2.5 to 2.9 indicates that the item is moderately agreed. In terms of the descriptive statistics in each attribute shown in Table 4.5, on average, the 5 factors had medium to high means (M＞3) which imply that most of these participants generally regarded the 5 attributes as medium to high level of importance. In other words, they endorsed that these five factors played important roles in the uses of CALL in their teaching.

In accordance with Martins et al's study (2004), Trialability (M=3.8) was the most important factor for the adoption of CALL. Similarly, Relative Advantage were the same with Trialability as the most influential factor in the present study (M=3.8); however, this factor exerted little influence in Martins' study (2004) in Brazil. This difference on the weights of the variables is likely due to the different characteristics

of the participants and the different research contexts. In Martins et al's study (2004), they investigated foreign language school administrators' views on the potential factors for Internet adoption rate, but the target population in the present study is college English teachers in Taiwan.

Moreover, the results from the logistic regression in Table 4.9 could be further served to estimate the influence of the five attributes on CALL adoption rate. Among the five attributes in the questionnaire, Trialability and Compatibility were the two most outstanding variables for predicting the CALL adoption rate. In line with Martins et al's (2004) findings, Trialability was the most adequate factor for predicting CALL adoption rate. As suggested by Rogers (1995), if an innovation could be experimented with before its actual implantation, the adoption rate will be higher. Therefore, the findings from both the present research and Martins et al's study were generally consistent. It may imply that the potential users of an innovation, like teachers in different teaching contexts, valued the importance of trying out an innovation prior to implementation.

However, the present study is a cross-sectional or one-shot study aiming at investigating the underlying factors affecting CALL adoption rate. A cross-sectional study is one that compares subjects or experimental items at a particular point in time (Beth and Robert, 2004). Unlike a longitudinal study which allows the assessment of changes for specific groups at two or more points in time to investigate long and complex issues, what we can draw from the results is the interrelationships between the five attributes and CALL adoption rate. The casual relationships, whether the five attributes could be served as the predictors of CALL adoption rate, or they may be to certain degree influenced after adopting CALL, could not be revealed from this study.

With reference to the qualitative data from both open-ended questions and

teachers interviews, most people claimed that they are reluctant to implement CALL due to the reasons like insufficient resources at their schools, complicated manipulation process, and unsatisfying learning outcomes. For these reasons, the five attributes tend to be seen as the causes instead of the effects in explaining the causal relationship.

Additionally, the major factors for adopting CALL drawn form the teachers' interviews were the reliability of the instruments, enough technology training, administrative facilitation, learners' feedback, and so on. These factors were beyond the hindrance within teachers themselves, and were more related to the lack of administrative support at institutions.

More Discussion on the Significant Quantitative Findings

As can be seen in Table 4.6, the correlations showed a strong and significant relationship among the five attributes, which implies that all of them could be served as predictors for adoption of CALL for those respondents in the study. It is noteworthy that weekly computer using hours played a significant role in the decision-making of the participants. It was found that the weekly computer using hours was negatively correlated with CALL availability, although the correlation did not reach a significant level. One possible reason is that teachers themselves might have to spend more time and effort compensating for the insufficient resources provided by the schools. In such situations, teachers might bear more workload on the computer and the Internet to prepare for supplementary materials.

In terms of years of teaching experience, it was only positively and significantly correlated with Observability. While there seems no clear reason for the result, one plausible explanation could be forwarded. Perhaps those senior teachers have more experiences in teaching, which may result in being less dependent on CALL-related

teaching components. They might rely more on their own teaching methods and styles; therefore, they seem to have more conservative views on the effectiveness of CALL. In other words, those senior teachers need more concrete and observable outcomes to convince themselves of the positive effects of using CALL in their teaching practices.

Considering the interaction of genders with the adoption of CALL, there was no obviously significant difference between male and female teachers. Reasonable explanations may be found in the characteristics of the target population. The number of female teachers is in fact larger than that of male teachers in English teaching profession. The fact could be partially drawn from the participants in the present study, which the number of females was tripled than that of males. That is why no difference exists in genders. Furthermore, since CALL is regarded as an assistant tool for language teachers, they would like to embrace the positive effects of CALL adoption if they have no difficulty in implementing CALL. Therefore, genders are of no particular importance on this aspect.

On the other hand, CALL availability conditions do play a large part in teachers' attitudes and decisions, which implies that the support from school administration will assist teachers to make good use of CALL in their teaching (Sherry, 1998; Martins et al, 2004). Conversely, it is more challenging and difficult for language teachers to construct a CALL environment or set up CALL-relevant facility on their own. If teachers can access to various components of CALL in their teaching environments, they will be more willing to try on or incorporate CALL in their teaching practices; along the same vine, they are not likely to relate CALL to teaching without the resources available, even some indeed would like to be CALL users (Levy, 1997; Felix, 2003). Compared with the findings on genders and CALL availability conditions, we found that the external factors weight more than teachers' internal

variables on the CALL adoption rate.

