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以活動理論檢視三位中學英語教師
對於資訊融入教學的理念與實踐

An Activity Theory Perspective to Examine Three Secondary School
English Teachers' Beliefs and Practices in Technology Integration

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中文摘要

　　近年來的研究對於教師實施資訊融入教學的理念與實踐日益轉向於重視社會與文化層面所帶給教師的影響。儘管之前相關的文獻已指出某些情境因素可能會阻礙教師將資訊融入於教學中，但那些因素大部份仍然是被視為獨立的個體變項，因此針對在中學教育現場裡僅出現少數資訊融入的現象，並無法提供完整的解釋。

　　為了能夠有更全盤的理解，本研究採用了活動理論(activity theory)為研究的理論架構，用來檢視中學英語教師在資訊融入教學所抱持的理念與實踐。活動理論(Engeström, 1987, 1999)是隸屬於社會文化理論之下，其架構並可以被用來解釋個人行為、心智與環境之間錯綜複雜的關係。透過活動理論，本研究以個案研究的方式，探討三位在中學任教的英語教師對於資訊融入教學的信念，以及其個體的活動系統(activity system)如何影響教師在資訊融入上的實行。研究資料擷取於面談訪問與課室觀察，並藉由活動理論中的六個物件來進行更深入的分析，其中包括對象(subject)、目標(object)、媒介工具(mediating artifact)、規則(rule)、角色(division of labor)、以及教師所身處的社群(community)。

　　本研究結果發現教師在資訊融入的實行上，會受到個人信念與情境因素(contextual factor)的影響。對於資訊在教學中所扮演的角色，每位教師皆抱持著各自不同的信念；而此信念亦成為教師們在往後決定該如何融入資訊科技於實際教學上所依據的首要標準。另外，存在於教師所在社群中的特定情境因素亦對於教師本身的資訊融入教學具有莫大的影響力。這些情境因素若是與教師原先的信念相矛盾，會迫使教師對現實情境產生妥協；相反地，若是與其相呼應，亦可使

教師更加相信資訊在教學中所應扮演的角色。

　　此研究結果提供四個在教學實務上的建議。首先,教師應被引薦在資訊融入教學上成功的例子,此舉可讓教師對於資訊融入在教學上的應用有較為正面的信念與較高的意願。第二,教師之間可互相合作,共同運用科技來設計教學材料,以達到省事省時的效果。教師亦需試著將課本視為參考而非唯一的教學來源,並輔以資訊科技來豐富課本的內容。第三,教師、行政人員、家長與學生之間應該有適當的溝通,以瞭解教師在資訊融入上所具有的須求及掛慮。最後,資訊融入應當是在它的確能夠幫助學生做有意義的學習的前提之下所進行的,而非為達到資訊融入而做資訊融入。

關鍵字:社會文化理論、活動理論、資訊融入、教師信念

ABSTRACT

In the recent years research on the relationship between teachers' beliefs and practices in technology has undergone a redirection of foci on social and cultural factors. Previous studies have identified a variety of contextual factors which may impede teachers from integrating technology in their classroom. Those factors, however, mostly being treated as independent variables, fail to provide a more complete view for the limited integration of computer technology in the classroom, especially in secondary education.

To gain a holistic picture of secondary English teachers' beliefs and practices in technology integration, activity theory (Engeström, 1987, 1999), an important component of sociocultural theory, was adopted as the theoretical framework to map out the complexity of individuals' behaviors and capture the dynamic interplay between individual minds and social surroundings (Hopwood & Stocks, 2008; Kahveci, et al., 2008). Case study methodology was adopted to explore three secondary English teachers' beliefs toward technology integration and their activity systems that shaped their pedagogical practices regarding technology. Qualitative data were elicited from interviews and classroom observations. Data were analyzed based on the six components of an activity theory system, including personal agency, objects, mediating artifacts, rules, division of labors, and the community where the teachers were situated.

The findings revealed that the teachers' pedagogical practices in terms of technology integration were affected by their beliefs as well as the situated contextual factors. As the subject of their activity systems, each participant carried their own beliefs regarding the role of computer technology in teaching, and such beliefs formed the fundamental subject agency that determined how technology could be integrated

in their teaching. Furthermore, contextual factors also exerted strong influence upon their technology integration. These contextual factors, embedded within teachers' situated community, could contradict or reinforce their beliefs, causing them to either make compromises or solidify their belief as to the role of technology in the classroom.

Four pedagogical implications derived from the study were provided. First, teachers can be introduced to feasible examples and demonstrations of effective technology integration so they can be more convinced of the potential and relevance of technology in teaching. Second, teachers can collaborate with one another to design classroom materials through technology to save the preparation time. Instead of total adherence to textbooks, teachers should also treat them as guidance and enrich its content through computer technology. Third, communication among all stakeholders should be in place to understand more about teachers' needs and concerns regarding technology integration. Finally, technology should be integrated under the premise that it can enhance students' learning in meaningful ways.

Keywords: sociocultural theory, activity theory, technology integration, teacher belief

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CHAPTER ONE
INTRODUCTION

General Background of Technology Integration

When computer technology gains its momentum in the educational field in recent years, it is suggested that the nature of education is jointly undergoing massive transformation. Student-centered learning, for example, is advocated in place of traditional lectures and linear instruction, thus calling for shifts in teachers' roles from knowledge experts to facilitators and mentors (Carballo-Calero 2001; Chen, 2004; Hsu, 2003; Wang, 2005; Zhong & Shen, 2002). In addition, as a result of the growing prevalence and advancement in computer technology, pedagogical decisions also change in that they no longer dwell on adoption issues but instead shift to the implementation process (Ertmer, 1999). Rather than choosing whether or not to use computer technology in the classrooms, teachers are now more concerned with when and how technology can be used effectively and efficiently so as to best facilitate students' learning.

In response to such largely technology-driven trend in education, Taiwan has also started encouraging the integration of technology into the educational picture. In 1998, the Ministry of Education (hereafter referred to as MOE) launched an educational reform entitled 'Grade 1-9 Curriculum Guidelines' (九年一貫課程綱要) (MOE, 1998). In this movement, information technology, or IT, is intertwined with almost every aspect of the reform such as its rationales, principles, objectives, and implementations. In particular, IT is changed from an independent course subject to one that is integrated into different learning areas such as language arts and social studies. Technology then, according to the basic objectives raised in the reform, is used for active inquiry, problem-solving, communication, as well as cooperation in

various subjects (Chen, 2008; Hsu, 2003). Visioning technology integration realized in elementary as well as high schools, MOE later in 2001 also announced the 'Blueprint of Information Education for Elementary and High Schools' (中小學資訊教育總藍圖), emphasizing increasing access to and the use of information technology to foster autonomous learning that ultimately promote lifelong learning (MOE, 2001).

Under such policies and the guidelines of educational reforms, teachers of each discipline here in Taiwan are expected to integrate information technology into their curriculum, EFL (English as a foreign language) teachers being no exceptions. With the need to facilitate national development and international relationship in Taiwan's national policy (Lin, 2007), it may be suggested that EFL teachers are confronted with multiple challenges. It is expected that they provide effective language instruction infused with various sources of information technology and multimedia, thereby preparing learners to learn English for purposes of cultivating learning interests and communication competence.
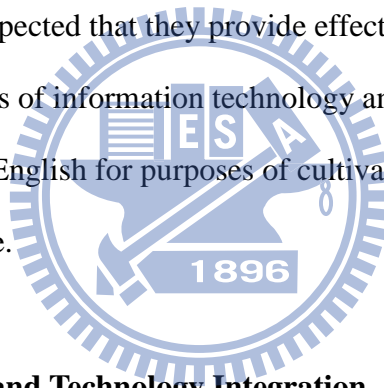
Teacher, Teacher Beliefs, and Technology Integration

Integration will not automatically take its course or bring any substantial changes in instruction even when a classroom is equipped with technology. It has been suggested that in order for successful technology integration to take place, teacher is one of the crucial determinants (Burnett, 1999; Chen, 2004; Chen, 2008; Drenoyianni & Selwood, 1998; Ertmer, 2005). Given that teachers here hold the prominent key, it therefore becomes of great importance to examine how teachers come to conceptualize their work and make instructional decisions regarding technology use. This is exactly where teacher beliefs come into picture.

Early studies have revealed that teachers' beliefs in technology play a pivotal role in teachers' decision-making process (Borg, 2003; Burnett, 1999; Chen, 2008;

Ertmer, 2005; Kagan, 1992; Levin & Wadmany, 2006; Theriot & Tice, 2009). Serving as references and filters that guide teachers through making instructional and curricular decisions, teachers' beliefs affect how teachers ultimately act and teach, and they can either facilitate or impede teachers' technology use in the classrooms. Likewise, when deciding the extent of technology integration, teachers would also draw on their beliefs that ultimately steer them toward how they conduct instructional practices with regard to technology.

A Sociocultural Perspective to Technology Integration

While teacher beliefs have been acknowledged for its significance in shaping teacher's pedagogy, there have been instances where teachers' beliefs do not necessarily transfer to their instructional practices (Belland, 2009; Drenoyianni & Selwood, 1998; Ertmer, 2005; Fang, 1996; Judson, 2006). In tracing the cause for the discrepancy, there is a redirection of foci on the contextual and social elements. Instead of viewing teachers as isolated individuals who make independent decisions based on their beliefs, more focuses are put on the social communities teachers participate in. As stated by Windschitl and Sahl (2002), teachers' thinking in this view is "social in nature", and it is affected by "both the social contexts in which they [teachers] operate and the institutional cultures that profoundly shape the meaning of their work" (p. 166). Such emphasis on the surrounding contexts resembles one of the central notions in sociocultural theory.

Sociocultural theory considers individuals as social beings influenced by sociocultural factors within specific contexts, and it contends that higher mental functions are socially mediated, i.e., it develops out of dynamic interaction between individual mind and social milieu (Lantolf, 2000). According to this theory, therefore, when teachers are engaged in teaching, their teaching practices would be strongly

mediated by contextual influences, and teachers' interpretation of how technology can be used or whether to use technology at all is then shaped by their participation in these contexts.

One of such sociocultural perspectives is activity theory, which "focuses on the interaction of human activity and consciousness (the human mind as whole) within its relevant environmental context" (Jonassen & Rohrer-Murphy, 1999, p. 62). Activity cannot be understood or analyzed outside the context in which it occurs, and this framework directs our attention to the activity systems where individual's behaviors are rooted. Furthermore, not only does it take into consideration all the structural, historical, and cultural elements needed for a more thorough understanding, but it is also able to capture the contradictions or tension arising within any activity systems (Hopwood & Stocks, 2008; Kahveci, Gilmer, & Southerland, 2008). Such analysis of human activity and context is essential if we are to understand teachers' instructional design process. Acknowledging the importance of social environment in relation to individual's development and choice of actions, activity theory therefore serves as a useful framework for interpreting how teachers decide the extent of technology integration to achieve their goals, as well as how they might be making any compromises during such decision-making process.