Teachers' Perspectives on CALL

The responses from both the questionnaires and interviews were classified into three major sections. More specifically, the opinions were examined towards the following areas: (1) teachers themselves, (2) learners, and (3) school administration.

Firstly, in terms of teachers themselves, there are several additional factors or problems of using CALL lying in their teaching process. Some teachers reported that the lack of ability to operate computers and technology skillfully and the obstructions of technical problems on computers are two major external factors to refuse the use of CALL. As mentioned by Hémard (2003), being user-friendly and easy to manipulate CALL-related resources is a major concern. Moreover, they were also concerned with the accesses to obtain and update information about CALL. As pointed out in the interviews, most of them were not familiar with CALL or did not have many chances to exchange and share information with other colleagues during the implementations of CALL. As a result, they sometimes felt like being alone in this trend of CALL in the teaching community. Without a supportive team, the quality of CALL in language teaching will be reduced or even failed in the end (Brent et al. 2002).

Other than the lack of technological knowledge and access to information exchange, teachers' personalities also have a deep influence on the attitudes toward CALL. Two interviewees recommended that being open-minded, curious and innovative is a great asset for language teachers because teaching and learning can promote and enhance each other. If teachers embrace the trend of CALL, they would like to spend more effort and energy on undertaking teaching with new innovations; consequently, students would benefit more from teachers' involvement.

Besides, some teachers observed that CALL operates on drilling and repetitive

mode of learning and involves only a rather low level of intellectual engagement and investment. This underlying reason may result from the misconception or ambiguous conceptualization of CALL. Therefore, language teachers should be equipped more knowledge and technology training on CALL to implement the courses with more all-round and in-depth inclusion of CALL other than the mechanical and superficial practices.

Teachers' Perspectives on Learners

As for the teachers' views towards learner's parts, an important issue revealed by several participants in the interviews is called "*Hawthorne effect*" or "*placebo effect*". According to Mousavi's definition (2002), *Hawthorne effect* refers to the tendency of humans to temporarily improve their performance when they are aware it is being studied. With regard to education, if a new teaching method or tool is used, there may appear certain improvement in learning, which is not caused by the method or tool introduced, but by the fact that it is new. To be more specific, learners may be motivated to some extent by the new technology at the beginning stage of using CALL; however, the effectiveness may gradually decrease as the instruction continues.

In response to the dilemma, the teachers in the interviews suggested some possible ways to avoid or improve *Hawthorne Effect*. First of all, what teachers should bear in mind is not overly emphasize or rely on the use of CALL during the adoption of CALL in teaching; that is, CALL is not the "panacea" that has the magic power to stimulate and maintain learners' motivation all the time. Instead, teachers should plan their teaching based on the nature of the courses, the characteristics of the learners, the class size, and their own teaching styles. Secondly, besides presenting and introducing the CALL-related resources, the teachers had better intertwine CALL

with students' participation so that the courses could provide multiple opportunities to use CALL.

Additionally, teaching students how to make good use of CALL-related materials is another important way to lengthen their interests (Ertmer et al. 1999). For example, teachers can lead their students to organize and manage information and provide some relevant practices and evaluation for them. Last but not least, teachers have to enhance learners' intrinsic motivation and educate them the importance of learner autonomy in learning English, which will in turn become an asset for learners to carry through their whole learning process. For example, cooperative learning is a practicable strategy, as pointed out by Jacobs et al (1995), to encourage students to actively participate in learning. Findings from the interviews also showed that the use of the cooperative learning techniques could engage students in learning tasks.

Teachers' Perspectives on Administrators

The assistance from the school administration is also an immediate and necessary solution corresponding to the specific difficulties encounter by most teachers. As agreed by all the interviewees and most responses in the questionnaires, the CALL-related resources in these teachers' institutions had not been systematically and explicitly introduced to them based on the need of the teachers. What is worse, some schools only focused on the great investment in advanced facilities without providing enough training courses or workshops for teachers. Therefore, some expensive equipment and devices finally became of no use due to the fact that the teachers do not know how to efficiently operate and manipulate them. Needless to say, the technical support and maintenance were particularly overlooked in many schools, resulting in teachers' frustration and panic.

With sufficient assistance from the administration, they generally believed that

teachers would be more willing to try out different elements of CALL. However, some participants indicated that they suffered from great pressure because the administrators in their institutions pushed them to use CALL without taking teachers' personal teaching styles and preferences into account, especially for those senior teachers who were not used to using technology in the classroom. Accordingly, teaching with CALL turned out to be the superficial operation of some facilities.

Another suggestion worth noticing was the centralization of pedagogical and technological information, which was limited mostly to the northern part of Taiwan. For example, the large-scale conferences and workshops and information centers of language teaching usually take place in Taipei. For teachers in other parts of Taiwan, the window to the latest information is not always available for them. They hoped the educational authorities could allot more teaching resources to different areas of Taiwan.

IMPLICATIONS AND SUGGESTIONS

Findings of the present study yielded some implications for researchers, practicing teachers, and school administrators. Both theoretical and pedagogical implications are presented in the first section. Furthermore, suggestions for language teachers, school administration and researchers are offered for improving the quality of CALL adoption.

Theoretical Implications

Rogers' theory of perceived attributes (1995) claimed that the five attributes affected adoption rate of an innovation, the findings in the current study corroborates with the model of diffusion theory. Combined with the high level of Cronbach's Alpha in the questionnaire, as shown in previous chapter, the high means of and the

significant correlations among the five attributes strongly support the theory of perceived attributes, which in turn provides further empirical evidence to explain factors that influence college English teachers' adoption of CALL in their instruction as innovative practices.

Moreover, since the questionnaire was developed based on Martins et al's study (2004), the findings in the present study were in substantial agreement with their study. In this sense, they could further provide the value of theory of perceived attributes in that it could be applied into different cultural backgrounds with the similar significance.

Pedagogical Implications

Concerning the pedagogical implications, both quantitative and qualitative findings lead us to believe that the investigations of the underlying factors in terms of the perceived attributes theory may shed some light on the reasons why English teachers use or not use CALL in Taiwan. In addition, the role of CALL in language teaching should not be exaggerated without considering other relevant factors, such as learners' involvement, administrative support.

Moreover, college teachers in Taiwan seemed to hold a positive attitude toward the adoption of CALL; however, they also pointed out the fact that they need further assistance and guidance in their practices and applications. As a result, how to assist teachers to make the best use of CALL has become an urgent issue in teachers' development. Lastly, their responses to the questionnaire demonstrated that "trying is believing" in which school administrators should give enough access for teachers to try out CALL rather than push them to use CALL blindly.

Suggestions for EFL Teachers

As suggested by some teachers in the study, teaching and learning are the two

sides of the same coin. English teachers should bear in mind that constant learning both teaching skills and knowledge is a lifelong goal of their teaching career. With an open-minded attitude, they will be more willing to renew and enrich their profession. Realizing that technology is a current trend that is closely related to everyone's life, teachers should expect themselves to teach English with a promising technology so that their students could benefit from their attitudes.

Nevertheless, keeping progress in teaching does not imply that everyone has to adopt CALL into the classroom. Without explicit teaching goals and appropriate design, the blind use of CALL may have negative impact on teaching quality. No matter how effective CALL would be, teachers have to recognize that it is teachers themselves that could contribute most to their students. In addition, discussion and cooperation with colleagues are also helpful for them to make teaching more successful; therefore, the support from teaching community needs to be highly valued.

Suggestions for School Administrators

The results from the present study indicated that school administration played a significant role in CALL adoption rate. Especially, the results from the logistic regression models in Chapter 4 suggest that Trialability is a most important predictor for the adoption rate of CALL. It should be responsible for providing necessary assistance to teachers in their implantation of CALL. For example, the teachers called for more training on technological knowledge and how to incorporate CALL efficiently and successfully into their own teaching. The school administrators could survey teachers' needs and organize some workshops periodically for the teachers. Furthermore, if the teachers receive efficient training and have the opportunity to try out most CALL-related resources at the beginning of implementing CALL, they would more possibly adopt CALL.

Besides, the school administrators could collaborate with other colleges in the neighborhood to integrate more resources such as technicians, facilities, information exchange channels, serving as possible solutions to the inadequate resources encountered by the schools. If institutions have abundant resources available, how to coordinate and promote more utilization of resources is another suggestion for school administrators. They could hold some panel discussion sections and orientation classes to guide their teachers how to integrate those resources into their teaching. At the same time, the problems and concerns of teachers could be presented or solved. In this way, the better communication and interaction between teachers and administrators could be mutually achieved.

Furthermore, the budget for maintaining and updating the technological facilities is another issue worth being taken into consideration for school administration. In addition to purchasing new equipments, the maintenance and the supportive system of the facilities seemed to be more imperative for teachers' needs; otherwise, some teachers tend to give up because of the frustration and upset from the technical problems (Curtin & Shinall, 1987; Colpaert & Decoo, 1999).