With attention now focused more upon identifying the relationship between teachers' integration of technology and a variety of contextual factors, it should be noted, however, that earlier studies may still exhibit several limitations. First, the factors identified in previous research were mostly treated as variables independent and irrelevant from one another, and they seemed to have failed to take into account the complex process in which teachers interact with and strive to negotiate between contextual realities and their beliefs (Ertmer, 2005; Windschitl & Sahl, 2002). Second, few efforts have been made to investigate teachers' beliefs and instructional use of

technology from the dimension of sociocultural theory. Even with those that did make such a connection, there seems to be a lack of concrete framework used to analyze the interaction among teachers' beliefs and instructional practices in relation to sociocultural influences. Third, earlier studies tend to focus more on teachers in general, while research targeting second language or English teachers in particular seems to be scant.

Given that activity theory carries the potential to capture the dynamic interplay among individual minds, their behaviors, and social surroundings, the current study will adopt activity theory as the underlying theoretical framework to examine how English teachers, under sociocultural influences, come to construct their beliefs about technology, as well as how they decide the extent of technology integration in their instructions.

Purpose of the Study

The current research is a qualitative case study on English teachers in junior and senior high schools. Through a sociocultural perspective of activity theory, the purposes of this study are first, to discover English teachers' beliefs toward the role of technology in their classroom practices; second, to disclose the underlying reasons that might attribute to English teachers' extent of technology integration in class; third, to investigate how English teachers deal with the conflicts arised when contextual realities constrain their implementation of beliefs in technology integration. One of the focuses here is how contextual and institutional influences interact with teachers' personal beliefs and their pedagogical practices regarding technology integration. In particular the researcher is concerned with any possible conflicts that may arise as they strive to negotiate between their personal agency (e.g., beliefs and goal) and contextual realities when deciding to integrate technology in their English classes.

Research Questions

The current study intends to address the following research questions:

1. How do English teachers' beliefs lead to their practices regarding technology integration?

2. How do contextual factors interplay with English teachers' classroom practices in technology integration?

Organization of the Thesis

In addition to Chapter 1, the organization of this thesis is as follows. In Chapter 2, related literature of different areas are reviewed, including technology integration, teacher beliefs and practices, its relationship with technology integration, and finally, activity theory. In Chapter 3, the methods used for this study are described in detail, namely the participants, data collection, procedure, and data analysis. In Chapter 4, the results of the study are presented in response to the research questions. Finally, Chapter 5, as the last chapter, concludes the thesis by discussing and summarizing major findings, pedagogical implications, limitations of the study, as well as suggestions for future research.

CHAPTER TWO
LITERATURE REVIEW

Serving as the research background on which this study is based, this review addresses the following three areas. First, the concept of technology integration is reviewed, including its definition, its application in Taiwan's compulsory education policy, as well as contributing factors affecting its success. Second, related literature on teachers' beliefs and practices in general are consulted; with its scope slowly narrowed down, studies on the relationships between teachers' beliefs and practices in technology integration will also be synthesized. Finally, sociocultural theory, or activity theory in particular, is reviewed, as it provides the theoretical framework needed for the design of this study.

Technology Integration

Despite high promotion of technology integration in the educational picture, so far there has not been a universally acceptable agreement as to the exact definition of technology integration itself. Some look at the issue from teachers' perspective, asserting technology integration as teachers' use of technology in preparation, in-class teaching, and after-class assessment (Chen, 2008; Newby, Stepic, Lehman, & Russell, 2006; Roblyer & Edwards, 2000). Some operationalize it as the use of technology to help learners solve problems and enhance learning in the content areas (Ertmer, 2005; Jonassen, Howland, Moore, & Marra, 2003; Sprague & Dede, 1999). Still some others define technology integration from the nature of technology itself, describing it as total infusion of technology into curriculum, materials, teaching and learning so that technology becomes an indispensible part of pedagogy (International Society for Technology in Education, 2000; Wang, 2004). While seemingly different, they are in

fact not so much contested or mutually exclusive when taken altogether.

Integration of technology is one of the central policies in Taiwan's educational reform. Since the Grade1-9 Curriculum Reform in 1999, Ministry of Education has redefined the role of technology in education. Information technology is no longer an independent course with sole focus on computer skills; instead, it is integrated into different learning areas, and teachers of various subjects are encouraged to incorporate technology to facilitate teaching and learning. In addition, information technology is also listed as one of the ten basic skills students need to cultivate as well as one of the six major issues in education (Chen, 2004; Hsu, 2003). Under such policy, the curriculum emphasizes cultivation of students' abilities to solve problems and do active inquiry as well as social communication (Chen, 2008). Later in 2001, the importance of information technology is once again emphasized in the '*Blueprint of Information Education in Elementary and Junior High schools*', as its goal is to develop information literacy, critical and creative thinking, effective learning strategies, active learning, collaborative learning, and lifelong learning (MOE, 2001).

Along with the advent of technology, researchers have suggested a potential link between successful technology integration in teaching and constructivist pedagogy (Chen, 2008; Levin & Wadmany, 2006; Reigeluth, 1999). In constructive teaching, teachers conduct student-centered instructions that "engage students in active problem solving and genuine inquiry" (Chen, 2008, p. 68). It has also been suggested that when giving students the opportunity to actively explore and inquire with technology in ways that are meaningful to them, their motivation and understanding can be increased (Jacobsen, 2001; Jonassen, Peck, and Wilson, 1999; Sandholtz, Ringstaff, & Dwyer, 1997). Similarly, Levin and Wadmany (2006) also suggested that teachers holding constructivist views tend to integrate technology in the classroom, and vice versa. Technology in this view is not merely an added tool that may be taken away,

but instead, because of technology, students are allowed to learn in meaningful ways and construct their knowledge. Thus, it may well be concluded that Taiwan's educational reforms and policies "encourage teachers in Taiwan to align technology integration with constructivist concepts" (Chen, 2008, p. 68).

Based on definition of earlier research and MOE's educational reform calling for constructivist approach, the researcher hereafter defines technology integration as teachers' use of technology, or computer technology to be more specific, to foster student understanding and raise motivation that promote constructive and meaningful learning on students' part.

Conditions and Factors Affecting Technology Integration

The success of technology integration can be determined by a variety of different terms and factors. In recent years researchers have focused particular attention upon the conditions set for an ideal technology integration (e.g., Bitner & Bitner, 2002; Bullock, 2004; Ertmer, 2005; Judson, 2006; Zhao & Cziko, 2001). In addition, a great number of studies have also been generated that looked into the specific factors accountable for teachers' extent of technology integration, (e.g., Bauer & Kenton, 2005; Ertmer, 1999; Hew & Brush, 2007; Lam, 2000).

Researchers have proposed features that characterize or facilitate ideal technology integration in the classroom (Bitner & Bitner, 2002; Becker, 2000; Bullock, 2004; Judson, 2006; Zhao & Cziko, 2001). In examining preservice teachers' experiences in integrating technology, Bullock (2004) suggested that effective mentoring and modeling, clear expectations, easy access to technology and technology support, and positive experiences with technology in the classroom will serve as crucial enablers for preserve teachers to practice using technology. Becker (2000) also suggested that access, preparation, freedom in the curriculum, and

teachers' constructivist beliefs will altogether help to shape computers as "valuable and well-functioning instructional tool" (p. 29).

On the other hand, the above features that promote technology integration, once missing, can also turn from facilitations to inhibitions. Brickner (1995), for example, developed the idea of first-order and second-order barriers in technology integration. Simply put, first-order barriers are more external, dealing mostly with the outside obstacles in the current teaching practices, and they are typically described in terms of resources such as time, access, support and training. Some of the attributions in earlier studies of technology integration fall right into this category (Bullock, 2004; Chen, 2008; Cuban & Peck, 2001; Ertmer, 1999). Second-order barriers, on the other hand, are more internal, centering upon teachers' attitudes and beliefs that might impede integration of technology (Belland, 2009; Bullock, 2004; Zhao & Cziko, 2001). In confronting such barriers, Ertmer (1999) addressed and delineated effective strategies in response to the barriers, suggesting that these two types of barriers are in fact closely related. Going beyond mere acquisition of software and technical skills, it is recommended that skills in leveraging technology to facilitate and assess students' learning is also needed.

Teachers' Beliefs and Practices in General

The process of teaching is said to comprise two major domains: teachers' thinking and their instructional practices (Clark & Peterson, 1986). In the traditional lines of research, most studies focused on the latter area, i.e., teachers' observable behavior or their teaching, exploring how it affects students' academic achievements (Fang, 1996). The basic tenet underlying such focus is the conviction that knowledge of qualities in 'good' teaching will lead to enhanced instruction and ultimately students' improved performances. Recently, however, there has been a shift of

attention to the aspect of teacher thinking. Instead of trying to capture effective teaching, researchers have started to exhibit particular interest in how teachers conceptualize their teaching, and more specifically, its relationship with teachers' instructional practices in the classroom.

The main purpose for such research is to better understand why and how teachers' classroom behaviors are in certain ways rather than the others. Graden (1996), for instance, believed that any discrepancies that arise in between teachers' beliefs and practices should be addressed, so that teachers can be better informed and equipped to "reconcile beliefs and practices in order to provide more effective instruction" (p. 387). Breen, Hird, Milton, Oliver and Thwaite (2001) went further to suggest four main reasons that account for the importance of knowing the principles that guide teachers' actions: (1) to achieve deeper understanding and find explanations that goes beyond mere descriptions of teacher actions; (2) to serve as a reference that guides teacher education and professional development; (3) to inform curriculum policy that allows greater feasibility of any innovations; (4) to contribute frameworks for language pedagogy that merges directly from classroom work. As illustrated in Borg's words (2003), "teachers are active, thinking decision-makers who make instructional choices by drawing on complex, practically-oriented, personalized, and context-sensitive networks of knowledge, thoughts, and beliefs" (p. 81). It is therefore worthwhile to examine the relationship between teachers' classroom practices and their pedagogical thoughts or beliefs.

Definition and Characteristics of Teachers' Beliefs

The importance of examining teachers' beliefs or thought processes has been stressed in numerous studies and is said to be inextricable from teachers' decisions and practices (e.g., Burnett, 1999; Fang, 1996; Kagan, 1992; Levin & Wadmany, 2006;

Theriot & Tice, 2009).While recognizing the potential that resides in teachers' beliefs, at the same time, researchers have also confessed that such belief in and itself is difficult to define (Borg, 2003; Breen, Hird, Milton, Oliver & Thwaite, 2001; Chen, 2008; Ertmer, 2005; Kagan, 1992). As summarized in Chen's words (2008), "… [the study of teacher beliefs] faces the difficulty of being short on clear and commonly accepted definition and conceptualizations of beliefs and belief structures" (p. 66). With such confusion in definition, similar concepts are often described using different terms, while an identical term is defined in different ways. Such complication of terminologies is also synthesized by Borg (2003), who listed out all the different labels that have been used in research on language teacher cognition.