Suggestions for Researchers

The return rate of the present study seemed to be much higher than that in mail survey research due to the benefits from the on-line questionnaire. On-line survey can be administered in a relatively short time and give the respondents more time to consider their responses. In addition, responses can be precoded to eliminate transcript errors and the data analysis could be done more easily and accurately. In this sense, computer technology indeed has the promising and favorable effect on foreign language research. This method of data collection may help some researchers solve the problem to obtain sufficient number of responses, especially from postal

questionnaires. The higher return rate would contribute to more significance and generalization of research.

LIMITATIONS OF THE STUDY

This research is a preliminary study serving as a basis for further research. Although this study shed new light on the current situation of adopting CALL in foreign language teaching in Taiwan, it is not without flaws and future research is required in a number of directions. Firstly, as suggested by some interviewees in the interviews, as there seems no agreement on what CALL is, the inconsistent interpretations of CALL may harm the reliability of this study.

Secondly, such research should define CALL into more explicit and definite classifications or narrow down the scope to certain categories to yield more specific information on CALL. Though this research has tried to limit the scope of CALL to more specific areas, those categories still seemed to be too broad for the respondents.

The third limitation is rooted in the unbalanced numbers of males and females allowed for the more accurate examination of gender differences on CALL adoption rate. Though the majority of teachers in foreign language education are the females, it may be of interest for future research to see gender as a potential variable. Similarly, the interviewees in the present study were mainly from a specific geographic area, only two of them were not from the north of Taiwan. Consequently, the results may not be able to be generalized well to the whole island.

The CALL training hours was not an important issue in this study, and it is not clear whether it is a crucial factor for CALL adoption rate. Future research is therefore necessary to determine with certainty the effect of teachers' CALL training hours on their CALL adoption.

Another area of future research that should be considered is the distinction of CALL adoption rate between national and private schools. The major concern of this study is the current situation of using CALL in Taiwan' colleges; however, the relationship between school types and CALL adoption rate clearly may need further exploration.

Moreover, though the adoption of the on-line questionnaire indeed contributed to a better return rate, the research technique has its own flaws. Since the research has no clear understanding on the total number of the target population in foreign language education, it seems difficult to estimate the actual return rate in the present study. Unlike traditional survey, the on-line survey cannot make sure to what extent the participants were randomly selected; thus, the study may be at the risk of only deriving viewpoints from more CALL-oriented teachers.

SUGGESTIONS FOR FUTURE RESEARCH

To achieve a better conceptualization of CALL and obtain more reliable data, future research could aim at examining common perceptions of CALL held by college teachers to generate more concrete definitions of CALL.

In addition, the present study has already found that the four categories of CALL application including hypermedia/multimedia, E-learning delivery platform, on-line reference tools and learning websites are the common and well-known elements for college teachers. It is suggested that the future research on CALL could be narrowed down to one of specific subcategories, such as multimedia, e-learning platform, or the Internet, to achieve a clearer picture of the adoption of CALL-related resources.

Though the majority of teachers in foreign language education are the females, it may be of interest for future research to see gender as a potential variable. It would

seem worthwhile to compare the differences between male and female teachers' attitudes towards the adoption of CALL. Similarly, it is suggested that future investigations would be carried out with more interviewees from different regions of Taiwan. In this way, information about how language teachers from various areas of Taiwan perceive and use CALL may provide more insights into the current situation of using CALL in Taiwan.

Additionally, the study found that the five attributes in Rogers' theory could potentially affect and predict the CALL adoption rate of college teachers. It may require follow up research to investigate the casual relationship between the five attributes and the CALL adoption rate.

CONCLUSION

The current study is essentially a preliminary study aimed to examine the underlying factors that may influence the adoption of CALL in English teaching from the perspectives of Taiwan's college English teachers. The researcher intended to investigate teachers' perceptions based on the theoretical framework proposed by Rogers (1995). The participating teachers all agreed that all the factors may have a significant effect on their decision-making processes. Our participants also provided some insightful viewpoints on the use of CALL in teaching English. Their responses were classified into three different aspects on teachers, learners, and school administration.

The findings from the study suggest that teachers' perception on CALL is a complex issue that deserves to be further studied. CALL is a popular trend in second and foreign language teaching and learning, but the claimed and perceived popularity of CALL has some discrepancy in college English teachers' perceptions. It is hoped

that this necessarily simplified survey and the follow-up research in the future could

lead to a better understanding of teachers' beliefs about the use of CALL.