Despite the 'messy construct' in defining teacher beliefs (Pajares, 1992), it is said to be different from teacher cognition. The latter refers to a more general concept that includes teachers' beliefs, knowledge, thoughts and reflections about teaching and learning (Borg, 2003; Calderhead, 1996; Kagan, 1990). The distinction between beliefs and knowledge, on the other hand, is not so clear-cut. Kagan (1990) considered these two interchangeable; still there are others who saw them as two completely different entities (Calderhead, 1996; Nespor, 1987; Kagan, 1992). According to the final view, beliefs, in contrast with the factual and therefore more objective nature that resides in knowledge, carry relatively more subjective color and does not require consensus among individuals. For example, teachers may have obtained shared knowledge regarding the benefits of technology in teaching and even witnessed how technology can be integrated in the classroom; nonetheless, they can still choose not to believe that computer technology is effective for their own classroom use. As inherent in beliefs is such an evaluative nature, beliefs are suggested to yield more power in predicting individuals' behaviors (Ertmer, 2005; Kagan, 1992; Nespor, 1987; Pajares, 1992). Additionally, Pajares (1992) went further

to urge that belief systems be specified in less general terms.

In the current research, the researcher adopted the definition of 'teacher beliefs' developed by Kagan (1992), which included two different dimensions: teachers' sense of self-efficacy and content-specific beliefs. The former refers to "teachers' generalized expectancy concerning the ability of teachers to influence students, as well as the teachers' beliefs concerning his or her own ability to perform certain professional tasks" (p. 67). The latter is defined as "teachers' orientation to specific academic content", which encompasses the teachers' "conceptions of the field to be taught, as well as his or her judgments about appropriate instructional activities, goals, forms of evaluation, and the nature of student learning" (p. 67).

Apart from its evaluative, affective color mentioned above, beliefs, as described by Nespor (1987), is said to hold yet several other characteristics. Firstly, beliefs resemble stories in that they draw references from episodic memories such as personal experiences and cultural sources of knowledge. They then serve as the filter for upcoming new information and experience. Secondly, beliefs can be resistant to change in some cases. Ertmer (2005) also exemplified this, presuming that affect-based beliefs are "more intimately connected to our personal identifies, reside in a more central position in our belief systems" (p. 32). Oftentimes filtered through individuals' earlier personal experiences, these affect-based beliefs thus become deeply engrained and harder to change as opposed to knowledge-based beliefs. Thirdly, beliefs can extend beyond contexts and be applied in ill-defined situations where no answers are available. Because of such flexibility, teachers can readily draw from their existing beliefs and extend them when they are confronted with problems that do not have an absolute solution. Finally, beliefs do not require group consensus, and thus may be quite idiosyncratic (Nespor, 1987).

Having stated the tendency of beliefs to stay constant, however, Ertmer (2005)

also stressed that this does not mean beliefs are absolutely fixed; instead they can still possibly be changed if individuals are dissatisfied with their existing beliefs. Three prompts were suggested to stimulate such dissatisfaction: personal experiences, vicarious experiences, and socio-cultural influences. Also acknowledging changes of beliefs is another study conducted by Levin and Wadmany (2006). In their attempt to analyze the evolution of teachers' beliefs, they found the presence of substantial changes in teachers' beliefs and practices. In addition, the results also yielded variance in changes of beliefs across individuals, and teachers often hold multiple rather than unwavering, dichotomous beliefs. They concluded that teachers' beliefs, while in the process of developing may appear contrastive and inconsistent, should instead be viewed as complementary.

The Relationship between Teachers' Beliefs and Practices

   Researchers have explored the relationship between teachers' beliefs as well as practices, recognizing the two as intertwining with each other, with beliefs shaping teachers' instructions and vice versa. Previous studies have indicated that teachers' beliefs regarding learning and teaching are generated by their prior conceptions from a variety of personal experiences such as their upbringing as well as life and schooling experiences (Belland, 2009; Hollingsworth, 1989; Theriot &Tice, 2009). When teachers teach, on the other hand, their accumulated experiences as teachers in turn will also shape the formation of their cognition, including their pedagogical beliefs (Borg, 2003).

   In the study that documented four preservice teachers' preparation in the education programs, for instance, Hollingsworth (1989) demonstrated how their learning experiences as students have led them to hold respective beliefs as to how classes should be conducted. Lortie (1975) termed this 'apprentice of observation',

explaining that teachers, through past experiences as learners of various subjects, know about teaching long even before they start to take formal educational courses. Likewise, Borg (2003) has also illustrated that, when working in the other way around, practices could exert influence upon teachers' beliefs as well. In his review he summarized studies which manifested a clear difference between experienced teachers and novice ones. Not only do teachers' past teaching experiences serve as references for forming instructional ideas and beliefs, but they also allow teacher to be experientially informed and act on interactive decision-making and improvise on the spot. Prabhu (1987) also coined the term 'sense of plausibility' to refer to teachers' ability to, after years of teaching, know what works or does not work. What is regarded as plausible then becomes the criteria, which teachers can apply to subsequent teaching situations.

The correspondence between teachers' pedagogical beliefs and their instructional decisions has also been another area of interest for researchers, and efforts have been made to investigate whether one conforms to the other or if any inconsistency in between occurs (Belland, 2009; Chen, 2008; Ertmer, 2005; Fang, 1996; Judson, 2006; Levin & Wadmany, 2006). In a review conducted by Kagan (1992), research has shown that teachers' beliefs "usually reflect the actual nature of instruction the teacher provides to the students" (p. 73). This is supported in Fang's study (1996), in which the researcher did a metaanalysis in studies related to literacy instruction. Regardless of students' level, the results all demonstrated that teachers hold theoretical beliefs that mirror their instructional practices or methodological approach. Taken altogether, these empirical evidence all confirmed that teachers' pedagogy are indeed shaped by what teachers think about their roles as well as the beliefs values they hold.

Nonetheless, there are yet another group of studies yielded completely the opposite findings (Chen, 2008; Fang, 1996; Graden, 1996; Haser & Star, 2008; Judson,

2006). In the attempt to compare foreign language teachers' beliefs and practices when teaching reading, Graden (1996) revealed large instances of inconsistency, which he attributed to teachers' compromise to accommodate students' actual needs. Due to students' poor performances in reading and their motivational needs, these teachers were compelled to prioritize students over their preferred instructions. Similar examples of inconsistency are also presented in Fang's review, in which he described a number of studies where teachers' professed beliefs do not indicate actual transfer to their instructional practices.

In response to such phenomenon, researchers have tried to trace down the underlying reasons responsible for the inconsistency. Some attributed this to potential flaws inherent in study design, asserting that teachers' self-reported data including surveys and written tasks render unreliable information (Fang, 1996; Judson, 2006). Other studies ascribed otherwise, looking at the influence of instructional contexts on teachers' pedagogical choices. Factors such as curriculum requirements, social pressure, time allocation, and availability of resources were all cited as explanations that result in the discrepancy (Borg, 2003; Chen, 2008; Ertmer, Gopalakrishnan, & Ross, 2001). Johnson (1996), for example, reported the struggles a student teacher experienced; in this study, her initial enthusiasm faded away when contextual realities forced her to conduct teacher-centered teaching, contrary to her own beliefs. Teachers are thus subject to a variety of different psychological, social and environmental realities inherent in schools and classrooms, thus constraining them from practicing what they believe in (Borg, 2003; Fang, 1996).

Teachers' Beliefs and Practices in Technology Integration

With the increasing popularity of computer technology in our daily lives, access to and related training on computer technology also become less problematic.

Nonetheless studies have shown that despite the investment in and the increasing access to computer technology in schools, in general instances of technology integration seem to remain small in number, the extent of technology integration limited, and the educational system mostly unchanged (e.g., Belland, 2009; Cuban, Kirkpatrick & Peck, 2001; Ertmer, 1999, 2005; Levin & Wadmany, 2006; Zhao & Cziko, 2001). Given that these outside barriers in resources might no longer be regarded as significant, researchers have shifted their attention instead to the final barrier, i.e., teachers' beliefs, as predictor of teachers' use of technology integration (Anderson & Maninger, 2007; Brinkerhoff, 2006; Ertmer, 2005; Hsu, Wu, & Hwang, 2007; Lumpe & Chambers, 2001; Park & Ertmer, 2007). Such change of focus is based on the premise that "technology integration is behavior planned according to intentions, which are informed by professed beliefs" (Belland, 2009, p. 354). In line with this argument, Zhao and Cziko (2001) also commented on the importance of teachers' beliefs in relation to the use of technology, asserting that teachers must be considered as "goal-oriented, purposeful organism" (p. 6). They suggested that if technology integration is to be realized, teachers need to hold positive beliefs towards the effect of and their abilities to integrate technology.

Given the importance of teachers' beliefs, researchers have looked into its relationships with teachers' instructional practices in technology in the classroom (Burnett, 1999; Chen, 2008; Drenoyianni & Selwood, 1998; Judson, 2006; Lam, 2000; Levin & Wadmany, 2006; Windschitl & Sahl, 2002). Several studies have manifested a more or less transfer from beliefs into practices in technology. In Lams' study (2000), for example, rather than manifesting 'technophobia' as were considered in previous literature, most of the English teachers instead were not convinced of the benefits of computer technology in L2 instruction, thus unwilling to allow any technology integration to take place. Winschitl and Sahl (2002) also confirmed such

transfer of beliefs, when the technological decisions of the three teachers in their study were influenced respectively by learners needs, nature of the subject matter, and the desire for classroom control. They thus concluded that teachers' integration of technology were "mediated in ways by teachers' interrelated beliefs systems about learners in that particular school, about what constituted 'good teaching' in the context of the institutional culture, and about the role of technology itself in the lives of students" (p. 195).

There are however some researchers whose studies yielded different results. Investigating the relationship between how teachers integrate technology and their beliefs about learning, Judson (2006) found little connections in between. In his study, while teachers identified with and claimed to conduct student-centered instructions, classroom observations of their technology integration nonetheless said otherwise. Similarly, Chen (2008) also reported such inconsistency between teachers' manifested beliefs and what they actually practiced regarding technology integration. Despite governments' encouragement and teachers' convictions of constructivist teaching by integrating technology in the classroom, it remained true that not so many teachers had the abilities to do so in reality. Instructions were by and large traditional with only limited extent of technology integration.

With increasing attention to the social and contextual influences recently, institutional culture has also been identified as another factor that contributes to the extent of technology integration. In their study to investigate the paradox between high access and low use of technology in two high schools, Cuban et al. (2001) labeled historical legacy as well as structures and time as two major factors that lead to infrequent use of technology. It was suggested that established practices, culture, and teaching goals that have been practicing within the school for years is hard to be changed or questioned. Teachers working in schools that encourage the image of

academic specialists, for example, would probably be compelled to cover large body of information within limited amount of time; the possibility of using technology is thus reduced. The larger educational system has also been held accountable for limited technology integration (Chen, 2008). Chen, in particular, pointed out that the exam-oriented phenomenon in Taiwan, which very often drives teachers to cover as many materials as possible to help students obtain high scores in exams. This tendency thus discouraged them from integrating technology in constructive ways.

As the present study explores teachers' beliefs and practices in technology integration through a sociocultural perspective of activity theory, in the last section of this chapter, activity theory will be reviewed. The application of activity theory as a theoretical framework will also be discussed here.

Sociocultural Theory in Language Education

Early studies in the field of second or foreign language have always put the emphasis upon learners as individuals. Hence, learners are predominantly perceived as individuals working in isolation with minimal influences from the surrounding contexts, and Second Language Acquisition (SLA) has traditionally been treated as an "internalized, cognitive process" (Zuengler & Miller, 2006, p. 36). It was not until recently that SLA studies have given rise to an alternative approach, incorporating a larger view that includes the social aspect of learning a language. In this sense learners are regarded as social beings whose actions are influenced by sociocultural as well as historical factors within specific contexts. Sociocultulray theory, originated from the works of Vygotsky (1978, 1987), takes on such an approach, and it sees human learning as a situated and mediated process interweaving between individual mind and social milieu (Lantolf, 2000).Whereas from the cognitive-acquisition perspective, language learning takes place solely within the mind of individual

learners alone, "within a sociocultural framework, however, learning, including the learning of second languages, is a semiotic process attributable to participation in socially-mediated activities" (Donato, 2000, p. 45). In other words, from a Vygotskian perspective, one of the central notions is that language learning, or any forms of higher mental functioning, involves individuals' participation in a given social practice, where individuals undergo constant negotiation of meanings.

Given that our mental work – thinking, reasoning, learning, for example – is socially mediated and largely decided by the social activities we engage in, it may be safe to conclude that the context in which those social activities take place is of great importance to our mental and cognitive development. In Rogoff's claim (1990), the social contexts are considered influential in affecting our cognitive activity, as our cognitions are constructed by the social interactional contexts we are situated in. Wertsch, in a similar vein, also stated the significance of context, asserting that sociocultural analysis aims to understand how mental functioning is associated with cultural, institutional, and historical context (1998). Thus, according to sociocultural theory, human action is always mediated as well as socially situated, and the specifics of its immediate sociocultural context is indispensable if a sweeping understanding of one's cognitive development is to be achieved. Moreover, it has also been suggested that learning and cognition is constructed and realized through social interactions in a given context (Mondada & Doehler, 2004). During social interactions, we become member of a particular culture, and, together with other members, we collaboratively construct exclusive, culture-specific experiences, which then not only shape and foster the development of our higher mental functioning, but they also affect our interpretations of the social environment and the activity systems we undergo.

Likewise, when applied to language teaching, sociocultural theory also assumes teaching as a practice situated in a particular setting. Teaching cannot be considered in

solitary; rather, they need to be understood in combination with the range of settings

in which teachers engage during teaching and learning to teach (Newell, Gingrich, &

Johnson, 2001). The schools teachers teach in, for example, carry context-specific

institutional cultures that are constructed and developed under "historically and

culturally grounded conditions" (Windschitl & Sahl, 2002, p. 166). These particular

cultures then mediate teachers' cognition and practices. Furthermore, not only does

mediation occur within a particular context, it also takes place across different activity

settings. As exemplified by Johnson and Golombek (2003), teachers' collective roles

as past learners in classrooms and schools, as student teachers in teacher education

programs, and as current teachers in the institutions they work in, altogether

contribute to shaping teachers' thinking and behavior. Taken altogether, sociocultural

theory is said to be capable in allowing teacher educators to see, in greater detail,

teachers' cognitive processes at work (Johnson & Golombek, 2003), particular in

relation to how they are mediated by the situated contexts teachers engage in – both

previously and currently.

One of the central tenets of and also closely related to sociocultural theory is

activity theory. In the following section, its history, definition, as well as application

in language teaching and learning will be discussed.

Activity Theory

Activity theory first stemmed from Vygotksy's sociocultural theory that humans'

higher mental functions are mediated by all kinds of signs, the process of which

Vygotsky termed 'tool-mediated functions' (Vygotsky, 1987). As graphed in *Figure 1*,

subjects use symbolic, culturally created tools and signs, either concrete or abstract, to

assist them working on the object. In other words, the relationship between the subject

and the object is constantly mediated by various mediational artifacts in the social

context. Sociocultural theory thus emphasizes the mediated connection between the social and the mental, holding that human mental activities are constituted of our interactive experiences with others and with artifacts (Lantolf, 2000).
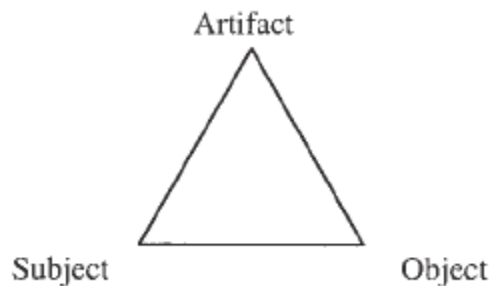
Figure 2.1. Vygotksy's Mediational Triangle (Vygotksy, 1978, 1987; Wells, 2002)

Being a close student and collaborator of Vygotksy's, Leont'ev (1978, 1981) took a step further, changing the focus from mediation to objects of the activity or, more precisely in Leont'ev's term, motives. Building upon Vygotsky's notion that human higher functions and activities are socially as well as historically mediated, Leont'ev developed activity theory, contending that socially organized human activity is the primary unit of analysis. Note that the term 'activity' here is operationally defined in different ways from 'task'. Taken in SLA research, the latter is often used to elicit linguistic data from participants and is controlled by research considerations, whereas the former "is the process, as well as the outcome, of a task" (Coughlan & Duff, 1994, p. 175). In their study that sets out to differentiate between the two, these two researchers asked the same group of participants to describe a picture several times; it was found that, rather than generating similar results as otherwise would have been anticipated, the task yielded different activities regardless of it being performed by different or the same individual(s) (Coughlan & Duff, 1994). Task and activity are therefore essentially and distinctively different.

Coming back to activity theory itself, contrary to the traditional approach that

acknowledges only minimal importance of social environment, activity theory on the other hand provides a theoretical framework that highlights the dialectic relationship between individuals and the social environment, focusing on the interaction of human activity and mind within its relevant environmental context. Thus, from the theoretical perspective of activity theory, in order to best understand individual's behaviors, one must take into consideration the specific social contexts involved, i.e., the activity systems in which individual's behaviors are rooted. In Leont'ev's (1978, 1981) model of activity theory, three different levels can be identified: motives, actions, and operations. According to this model, individuals are, within a particular activity system or context, driven by underlying motives, and these motives are realized in goal-oriented actions, which will then lead to executions of specific operations carried out to reach a desired outcome. Even with different actions, activities will be considered identical provided that the motives are the same; conversely, even when the actions taken are the same, activities will be different if the underlying motives are distinct. Motives are therefore representative and of crucial importance in understanding an activity system.

In better capturing the nature of a collective activity system, Engeström (1987; 1999), as shown in *Figure 2*, further expanded Leont'ev'**s** primitive model of activity theory into what he later termed 'international activity-theoretical collaboration' (1999). The complexities of individuals' social practices are mapped out with respective elements, and rule, community, and division of labor are included in the lower triangle of the model to account for social, cultural, and historical influences. Whereas the upper triangle describes the tool-mediated relationship between subject and object, the lower part of the triangle adds community as another mediation that shapes the subject-object relationship. As cited elsewhere (Jurdak, 2006; Nelson & Kim, 2001), subject is the human agent undertaking the activity; object represents the

targeted point the subject is working towards, the process of which is mediated by

different artifacts, tangible and intangible alike, to finally reach the desired outcome.

Subjects who share the same object belong to one distinct community, and the rules

refer to the norms, conventions, or regulations that regulate the actions and

interactions within that particular community. The division of labor refers to how

tasks and power status are divided among members of that community. The

components described above are by no means fixed, but undergo constant changes as

a result of the interaction among these elements.
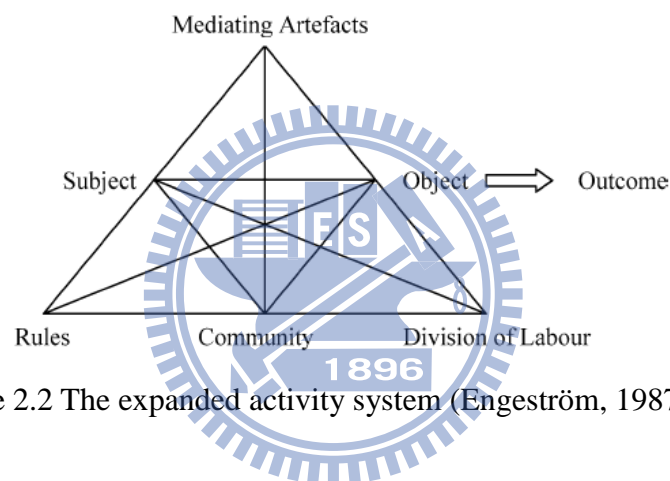
Figure 2.2 The expanded activity system (Engeström, 1987, 1999)

One of the principal ideas of activity theory is internal contradictions or tensions

inherent in any activity systems (Barab, Barnett, Yamagata-Lynch, Squire, & Keating,

2002; Blin & Munro, 2008; Engeström, 1999; Hopwood & Stocks, 2008). As

Engeström (1999) contends, he urged that activity system be considered from a

broader perspective, arguing that disruptions and unexpected innovations are typical

and representative of the activity system. As different elements within the activity

system interact among one another, tension or even mismatch among elements may

arise, which might prompt individuals to either give up or reform new motives and

goals for their activity system and change their actions in order to resolve the crisis.

As Cole and Engeström (1993) put it, "activity systems are best viewed as complex

formations in which equilibrium is an exception and tensions, disturbances, and local

innovations are the rule and the engine of change" (p. 8). Accordingly, the

components described above are by no means fixed, but instead undergo constant

changes as a result of such tension, conflict, and interaction that stimulate

developments and transformations. By evaluating through the lens of the activity

theory, it is suggested that potential contradictions attributable to the changes can be

spotted.

Activity Theory in Language Teaching and Learning

In recent years activity theory has been employed widely in a number of studies

to explain behaviors or phenomena observed across different domains, including

language teaching and learning. Researchers in this field have started to emphasize

the influence of context on teaching and learning from a sociocultural perspective.

Activity theory thus is adopted as an analytical framework to address the complexity

of language learning as well as teaching process (e.g., Gao, 2008; Grossman,

Smagorinsky, & Valencia, 1999; Haneda, 2007; Jonassen & Rohrer-Murphy, 1999;

Jurdak, 2006; Lantolf & Genung, 2002; Lantolf & Thorn, 2005; Nelson & Kim, 2001;

Norton, McRobbie, & Ginns, 2007; Storch, 2004).

In a case study exploring the transformation of a student's course of actions, for

instance, Lantolf and Genung focuses specifically on the conflicting power status as

wielded by the instructor and perceived by the student (2002). Due to such

contradiction, the student considered her learning experiences as inhibition rather than

facilitation to her Chinese learning. In defense for her own belief systems, the student

struggled to challenge but failed, leading her ultimately to submit to the power and

change her actions in order to meet her PhD requirement. It was later implied that the

histories that students and teachers brought with them, accountable for the conflicts

arose here, can cause individuals to shift their motives, goals, and behaviors in response to the conflicts. This research accordingly confirms one of the central notions within the activity theory, which sees disruptions and changes as typical of any activity systems. In another similar study, appropriation, mediation, and contradictions in the L2 writing classroom were explored (Nelson & Kim, 2001). The results magnified the significance of sociocultural influences, suggesting that individual's goals and motives would differ even when they are situated within the same classroom. It was further proposed that learners' past as well as present learning activities served as a significant mediator on their appropriation, and the conflicts encountered led to changes in one's actions and generalizations into other activity systems.