Appendixes

Appendix A

Questionnaire Used in the Pilot Study

使用 CALL 作為英語教學工具之問卷

說明：本研究中所言「**CALL** 電腦輔助語言教學」之定義採用 Levy (1997)在 *Computer-assisted Language Learning: Context and Conceptualization* 一書所提：「凡是在語言教學語學習過程中，運用到電腦與科技相關的素材與資源作為教學方法或工具者，稱之為電腦輔助語言教學(**CALL**)」。下列問題皆有五個選項，請您依據對每一個問題的同意程度選出最合適的選項。若您尚未在語言教學上使用電腦科技，也煩請您以目前的想法回答各題。

1. 在教學上使用 **CALL**，能幫助我達到預期的教學目標。

□1.非常不同意 □2.不同意 □3.沒意見 □4.同意 □5.非常同意

2. 在教學上使用 **CALL** 不會與我其他的教學工作衝突。

□1.非常不同意 □2.不同意 □3. 沒意見 □4.同意 □5.非常同意

3. 我很清楚電腦輔助教學的成效。

□1.非常不同意 □2.不同意 □3. 沒意見 □4.同意 □5.非常同意

4. 在決定將 **CALL** 運用在教學之前，我有嘗試使用的機會。

□1.非常不同意 □2.不同意 □3. 沒意見 □4.同意 □5.非常同意

5. 對於 **CALL** 相關的軟硬體設備的操作使用上，我不覺得有困難。

□1.非常不同意 □2.不同意 □3. 沒意見 □4.同意 □5.非常同意

6. 我可以清楚比較出教學上使用 **CALL** 前後的差別。

□1.非常不同意 □2.不同意 □3. 沒意見 □4.同意 □5.非常同意

7. 使用 **CALL** 可以提升我教學方面的品質。

□1.非常不同意 □2.不同意 □3. 沒意見 □4.同意 □5.非常同意

8. 使用 **CALL** 與我慣用的教學方式可以相容。

□1.非常不同意 □2.不同意 □3. 沒意見 □4.同意 □5.非常同意

9. 在我的教學環境中要取得使用 **CALL** 相關資源的管道很容易。

□1.非常不同意 □2.不同意 □3. 沒意見 □4.同意 □5.非常同意

10. 我能夠清楚地向其他教師分享或說明自己使用 **CALL** 的經驗與成果。

□1.非常不同意 □2.不同意 □3. 沒意見 □4.同意 □5.非常同意

11. 在教學上正式使用 **CALL** 之前，我有足夠的試用空間去觀察它的成效。

□1.非常不同意 □2.不同意 □3. 沒意見 □4.同意 □5.非常同意

12. **CALL** 與我的教學風格可以相容。

□1.非常不同意 □2.不同意 □3. 沒意見 □4.同意 □5.非常同意

13. 整體而言，**CALL** 在英語教學上的運用並不困難。

□1.非常不同意 □2.不同意 □3. 沒意見 □4.同意 □5.非常同意

14. 使用 **CALL** 之後的教學成效會很顯著。

□1.非常不同意 □2.不同意 □3. 沒意見 □4.同意 □5.非常同意

15. 我有機會去嘗試使用各種 CALL 相關的教學功能。

□1.非常不同意 □2.不同意 □3. 沒意見 □4.同意 □5.非常同意

16. 使用 CALL 能夠增加我與學生間良性的互動。

□1.非常不同意 □2.不同意 □3. 沒意見 □4.同意 □5.非常同意

17. 對我而言，如何將 CALL 與教學結合很簡單。

□1.非常不同意 □2.不同意 □3. 沒意見 □4.同意 □5.非常同意

18. 我可以明確解釋在教學上使用 CALL 的優缺點。

□1.非常不同意 □2.不同意 □3. 沒意見 □4.同意 □5.非常同意

19. CALL 讓我更能自主地操控自己的教學工作。

□1.非常不同意 □2.不同意 □3. 沒意見 □4.同意 □5.非常同意

20. 學校若能夠提供老師資源有效利用 CALL，會增加我使用的意願。

□ 1.非常不同意 □2.不同意 □3. 沒意見 □4.同意 □5.非常同意

21. 我任教的環境鼓勵老師將 CALL 融入教學中。

□ 1.非常不同意 □2.不同意 □3. 沒意見 □4.同意 □5.非常同意

22. 使用 CALL 不會增加我目前的教學負擔。

□1.非常不同意 □2.不同意 □3. 沒意見 □4.同意 □5.非常同意

23. 我要試用過 CALL 相關資源，才會在課堂上正式實施教學。