Storch (2004), in a similar vein, also highlighted the importance of social and historical factors individuals brought upon their learning. In investigating the dyadic interactions between learners, Storch found variations in the patterns of students' interactions, which, through the analytical lens of activity theory, was attributed not to different task types, but to learners' own definition of the situation, their perceived goals and roles. Thus, in accordance with Coughland and Duff's (1994) finding, it was believed that student agency came into play where each individual, though given what might otherwise appear as identical task, underwent different activities, depending on learners' previous as well as present learning experiences and their own activity systems embedded in a specific context. As illustrated by Donato (2000), "No amount of experimental or instructional manipulation […] can deflect the overpowering and transformative agency embodied in the learner" (p. 47). By underscoring the 'situated definition' uniquely created by each individual, Storch's as well as Coughland and Duff's studies thereby coincide with one of the central notions underlying activity theory, which regards sociocultural and historical impact upon

individuals of paramount importance in their choice of actions.

Apart from explaining learners' behaviors, activity theory also contributes to language teaching (Grossman, Smagorinsky, & Valencia, 1999; Jonassen & Rohrer-Murphy, 1999; Martin, 2008; Newell, Gingrich, & Johnson, 2001; Valencia, Martin, Place, & Grossman, 2009). Useful for understanding the process of teaching and learning to teach, activity theory has received particular attention on and also been employed in teachers' professional development. Jonassen and Rohrer-Murph (1999), for instance, used activity theory to explore its application in designing constructive learning environments. After careful examinations of factors underlying the activity systems, they concluded that activity theory was indeed with the potential to yield different perspectives for analyzing learning process and outcomes, thus proven valuable for designing instruction and building a constructive classroom.

Also acknowledging the values of activity theory is the research article done by Grossman, Smagorinsky, and Valencia (1999). In setting out to explain the incongruity in the values and practices promoted between teacher education and practicing schools, they incorporated activity theory to examine the conceptual development of teachers. By placing predominant emphasis upon the activity settings, they found activity theory's rich potential to illuminate how teachers' progression through different settings shaped their beliefs about teaching, learning, and instructional practices. As Grossman et al. (1994) described, "Rather than seeking a uniform explanation for the reasons behind teachers' gravitation to institutional values, an approach grounded in activity theory is more concerned with issues of enculturation and their myriad causes and effects" (p. 4). Conforming to this line of research, Newell et al. (2001) also recognized activity theory as a powerful theoretical framework in identifying and understanding student teachers' appropriation process as they struggled to negotiate among different beliefs, attitudes, and principles promoted

in various activity settings.

These studies, by adopting activity theory as the theoretical framework, altogether highlight the importance of a given context as well as the impact of social, institutional, and historical factors upon individuals' choice of actions. Thus, activity theory provides a useful framework for analyzing teachers and students' behaviors.

In this chapter, the researcher first reviewed the concept of technology integration. Then studies on teachers' beliefs and practices as well as its relationship with technology integration were also discussed. Finally, related literature on activity theory and its employment in previous research were continued to be reviewed. It should be noted nonetheless that, as shown in the discussion, practices of technology integration has mostly been treated in isolation; not much consideration were paid to how different sociocultural and contextual factors interact with one another to affect teachers' beliefs and practices in technology. While some attempts have been undertaken to make such a connection (Chen, 2008; Cuban et al., 2001; Winschitl & Sahl, 2002), few were able to incorporate a concrete framework to analyze the dynamic interplay between individual minds and social milieu in a systematic and comprehensive fashion. Moreover, in earlier studies there seems to be only limited amount of research focusing on English teachers in particular. In trying to fill the gap, activity theory is adopted as the underlying theoretical framework, and the present study aims to examine how English teachers under various influences construct their beliefs and practices concerning technology integration.

Based on the literature reviewed, this study aimed to explore secondary English teachers' beliefs and practices in technology integration through the analytical lens of activity theory. In the next chapter, methods used in this study are described in detail.

CHAPTER THREE
METHODOLGY

In this chapter, the methodology of this study is described in detail, including descriptions of the setting, participants, procedure, data collection, and data analysis.

Participants

The current study explored secondary English teachers' beliefs and practices regarding technology integration. Thus, the researcher intended to target English teachers in secondary schools who may or may not use technology in their classrooms. Through means of convenient sampling, three English teachers were targeted based on the following criteria. First, all teachers taught in public secondary schools. Second, all of them had taken courses related to CALL (Computer Assisted Language Learning) application in the professional courses in graduate school. Third, they were all equipped with basic computer literacy. That is, they were able to operate basic computer systems, such as *Microsoft* word processor and Internet searching.

The three participants were first informed of the purpose of the study. Through a consent form (see Appendix A), they were then asked whether they were willing to participate in the current study, and all three of them agreed to be the participant for this study. Their identification is presented by codes to ensure confidentiality. Table 3.1 presents the basic demographic information for respective participants.

Table 3.1

Basic demographic information of participating teachers

Categories	Teacher A	Teacher B	Teacher C
Gender	Female	Female	Female
Age	early 40s	early 30s	late 20s
[1]Years of English teaching experiences	16 years	10 years	4 years
School level	Junior high school	Junior high school	Senior high school
Location	Taipei City	Hsinchu County	Hsinchu City
Number of classes[2]	3, from 8th grade to 9th grade	3, one 7th grade & two 8th grade	3, all 11th grade[3]
[4]Total teaching hours/per week	18 hours	12 hours	16 hours

Note 1. Years of English teaching experiences account for the total years up to 2009 academic year.

    2. The data collection time for Teacher A's case began from the spring semester to the fall semester, and during this time her students turned from 8th grade to 9th grade.

Note 3. 11th grade in Taiwan's educational system refers to 2nd year in senior high.

Note 4. The total teaching hours account for those in an academic year.

Teacher A

    Teacher A was a female English teacher at her early 40s. At the time of data collection (Spring semester to Fall semester in 2009), she had 16 years of English teaching experiences in total. She was teaching at *School A*, a junior high school in Taipei City.

    Teacher A had two years of English teaching experiences in two other remote junior high schools and three years in an elementary school in Taipei City, respectively. Then she transited to the current *School A* in Taipei City, where she had been teaching for 11 years. When Grade 1-9 Curriculum[1] was first announced in 1999, Teacher A's teaching experiences in the elementary school enabled her to bridge

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[1] Grade 1-9 Curriculum refers MOE's effort in connecting years of education from elementary to junior high school level, making it more thorough and integrated instead of fragmented and disconnected.

the gap between elementary and junior high level, thus making her more familiar with the execution of the policy. Concomitantly, her teaching experiences in remote areas also allowed her to take into consideration any practicality issues present on the teaching sites.

While teaching in *School A*, Teacher A received her master's degree in ETMA[2] from a public university in Northern Taiwan. She considered the training in graduate school helpful for her teaching, as she was able to combine her teaching experiences with the theories she learned, making her more efficient in designing her instructions. During Teacher A's master's study in TESOL, however, she failed her thesis once, and her thesis was criticized on putting too much emphasis upon technology alone rather than referring it to English teaching. Coupled with several other personal incidents that upset her, she temporarily suspended her teaching and instead was transferred to administrative work for a year. During that time she got to deliberate upon the meaning of technology in English teaching. She also encountered a group of teachers who were conducting *IEARN* projects. These experiences stroke her and led her to realize that English teaching could be enriched with so many different aspects, with computer technology assisting rather than dominating English instructions. She was thus able to overcome this particular obstacle and continued working on her thesis by a different focus.

During her five years of master's study, Teacher A was also assigned to be a member at the Compulsory Education Advisory Group[3], which in turn allowed her to be more familiar with nation-wide educational policies, receive in-service training, and attend various seminars and workshops related to teaching.

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[2] ETMA refers to Master of Arts in English Teaching, and this program is specifically designed for in-service English teachers with at least two years of practical experience in English teaching.
[3] The Compulsory Education Advisory Group Teacher A participated in was led by the central MOE, in which experienced and professional teachers would be recruited. To put it simply, they would be trained and train other teachers in order to elevate the overall quality of Taiwan education.

According to Teacher A, as an English teacher, she carried several distinct characteristics that characterized her as a unique instructor. First, she described herself as one without much patience but willing to experiment new teaching ideas in her instructions. Thus, instead of recycling the same teaching materials over and over again, she favored adding innovation and creation into her own teaching. Second, Teacher A remained single in her marital status, which, granted her lots of time and flexibility to design her own instructional methods and materials. Third, Teacher A also reported a continuous high interest in computer technology, as she had been learning computer since senior high school. Such interest in computer technology, her computer technical skills, coupled with her years of English teaching experiences, altogether enabled her to know which technology would work best in meeting her teaching goals and needs.

Teacher B

Teacher B was a female teacher at her early 30s, and at the time of data collection, she had 10 years of English teaching experiences in total. She was teaching at *School B*, a junior high school in Hsinchu County. Teacher B first taught in a private vocational high school for 5 years, followed by another 4 years in a local junior high school in Pintung City. During the particular time when she was teaching in Pingtung City, she was on unpaid leave of absence, as she was pursuing her master's degree in TESOL in a public university in California, U.S.A. Then starting from the fall semester in 2009, she was transferred to her current school, *School B*. Thus, when the data was first collected, it was only her first year in *School B*, and Teacher B admitted that she was still in the process of adjusting to a whole new setting.

Teacher B regarded herself as an English teacher with good adaptability, as she

stated she was able to adapt to different schools and different students' learning needs in the shortest time possible. Moreover, she considered herself a conscientious and positive teacher who would strictly demand order in the classroom as well as proper writing on students' note-taking and assignments. She also hoped that she could become an English teacher who could strive for the better and incorporate as much diversity in as possible in her instructions, so that students could indeed learn something from her English classes.

Teacher C

Teacher C was a female at the age of late 20s, and at the time of data collection, she had been teaching for 4 years. During data collection time she was teaching at *School C*, a senior high school in Hsinchu City. Before starting out as a teacher, Teacher C had received her master's degree in TESOL in a public university in Northern Taiwan. Upon the completion of her master's study, she taught at a local senior high school in Taoyuan County. After her internship, Teacher C taught first as a substitute in Taoyuan for a year. She was later hired as a regular teacher in a local senior high school in Hsinchu City for another year before transferring to her current school, *School C*.

As an English teacher, Teacher C regarded the willingness to learn new things as the one of the most important qualities of being a teacher. From her perspective, teachers cannot reject the idea of learning nor be satisfied with the status quo. In particular with computer technology getting more prevalent these days, Teacher C thought that teachers cannot be terrified of new challenges nor have any phobias regarding technology. Thus, feeling yet still in sufficient in her abilities even after her master's study, she would attend and participate in various seminars and workshops related to either teaching or technology integration. Her school (*School C*) would also

hold similar seminars, inviting model teachers of every discipline to demonstrate how they integrated technology in their classes.   In addition to being open to innovations, Teacher C also considered it of primary importance to become an irreplaceable English teacher. In her own definition, this meant to impart to students knowledge that they might not be able to obtain if they were to learn from other sources (e.g., dictionary, cram school, parents, etc.)

Data Collection

A case-study approach was used to allow greater in-depth examinations of the stories of each individual teacher, reported in their own voice. Such an approach, according to Stake (1995), gave a great a chance to explore the unique and common sides of the teachers, as well as the detail of interaction within the given contexts.