□1.非常不同意 □2.不同意 □3. 沒意見 □4.同意 □5.非常同意

24. 在我任教的環境中，CALL 可以實施地很順利。

□1.非常不同意 □2.不同意 □3. 沒意見 □4.同意 □5.非常同意

25. 使用 CALL 能夠提升學生的學習動機。

□1.非常不同意 □2.不同意 □3.沒意見 □4.同意 □5.非常同意

開放式問題：

　　若您對使用 CALL 教學仍有上述題目未提及的想法，請寫下您的建議或意見。

_____

_____

_____

Appendix B

Questionnaire Used in the Formal Investigation

各位老師您好，我是台北大學應用外語系助理教授廖柏森，懇請您協助我指導的研究生周彥進行問卷調查。同為大專教師，個人深知您的教務繁忙，難有餘裕。但若您能撥冗幾分鐘，就可幫助我們增進對於此研究議題的了解。而英語教師社群對於研究工作的相互扶持,亦是促進英語教學專業成長的動力,希望您能不吝惠填這份問卷，個人和周彥同學都將致上最大的謝意。

廖柏森

大專英文教師使用電腦科技之問卷

各位師長您好，我是**交通大學英語教學碩士班**研究生周彥，本問卷為學生碩士論文研究問卷,主要目的是想要了解目前台灣**大專英文教師在英語教學上使用電腦科技的看法，如尚未使用者亦可參與本研究**。本問卷共分為兩部分，第一部份是您的基本資料；第二部份為 25 題問題。請您撥冗惠填以下個人資料及問卷，**在適當選項上予以勾選**。您的寶貴意見和建議將有助於釐清國內電腦輔助英語教學的現況。此問卷並無標準答案,請依照您個人實際使用經驗或看法直接回答問題即可。本調查採取匿名方式，所得資料僅供學術研究之用，敬請安心作答。非常感謝您的協助，特此致上最誠摯的謝意。

恭祝：

教安！

交通大學英語教學碩士班
指導教授：**廖柏森**
研究生 **周 彥** 敬啟
民國九十五年三月

A. 個人基本資料調查

1. 請問您的性別為：

　1.＿＿＿ 男；2.＿＿＿＿ 女

2. 請問您的年紀為：

1. _____20-30 歲；2. _____30-40 歲；3. _____40-50 歲；4. _____50 歲以上

3. 請問您的最高學歷為：
1. _____ 學士; 2. _____ 碩士; 3._____博士

4. 請問您居住的區域在台灣的：
1._____北部；2. _____中部；3. _____南部；4. _____東部；
5. _____其他地區

5. 請問您從事英語教學的年資為：
1. _____0-5 年；2. ____6-10 年；3. _____11-15 年； 4. _____16-20 年；
5. _____20 年以上

6. 請問您每週平均使用電腦的時數為：
1. _____10hrs 以下；2. _____10-20hrs；3. _____20-30hrs；4. _____30-40hrs；
5. _____40hrs 以上

7. 請問您目前任職的學校中，是否有提供電腦輔助語言教學的相關設備資源？
1. _____有
2._____沒有

8. 請問您目前的教學中是否有運用到電腦科技或其它電子設備？
1. _____有 （選擇此項者，請繼續填寫第 **9** 與第 **10** 題）
2. _____沒有

9. 請問您將**CALL**運用於英語教學的那一方面？(可複選)
1. _____ 聽； 2. _____說； 3. _____ 讀；4. _____ 寫；
5. _____ 其他（請說明：_____）

10. 以下是常見的 **CALL** 相關資源與設備之定義和例子，請依照您的使用頻率予以勾選。

	定　　　　義
Hypermedia 超媒體	能存取與連結不同媒介中大量資源的電子文件。
Multimedia 多媒體	包含聲音、影像或其他資源的綜合媒體。
E-learning Delivery Platform數位教學平台	提供教學者放置教材，並與學習者透過網際網路互動的媒介；具有教材下載、作業上傳、聊天室、討論區、視訊會議等介面的形式。
On-line Reference Tools 線上參考工具	透過網際網路提供學習者各種有助學習的資源。 ✧ **Database 資料庫**：儲存於電腦並藉由電腦所處理的大量資訊。 ✧ **Concordancer 索引工具**：取得文本資料庫的一種媒介，可顯示文章中特定單字或詞組所緊鄰的上下文。
Learning Websites 學習網站	一套相互連結的網頁，由個人或組織準備與維護的大量資訊。主要功能為提供各種學習資源，便於搜尋與存取線上學習資料。

(1) 我在平日教學中使用 CALL 的頻率為：

CALL 相關資源與設備之例子	使 用 頻 率				
	1 從未	2 很少	3 偶爾	4 經常	5 總是
(5) Hypermedia / Multimedia （**超媒體/多媒體**） 例：空中英語線上教室、CNN 互動英語等					
(6) E-learning Delivery Platform （**數位教學平台**） 例： Blackboard, E-campus, 網路日誌、線上論壇、討論版、聊天室、電子郵件等					
(7) On-line Reference Tool （**線上參考工具**） 例：索引工具、搜尋引擎、網路字典、線上百科全書、語料庫、資料庫等					
(8) Learning Website （**學習網站**） 例：Dave's ESL Café、英文線上寫作網站、閱讀網站等					

(2) 若您尚有使用以上未列舉的項目，請列舉說明:

_____
_____
_____
_____
_____

B. 使用 CALL 作為英語教學工具之問卷

說明：本研究中所言「**Computer Assisted Language Learning (CALL) 電腦輔助語言教學**」之定義採用Levy (1997)在*Computer-assisted Language Learning: Context and Conceptualization*一書所提：the search for and study of application of the computer in language teaching and learning「尋求與研究電腦在語言教與學中的應用，稱之為電腦輔助語言教學(**CALL**)」。為便於您的作答，研究者將CALL的範圍限定如下：

包含：(1) Hypermedia/Multimedia(超媒體/多媒體)；

　　　(2) E-learning Delivery Platform (數位教學平台)；

　　　(3)On-line Reference Tool (線上參考工具)；

　　　(4)Learning Website (學習網站)

下列問題皆有**五個**選項，根據上述 CALL 的定義項目，請您依據對每一個問題的同意程度選出最合適的選項。

若您尚未在語言教學上使用電腦科技，也煩請您以**目前任教環境的現況**與**目前的想法**回答各題。

1. 在教學上使用 **CALL**，能幫助我達到預期的教學目標。
□1.非常不同意 □2.不同意 □3.沒意見 □4.同意 □5.非常同意
2. 使用 **CALL** 不會與我現有的教學需求產生衝突。
□1.非常不同意 □2.不同意 □3.沒意見 □4.同意 □5.非常同意
3. 使用 **CALL** 後，我可以向其他教師清楚說明 **CALL** 在教學上的成效。
□1.非常不同意 □2.不同意 □3.沒意見 □4.同意 □5.非常同意
4. 將 **CALL** 運用在教學之前，我有機會在目前的教學環境中嘗試使用。
□1.非常不同意 □2.不同意 □3.沒意見 □4.同意 □5.非常同意
5. 在目前的教學環境中，正式使用 **CALL** 之前，我有充裕時間可以試用。
□1.非常不同意 □2.不同意 □3.沒意見 □4.同意 □5.非常同意
6. 對於 **CALL** 相關軟硬體設備的操作使用，我不覺得有困難。
□1.非常不同意 □2.不同意 □3.沒意見 □4.同意 □5.非常同意
7. 我能清楚比較使用與未使用 **CALL** 對於我教學結果的差別。
□1.非常不同意 □2.不同意 □3.沒意見 □4.同意 □5.非常同意
8. 使用 **CALL** 能夠提升我的教學品質。
□1.非常不同意 □2.不同意 □3.沒意見 □4.同意 □5.非常同意
9. 使用 **CALL** 與我慣用的教學方法可以相容。
□1.非常不同意 □2.不同意 □3.沒意見 □4.同意 □5.非常同意
10. 對我而言，理解如何運用 **CALL** 的相關設備並不困難。
□1.非常不同意 □2.不同意 □3.沒意見 □4.同意 □5.非常同意
11. 我能夠清楚地向其他教師分享說明自己使用 **CALL** 的經驗。
□1.非常不同意 □2.不同意 □3.沒意見 □4.同意 □5.非常同意
12. 使用 **CALL** 可以符合學生的需求。
□1.非常不同意 □2.不同意 □3.沒意見 □4.同意 □5.非常同意
13. 整體而言，**CALL** 在英語教學上的運用並不困難。
□1.非常不同意 □2.不同意 □3.沒意見 □4.同意 □5.非常同意
14. 使用 **CALL** 之後，我可以明顯地觀察其教學成效。
□1.非常不同意 □2.不同意 □3.沒意見 □4.同意 □5.非常同意
15. 在目前任教環境中，我有機會去嘗試使用與 **CALL** 相關的教學功能。
□1.非常不同意 □2.不同意 □3.沒意見 □4.同意 □5.非常同意
16. 使用 **CALL** 能夠增加我與學生間良性的互動。
□1.非常不同意 □2.不同意 □3.沒意見 □4.同意 □5.非常同意
17. 對我而言，如何將 **CALL** 與教學工作相結合很簡單。
□1.非常不同意 □2.不同意 □3.沒意見 □4.同意 □5.非常同意
18. 我可以明確地向其他教師解釋教學上使用 **CALL** 的優缺點。
□1.非常不同意 □2.不同意 □3.沒意見 □4.同意 □5.非常同意
19. 使用 **CALL** 讓我更能自主地進行自己的教學工作。
□1.非常不同意 □2.不同意 □3.沒意見 □4.同意 □5.非常同意
20. 任教學校若能提供資源輔助老師有效利用 **CALL**，會增加我使用的意願。