Two major sources of data were collected, namely classroom observations and interviews. The interviews were the primary source for data collection in this study. In order to gain a more holistic picture, the interviews included those with participating teachers, their students, and the school administrators they worked with. By having such multiple interviews, teachers' interpretations of their actions could be supported and supplemented by statements from students and administrators. Further details of observations and interviews are described in the following section.

Classroom Observations

Given the concern of time constraint and the fact that classroom observations constituted secondary source of data that served supplementary function to the interview data, only one class of each participating teacher was randomly selected by us for observations, and the researcher acted as the outside observer sitting behind in the classroom. These observations focused on how teachers normally conducted

classes and how they integrated any forms of technology in their teaching. With each

observation, field notes were kept, and class documents, including worksheets,

classroom materials, student works, and example readings, were also collected.

Interviews

    Interviews with participating teachers

As the data collection time with Teacher A spread across two different semesters,

the number of interviews with her was more than that with the other two teachers.

There were 5 major interviews conducted with Teacher A, and 3 major interviews

conducted with Teacher B and C. Throughout all the interviews, Chinese was used to

ensure mutual understanding on both the researchers and the participants. The first

major interview with all teachers lasted for approximately an hour. In this interview,

the questions probed into the following aspects: (a) specific demographic information

of each teacher, (b) teachers' own definition of technology integration, (c) teachers'

beliefs about technology integration in their English classes, including its pros and

cons, (d) practices of technology in any forms, if any, in the past or in the current

school semester, (e) factors for deciding to integrate technology in class, and (f)

difficulties encountered when attempting to integrate technology in class as well as

the attributions for such difficulties (see Appendix B). Moreover, as Teacher A was

situated in a different context in the fall semester of 2009, the researcher conducted

another interview with her in the fall semester to explore again her beliefs and

practices in a different context.

For the next major interview, the researcher spent 30 to 40 minutes to explore the

underlying rationales and philosophy behind teachers' instructional practices and

integration of technology in the ways observed (see Appendix C). Lastly, a final

interview (see Appendix D) with each participating teacher taking for about an hour

was also conducted near the end of the semester. In this interview, they were asked to clarify further (a) their thoughts regarding how technology can be integrated to facilitate their teaching and (b) how the underlying factors might altogether assist or impede their attempt to integrate technology in the classroom.

Interviews with students and school administrators

The researcher randomly selected two representative students from the observed class to conduct an interview, which lasted for about 30 minutes. Questions for the students included their knowledge of and attitudes toward technology integration, and their expectations of how technology could be integrated in their English classes (see Appendix E). The researcher also interviewed two school administrators from the Office of academic affairs in each school. These administrators were the Section Chief of Curriculum Design (教學組長) and the Section Chief of Information Technology (資訊組長). They were asked about the infrastructure available in school, the extent of technical support given in any ways to teachers and the general degree of technology integration teachers usually incorporated in their school (see Appendix F).

Procedure

The procedures undertaken in the study extended over two semesters. Table 3.2 shows a detailed timeframe for respective interviews and observations conducted in this study.

The data collection with Teacher A first started out in May 2009, in the middle of the spring semester. To achieve initial understandings of her demographic information, her beliefs as well as practices regarding technology integration, a first major interview was conducted. Through this initial interview, the data collected served as guiding references for later observations. After the first interview, classroom observations were conducted rather intensively for the following May and June, with

the researcher observing the target class for five classes in a row. Through such intensive observations, basic knowledge was obtained as to how teachers' classes were usually conducted a lesson. In between the observations, the researcher also had small, informal conversations with Teacher A as follow-ups of her classroom teaching. The second major interview with Teacher A took place near the end of the semester to explore and summarize the rationales of Teacher A's teaching and decision-making of adopting technology in her classroom.

Next, as it was the beginning of another academic year, the researcher continued to conduct the third interview with Teacher A to trace her follow-up beliefs and practices in a different context (i.e., time and classes). Then starting in September 2009, the researcher additionally recruited Teacher B and Teacher C as two other participants for the study and conducted the first major interview with them. The purpose was to gain their demographic information, beliefs in technology integration and their teaching practices. Then similar to the previous semester, intensive observations were once again undertaken throughout September and October. Likewise, with the same intention of getting to know teachers' teaching philosophy, the fourth interview with Teacher A and the second interview with Teacher B and Teacher C were conducted respectively in October. Later subsequent classroom observations continued to take place for another month. The researcher nonetheless reduced the number of observations at this point,; they were conducted only once every two weeks, and they served as a regular check up on teacher' instructions.

The final major interviews with each teacher were conducted at the end of the semester. At this particular time, the researcher sought for further illumination of teachers' beliefs and practices in technology integration, tapping farther into the relationship among technology, their teaching, and the underlying attributions. Lastly, there were also respective interviews conducted with two students in each observed

class as well as two school administrators from the office of academic affairs. The

purpose was to delve into students' and administrators' attitudes toward technology

integration in the classroom. The teachers were consulted first before the interviews

took place so they could feel comfortable with their students being interviewed.

Table 3.2

Schedule for the interviews and classroom observations

Time span	Things to do	Purpose(s)
May, 2009	1st major interview- Teacher A	Teacher A's demographic information & her beliefs & practices in technology integration
May & Jun. 2009	Intensive classroom observations- Teacher A's class	Basic knowledge of how classes were conducted
Jun. 2009	2nd major interview- Teacher A	Understanding of Teacher A's rationales for teaching
Sep. 2009	3rd major interview- Teacher A	Follow-ups of Teacher A's beliefs & practices of technology in a different context
	1st major interview- Teacher B & Teacher C	Teacher B's and Teacher C's demographic information & their beliefs & practices in technology integration
Sep.-Oct. 2009	Intensive classroom observations- all teachers	Basic knowledge of how classes were conducted
Oct. 2009	4th major interview- Teacher A	Understanding of teachers' rationales for teaching
	2nd major interview- Teacher B & Teacher C	
Oct. -Nov. 2009	Follow-up classroom observations	Check-up on teachers' teaching
Jan. 2010	Final interview with each teacher	Further clarification of teachers' beliefs and practices in technology
Jan.-Feb. 2010	Interview with students & administrators	Attitudes toward technology integration

Data Analysis

Data analysis was mainly based on the data collected from interview and observations. In trying to further understand how the participants operate or make instructional decisions, data analysis also employed the six components in Engeström's (1987, 1999) model of activity theory – *subject*, *object*, *mediating artifacts*, *rules*, *community*, and *division of labor*. In the context of the current study, respective components in the activity system are listed as the following (see Figure 3.1).

- **Subject**: Three participating teachers and their subject agency, such as their beliefs, personal background and experiences.

- **Object**: The teaching of English and teaching goals as stated by each participating teacher.

- **Mediating artifacts**: All kinds of artifacts that helped teachers achieve their objects, such as materials, languages, tools, resources, and technology.

- **Community**: All stakeholders involved in teachers' teaching, such as the observed classes, English faculty members, school administrations, and parents.

- **Rules**: The conventions, structures, regulations and cultures that are historically developed within that particular communitysuch as schools or classrooms.

- **Division of labor**: The power status delivered by the teachers, students, and school administrators within and across each community.

MEDIATING ARTIFACTS:
All kinds of artifacts teachers used
to achieve their objects

SUBJECT:
Teacher A, B & C
Their subject agency

OBJECT:
The teaching of English

RULES: School and
classroom conventions,
structures, regulations
& cultures

COMMUNITY:
All stakeholders involved
in teachers' teaching

DIVISION OF LABOR: Roles
and power status performed and
displayed by all members of the
community

Figure 3.1 Activity system in the current study

After defining what each component entailed, the researcher analyzed and coded all the interview transcripts and field notes, categorizing them according to the component the researcher considered appropriate. One of the focuses of the study was to investigate teachers' beliefs in teaching, learning, and technology as well as the relationship between their beliefs and their English instructions. With such purpose in mind, it only makes sense to analyze each component in the activity system to interpret and explain any possible triggers that might be held accountable for participant's choice of actions.

Trustworthiness

Two approaches were used to ensure the trustworthiness and to increase credibility of the study, and these included triangulation of data, the employment of member checking technique. According to earlier studies, it was essential to triangulate the data from multiple data sources (Patton, 2001; Yin, 2003). The data collected in this study consist of interviews with teachers, students, and school

administrators as well as field notes from regular classroom observations, all of which triangulated one another, eliminating possible biases hidden in the data. Second, to verify and to avoid false interpretations of the data, member checking technique was adopted. That is, the researcher would restate or summarize the information received from the participants during the interviews.

In the next chapter, the study results are presented.
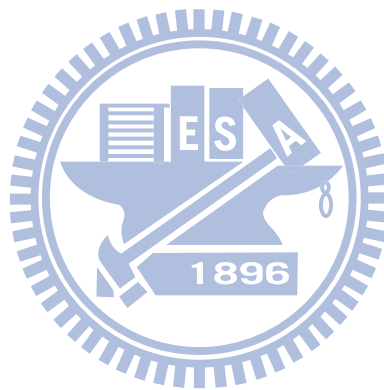
CHAPTER FOUR
RESULTS

In this chapter, the results of this study are presented. Respective teacher's teaching beliefs and beliefs in technology are first described. Second, their instructional practices are also presented, and finally, some contextual factors to their teaching and technology integration are also reported.

Case One: Teacher A

Teacher A's Teaching Beliefs

Teacher A's teaching beliefs in general

During the data collection time (from Spring semester to Fall semester, 2009), she had three classes at hand accounting for 18 teaching hours in total; her students also crossed from 8th grade to 9th grade. As an English teacher, Teacher A held several beliefs regarding how English could be taught and delivered in ways appropriate that best meet her desired goal of teaching. This included her preference for reading and writing over speaking, her stress on providing students multiple possibilities of learning English, and also her disregard for test-oriented instructions.

First of all, Teacher A believed that reading should be the predominant area for her English instructions. According to her, while language educators have long been advocating the benefits of communicative approach, she did not believe it to be necessary. That was because her students, situated in an EFL setting such as Taiwan, did not actually have many chances to speak. They, however, definitely would have lots of exposure to written English and the chance to read. When she went abroad to travel or give presentations in other countries, such overseas experiences also convinced her that simple English speaking skills were sufficient when going abroad.

In addition, as the communicative approach mostly emphasized on students' oral fluency, Teacher A felt that it would take up lots of time to achieve fluency. Given her immediate need to meet the curriculum schedule, she admitted that reading would in fact be a lot easier to attend to than speaking. Thus, Teacher A reflected that she would leave communicative approach aside and put her primary focus upon training students' reading abilities, because she believed that reading was more of an applicable and useful skill in daily life.