□1.非常不同意 □2.不同意 □3.沒意見 □4.同意 □5.非常同意
21. 運用 **CALL** 與我任教環境的教學理念相符。
□1.非常不同意 □2.不同意 □3.沒意見 □4.同意 □5.非常同意
22. 使用 **CALL** 不會增加我目前的教學負擔。
□1.非常不同意 □2.不同意 □3.沒意見 □4.同意 □5.非常同意
23. 我要試用過 **CALL** 的相關資源後，才會在教學上正式實施。
□1.非常不同意 □2.不同意 □3.沒意見 □4.同意 □5.非常同意
24. 相較於其他教學工具，**CALL** 的使用對我而言不會很困難。
□1.非常不同意 □2.不同意 □3.沒意見 □4.同意 □5.非常同意
25. 教學上使用 **CALL** 的相關資源，能夠提升學生的學習動機。
□1.非常不同意 □2.不同意 □3.沒意見 □4.同意 □5.非常同意

開放式問題：

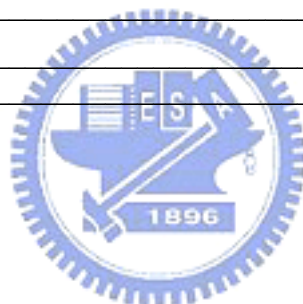　　對使用 CALL 相關資源的教學若有上述題目未提及的想法，請寫下您的建議或看法。您的意見對本研究將有寶貴貢獻，謝謝您！

_____

_____

_____

_____

再次誠摯感謝您的填寫！

訪談同意書

由創新擴散理論探討大專英語教師使用電腦輔助語言教學之信念

老師您好，感謝您參與這個研究，共同探討台灣大專英語老師使用電腦輔助語言教學之信念。我是周彥，目前是國立交通大學英語教學所碩士候選人。這個研究是我的碩士論文，我希望能夠瞭解您對 CALL 的看法，以及您在教學過程中使用 CALL 的情形。因為您正任職於大專院校，所以邀請您參與這個研究。總共約有 8 位老師參與研究，您是其中的一位。

如果您同意參加這個研究，我會與您面談，來瞭解你對 CALL 的看法，以及您在教學過程中使用 CALL 的情形。訪談時間約需 30 至 40 分鐘，而且將會錄音。您無需回答每個問題。這種面談沒有任何風險，錄音帶會以代碼註記，您的個人資料不會顯示在錄音帶上。而且錄音帶將妥善保存在研究者的研究室中，只有研究者在作研究時才能聽到錄音帶。所有的錄音帶內容在謄寫後都會清除。在這研究中任何跟您有關的資料都會保密，沒有您的同意就不會對外透露。

如果現在您有任何問題，請直接問我。如果之後您有任何問題，您可以透過電話 0952066892 或 e-mail: joanne1222.flg92g@!nctu.edu.tw 與我聯絡。您也可以與我的指導教授廖柏森博士聯絡，電話號碼是 (02) 8674-6614，e-mail: posen@mail.ntpu.edu.tw。

如果您需要的話，您可要求一份同意書的影本供您保留。

請您現在決定是否參加這個研究，您在以下欄位簽名就表示您已讀過以上的說明並同意參與。假如您之後決定不想參與，只要告訴我就可以隨時退出這個研究。再次謝謝您的參與。

_____

參加者簽名　　　　　　　　　　　　　　　　　　　日期

_____

研究者簽名

Appendix D

訪談問題導引

1. 對於電腦輔助語言教學，您個人的態度為何?

2. 電腦與科技融入教學是一當下流行的趨勢，您認為電腦輔助語言教學（CALL）是否能夠增進您的教學品質？原因為何？

3. 就您個人而言，使用電腦輔助語言教學（CALL）最大的優點與缺點為何？

4. 除了問卷中所提及的五個潛在因素，是否尚有其他原因會影響您採用CALL 的意願？

5. 對於同樣在台灣一個與英語為外國語言（EFL）的環境中任教的英語教師，可否請您提供任何相關的建議以供參考。

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