Second, Teacher A considered it of primary importance to give students multiple avenues to learning English. Thus, in her instructional practices, textbooks were not regarded as the 'Bible', but would be treated as the framework of teaching, and she preferred to provide additional materials for the students. She reported that what she could do the least is that students would not dislike English because of her. Using the metaphor of ordering in a restaurant, she commented,

> "[…'] It's like, not everyone would order the same dish; some [students] might not be good at textbook-learning, but it's possible that they might excel in other areas. […] What I could do is to let them discover that there are actually so many ways of learning English, so many possibilities. Even if they didn't learn well, that's okay too, maybe some time in the future they would suddenly be enlightened or have the interest, then they could follow the little sprout I planted for them, that computers could be used this way to learn English…yeah to help the sprout grow, that's what I hope for, to say the least." (interview #3, Sep. 07, 2009)

Third, she did not value test-driven teaching approach, which she believed would not lead to students' better performances. During her initial teaching experiences she would focus primarily upon textbook and give students many tests. However, later when she found that the results were all the same regardless of how many times the students were tested, she started to question that multiple tests were in fact a waste of time. She also recalled several exchanges she had with other middle school English teachers, in which she asked them about the outcome of having extra subsidiary

classes and self-study time during nights. While those study-hours were designed to reinforce students' English abilities, those middle school English teachers admitted frankly that such effort did not appear to take effect. As a result, Teacher A preferred to offer students supplementary materials outside of textbooks instead of giving them repetitive tests over and over again.

Teacher A's beliefs in technology integration

With regard to technology integration, Teacher A had her own definition, and it was described in terms of the ideal goal she would like to achieve. She hoped that through the integration of technology, she could cultivate students' autonomy. In other words, students would be given many chances to use English and eventually be equipped with the ability to plan and monitor their own learning, using resources in technology to locate what they want. Instead of repetitive and continues lectures, teachers in this sense would only guide students through the learning process.

Having stated her ideal goal for technology integration, however, Teacher A held somewhat mixed attitudes toward computer technology. First, she acknowledged that technology could attract students' attention; nonetheless, without proper supervision, it could also lead to a chaotic classroom where students might "run wild". Second, while all the visual as well sound effects embedded within technology resources could strengthen students' impression of learning, they might also result in students overlooking what they ought to learn. Third, even though technology could present students with various learning resources, it might also increase teachers' work load in preparing and making sure that computer glitch would not get in the way. Because of such mixed review of technology, Teacher A started to reflect upon the necessity of computer technology in teaching. From her point of view, if the use of technology was only to achieve those that could simply be achieved through handouts, there would be no point in spending all the time and effort in adopting technology.

In a similar vein, Teacher A's being flunked in her thesis and exchanges she had later with a group of teachers who conducted project-based learning also led her to reconsider the role of computer technology in English teaching. From these experiences, she learned to reorient herself and understood that technology served only as an assisted role, the purpose of which was to enhance and enrich her instructions. As she reflected in the interview, "…as I see English as a subject, do I really have to work with that [computer technology]? And I started to give it a question mark. […] I should set out from the point of English teaching itself." (interview #1, May 20th, 2009) In another interview, Teacher A restated that her major purpose was to teach English rather than to teach computer, and the latter was used as facilitative element to help the former. She also coined the term 'integrating technology with ease', stressing particularly that teachers needed not be competent in computer skills. Quite conversely, basic computer literacy would be enough, provided that teachers could use it with ease.

Despite the above-mentioned mixed viewpoints toward computer technology, Teacher A still believed that technology still carried certain benefit and potential that the traditional textbook could not provide. From her perspective, one of the greatest values of computer technology resided in its ability to offer students various English learning experiences and, more importantly, to cultivate students' global vision. She believed that through its help, students could experience the entire world, which traditional textbooks or teaching alone failed to furnish. Corresponding to her preference for providing students with manifold approaches to learning English, she believed that the use of computer technology could open up the possibilities of English learning as well. Referring back to the time when she conducted computer project-based learning, she recounted moments where her students' feedbacks became driving forces that stirred on her technology integration:

"…initially the low-level students all felt it unnecessary for them to learn English, that it's grown-ups claiming that English is important. But after the projects some began to change […] For them it's really encouraging because by learning English, they could one day communicate with others; even if it's not communication, through this chance [PBL] they got to know the world more, and they began to have the dream of wanting to go outside. […] They were also amazed [as described in students' reflections] that there were so many different countries out there, that one day I would like to see it myself too. They [the low-level students] started out from denying English and themselves, to finally – I was so touched that I almost cried – wanting to go abroad for sure. They mostly came from families of working class and they dared not to have such dreams…" (interview #2, Jun. 15th, 2009)

For Teacher A, one great treasure of technology was that students were finally given the chance to face the world. Had they been given instructions relying solely upon textbooks, they probably would still be reluctant to dream and negate the purpose of learning English even after years of learning.

Teacher A's Instructional Practices

The spring semester of 2009

In the spring semester of 2009, Teacher A was teaching the 8th-grade students, and she was assigned a one-hour computer class to couple with her regular English classes. During data collection time, Teacher A used the computer class at hand and integrated technology through two different computer projects in addition to teaching from the textbook. These projects were called *My School, Your School* project, and *Magic Moments around the World*, which functioned as the mediations that Teacher A used to reach her goal of teaching.

Hosted through the *IEARN* platform, *My School, Your School* was a cross-cultural learning project, the purpose of which was for students to get to know lives in other schools and to introduce their school from various aspects. *Magic Moments around the World* was a website where people from different countries shared their special and unforgettable moment they experienced in their life. Through

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implementing these projects in her teaching, Teacher A hoped that she could not only train students' English abilities but also "scaffold students through the process of knowing how to locate information". Students could also cultivate their global vision, so that they could know more about and face the world on their own.

My School, Your School project

For Teacher A, this was her second time to conduct *My School, Your School* in her teaching, and her previous experiences helped her with its implementation this year. She was able to improve and further enhance certain aspects that were unsatisfactory the last time this project was carried out. Prior to the implementation of this project, in the previous semester Teacher A had already trained students the prerequisite skill of basic writing. Students were equipped with the ability to do basic paragraph writing, thus laying the groundwork for this cross-cultural project. The following summary reflected how Teacher A integrated technology through *My School, Your School* project.

When the project began, Teacher A first guided students through reading from the Internet, directing them to get to know schools in other countries and to decide the themes students (in different heterogeneous groups) wanted to work on. Then at the next level, they were asked to write self-introduction. When students were familiar with certain writing patterns required in an introduction, they began the process of writing about their school from the theme they had chosen. During the initial process of forming ideas and drafting sentences, Teacher A would provide examples of website links[4], which the students could then draw as references to see if there were any useful words and sentences they could learn from. She also guided them to learn, step by step, some of the basic computer and Internet searching skills needed for

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[4] Teacher A kept a teaching blog where she would record down steps, website links, and files for students to download and follow. This blog served the purpose of accompanying her classroom instructions and references students could draw upon when completing their assignments and projects.

writing completion. When the students completed their final draft of introducing their school, Teacher A compiled their work together, and through students' example paragraphs, she led them to sort through some common mistakes they made in their writing. Finally, students were asked to discuss in groups and revise their final product. Figure 4.1 presents the homepage screenshot for *My School, Your School* platform.
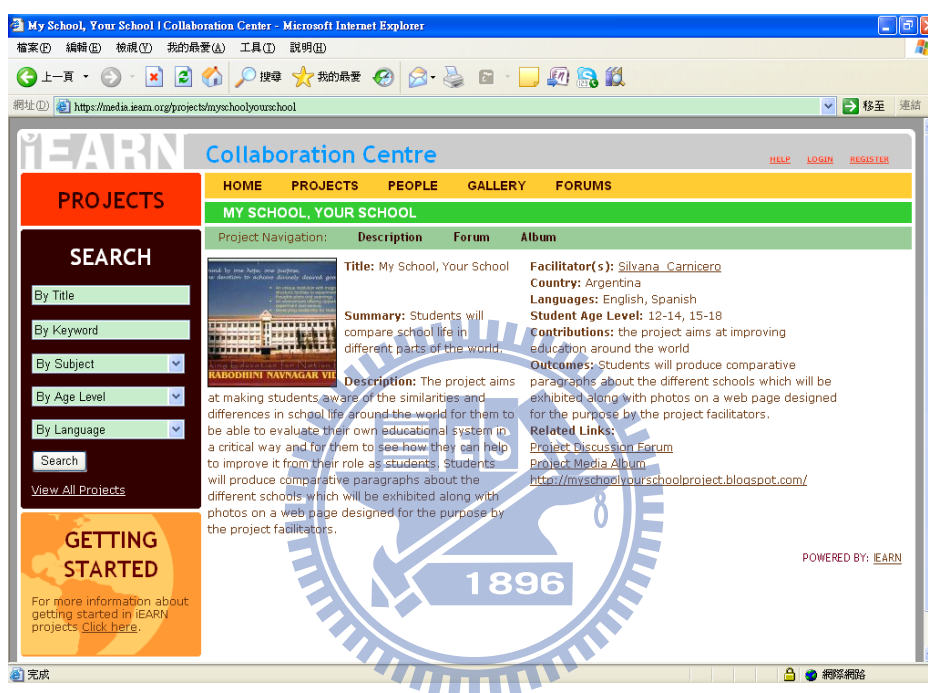
Figure 4.1 Screenshot of *My School, Your School* project

Teacher A also used *My School, Your School* as the mediated platform to teach students related grammatical concepts. Nevertheless, Instead of confining herself to the textbook and teaching 8th-grade grammar in particular, she would teach students any sentence patterns and grammar required for project completion. In recollecting her experiences doing *My School, Your School* project, she said,

"…at this point [when students started writing] you couldn't really control what kinds of sentences they should have; […] so it's only after they started writing that you came to find where their common problems lied […]. For this year students generally did not know how to use conjunctions appropriately, so I purposely did a lesson for them on conjunctions, where they would learn all about coordinate conjunctions and subordinate conjunctions. Some of them would be

taught in 9th grade and even in senior high level, and I just taught them all during that time." (interview #4, Jan. 28th, 2010)

Thus, in the end students were both reviewing grammatical concepts and previewing those that would be learned in the future at the same time. From Teacher A's point of view, the 8th grade was the crucial time period where a majority of emphasis was put upon learning grammar. Even though it would be hard work when students were in the 8th grade, Teacher A reassured them that by the time they became 9th graders, they would be able to "lie down while learning English". In other words, students could easily learn English in an effortless fashion.

Magic Moments around the World project

Near the end of the semester, Teacher A received invitation from IEARN to conduct another project: *Magic Moments around the World*. This was a relatively small project, and it only took place for one class period. In this project, people from different countries would post their short moments that struck them as memorable and remarkable. Students were first asked to briefly introduce what this project was about by visiting its website (Figure 4.2), and they were then given an online compilation of short stories that people shared (Figure 4.3). With that compilation, students were assigned one story written by people from a certain country. They were asked to find the location and basic introductions of that particular country, as well as their reflections of the stories on the personal blog[5] they were keeping. Similar to *My School, Your School* project, Teacher A would also provide links of related websites as references for students to look up.

When implementing *Magic Moments around the World* project, Teacher A's professional knowledge and skill in computer would enable her to solve some technical difficulties that students might encountered during the process of project

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[5] Students were asked to keep personal blogs, and it was a space for them to post their assignments (English or computer assignments alike).

completion. For instance, once in the observed class students reported not being able

to open the PDF file of the online book. Teacher A, however, seemed familiar with the

problem and was able to provide alternative solutions and kept the class going

Figure 4.2 Screenshot of *Magic Moments around the World* platform

Figure 4.3 A compilation of stories in *Magic Moments around the World*

<u>Setting of the two projects</u>

When conducting these two projects, students were taken to the computer lab. In this classroom, the number of computers exceeded that of the students, so each student had one personal computer for their own disposal. For both projects, students were given total control to use the computer and complete their projects during most of the class hours; Teacher A only worked as a facilitator that guided students through the process, walking here and there to check students' progress. Thus, it was more of a student-centered classroom.

When first having the computer class, students were reported as feeling excited, because they were under the impression that they 'were there to play', and learning English never occurred to them. Such attitude was confirmed in the interview with students, as they recalled their computer class back in the 7th grade:

> "Our computer class at 7th grade was not like this at all. We're just playing and fooling around, and the teacher just told us when we needed to hand in which assignments […] the teacher basically wouldn't control us that much. But then all of a sudden in 8th grade it became this [use computer to learn English], [we're] not used to it, and everyone all felt troublesome that we're practically still learning English even at computer class, and with all that assignments to hand in, plus the grading proportion was heavy…" (interview with two students, Jan. 29th, 2010)

To prevent students from creating such false expectations of computer class, Teacher A was clear from the beginning that she was teaching them English rather than computer. She also established clear rules,

> "[…] when I first began, students were all going crazy and complained why the rules were so strict; [there were times when they misbehaved] the entire class were all driven off from the classroom […] and [I] just conducted class directly from within the classroom, with them standing outside listening…" (interview #2, Jun. 15th, 2009)

Teacher A also made use of the broadcasting function^{6} to monitor and inspect if any

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^{6} The broadcasting function was built in the teacher's computer in the computer classroom. Teachers

students were doing things unrelated to the project at hand. With such clear rules established, the students learned to stay concentrated in the computer classroom, and it allowed the computer projects to successfully take place.

The fall semester of 2009

In the fall semester, 2009, her students turned 9th grade. Her total teaching hours remained the same, but there was no more computer class assigned to her. Consequently, Teacher A was no longer able to integrate technology through computer projects but to pull her students back to regular classrooms, where she would mostly adopt traditional teaching approaches. Contrary to the previous semester, such instructions however caused changes in the relationship between the teacher and the students. It was more teacher-centered, with the teacher exerting total control and giving lectures exclusively to the students.

As Teacher A's students were at their last year of school, they would soon face the *Basic Competence Test* (hereafter referred to as *BCT*)[7]. Thus, the teaching focus was primarily on training students' test-taking skills, and in most of the observed classes Teacher A was preparing students for this upcoming test. She would quickly go over the textbook and have students do test booklets and papers, which she would then review. It was observed, however, that when going over certain grammatical concepts from time to time, Teacher A would mention they had already covered this during 8th grade. As she explained,

> "[…] this also goes to prove that what they've learned in the past – because they've been given whatever and a lot of stuff to read – they would feel doing the test papers, just like I told them, they could treat English as a 'side dish' [instead of a main course], and English would be nothing when they went to 9th grade."

could use it to broadcast her screen to the each computer so that every student could see very clearly from their own computer. It could also be used to see if students were focusing or doing other unrelated work.

[7] The *Basic Competence Test (BCT)* is administered by the Ministry of Education in Taiwan since 2001 to assess junior high school students' basic competence and their developmental potential.

(interview #4, Jan. 28th, 2010)

Having said so, Teacher A however also confessed that students still had the stress to attend to those that they had or had not learned. Despite all the tight schedules and the large extent of materials to cover and review, Teacher A would still assign students additional readings outside of textbooks, because she believed that such would not only help students' preparation for the test, but also present students with multiple exposures to English. When Teacher A first started to provide lots of online materials because numerous tests proved in vain, she confessed that she was under enormous pressure that she might be taking the wrong step. If she had failed in her attempt, others might have questioned and criticized her for not sticking to the textbook. Fortunately, after two or three years of doing so, students' grades got better, and she was able to prove that outside materials could indeed improve students' academic performances. Responses from Teacher A's students also supported her in doing so:

> "[…] because in *BCT* there are a lot of reading comprehension too, […] you could learn to grasp some key points, and you would know, oh okay for this question I need to start from the above, and it's easier to find the answer, to train reading abilities…" (interview with two students, Jan. 29th, 2010)

The supplementary materials that Teacher A adopted were very often texts extracted from online news and articles, which were then modified and reorganized by Teacher A in ways appropriate for the students' level. According to Teacher A, preparing the materials took up a lot of time, as she had to search through the Internet to find websites and materials that would arouse students' interests. In addition, she also had to modify the content to the extent that it would be suitable for yet still posed challenges to students' level. Regardless of such painstaking effort, Teacher A still considered it worth the effort.

Contextual Factors Affecting Teacher A's Technology Integration

   The spring semester of 2009

   Several contextual factors embedded within Teacher A's classroom and school influenced Teacher A's integration of technology in this semester. The availability of computer resources and the joint support from her school as well as colleagues, the parents' approving disposition, and the nature of the students altogether granted Teacher A the chance to integrate technology and implemented computer projects in her instructions.

   First, in this semester, Teacher A was assigned one computer class. She had the computer classroom available for her use, which constituted the initial condition for technology integration to take place. Because of this particular class, Teacher A was able to lead students through project based learning, which otherwise could not have been done if the computer resources were not available.

   Second, Teacher A reported that her school basically did not intervene much in teachers' instructions, which basically gave her full autonomy in designing her own teaching. Similarly, her colleagues did not interfere with her teaching either, and they respected one another's classroom practices. With such mutual regard, Teacher A was therefore able to exert control over her instructions without feeling pressured.

   Third, her integration of technology through computer projects was also made possible due to parents' approval. On account of previous unpleasant experiences dealing with parents' expectations in the past, Teacher A learned the importance of properly communicating what she planned to with parents beforehand. In addition to understanding parents' demands, she would also reassure them that, when given enough time, students would not only improve their grades but also be given a lot more than just textbooks alone. With such reassurance, parents were glad to see that their children were learning something different without compromising their

academic performances.

Finally, the fact that most of her students were attending cram schools and had higher English proficiency also allowed her to conduct project-based learning in the classroom. Given that the content coverage in school and at cram schools was pretty much the same, Teacher A asserted that students would tend to lose interests in learning more about textbooks in her classes, making them more receptive toward outside materials. Such assertion was confirmed in the interview with one of her students:

> "[When I was] at 8th grade I would [tend to lose focus in class]. Because at that point the concepts were not so difficult, and then also because cram schools would cover them too, so sometimes I wasn't paying attention in class…" (Jan. 29th, 2010)

In addition, compared to students in other areas, students in Taipei also had relatively higher English proficiency levels. Such characteristic allowed Teacher A to, for example, conduct guided or even free writing through small groups in *My School, Your School* project, which she frankly admitted not being possible if she had been teaching in remote schools.

The fall semester of 2009

When students reached 9th grade, the external community where Teacher A was situated in was changed, and the contextual factors from the community limited her extent of technology integration, compelling her to make compromises. No computer classes, the sense of unification among all 9th grade teachers, demand for students' grades from both school and parents, and students' lack of autonomy as well as heavy school load all served as limitations that confined her technology integration.

First, despite the fact that Teacher A still believed in the value and potential of computer technology, having no more computer classes assigned to her deprived her of the chance to conduct any project-based learning as in the last semester. In the

interview with school administrators, they responded the amount of class hours was already predetermined by the Ministry of Education:

> "[…] because we're only given [by MOE] this many teaching hours in total, and there are certain amount of basic hours assigned to each domain […] basically we don't have enough teaching hours so we really cannot do some other allocations for the 9th-grade." (Feb. 3rd, 2010)

Second, Teacher A reported a strong need for unification among the 9th-grade teachers to set the same learning schedules, instructions, routines, tests and actions, and it seemed to surface every time students turned 9th grade. Because of such unification, it would have been hard for Teacher A to explain to school, parents and students alike had she decided to disregard such unification and conducted her own teaching. Thus, even though such inflexibility in teaching contradicted her belief of giving students multiple aspects of English learning, as most teachers tended to teach in traditional ways, it became the norm that Teacher A was left with no options but to do the same. This became a great source of pressure for her, and she ended up having little time and freedom to conduct teaching in her own desired way. In the following excerpt, Teacher A reported her helpless feeling:

> "[…] What you can't deny is that regardless of how good and innovative a teacher is, he still had o face his colleagues. Unless you could just toss it all aside; […] but what about the parents then?...So people are talking about teachers' autonomy over their professions, […] that's really difficult to achieve. If the system [entering privileged schools through tests] didn't change, then there's no autonomy at all; we as teachers are just the spokesperson for textbooks instead of an autonomous group." (interview #3, Sep. 7th, 2009)

Third, the school administration and parents all put primary focus upon students' performances, demanding and expecting that students' test outcome needed to be good. Under such expectation, one mutual goal among all 9th-grade teachers was to prepare students for the test. Teacher A was thus driven to give up her original goal of cultivating students' global vision and complied with the community needs, changing

her teaching goal into students' test preparation as well. Similarly, parents at this stage were also concerned about children's grades and rank at school. To further illustrate this point, Teacher A referred to what she read from a students' contact book:

> "…a student whose rank in class was within the top three, his mom would unplug all the entire television and computer at home and didn't allow him to watch or use any of it […]; she thought that 9th-grade students should not have any entertainments at all, and it's all about studying…" (interview #3, Sep. 7th, 2009)

Fourth, while students at 9th grade had heavy schoolwork to deal with, they generally still lacked autonomy in their learning, and Teacher A was prompted to spend lots of time guiding students through, which naturally restricted the time for technology integration. Given that Teacher A still had to teach according to the assigned schedule, she commented that she had to take into consideration students' ability and their already heavy school load, because offering too many additional materials might pose as burden to the students. Students, realizing the stress for the test ahead, also felt it unnecessary to do any project-based learning again. As they described in the interview,

> "It [doing computer projects] was easier when we were at 8th grade; there was no pressure, not the kind of feeling that we have right now, like I have to read and study a lot; back then we would have more time doing it [computer project]" (interview with two students, Jan. 29th, 2010)

Teacher A also pointed out the predicament in junior high school: unlike students in elementary and senior high schools who were either free of pressure of entering middle schools or autonomous enough, students in junior high were confronted with the test challenge, yet they were still insufficient in their autonomy, unable to monitor their own learning. Therefore, Teacher A claimed that teachers in junior high were often forced to be limited in their creations, as they needed to spend lots of time

guiding students through and helped them prepare for the *BCT*.

Summary of Teacher A's Case through Activity Theory

Examining Teacher A's case through the lens of activity theory, two different activity systems at work could be identified, and what appeared to mark the divide was the immediate need and pressure to prepare students for the upcoming *BCT*.

In the spring semester, Teacher A was able to integrate technology as a result of interaction among her subject agency as well as the nature and the division of labor within the community. As a subject of the activity system, Teacher A brought a dynamic set of subjectivities to her teaching. She carried with her distinct personal background, personality, teaching experiences, and belief systems of her own, all of which painted a strong color of subject agency that formed the basis of her technology integration. Shaped by her personal agency, Teacher A thus came to construct her objects, and prompted her to use computer projects as a mediated platform that helped her achieve her goals.

Additionally, with the implementation of computer projects, the division of labor was no longer that found in the traditional classroom. Rather than teachers lecturing predominantly, students were given the power to learn in cooperation with others and complete the assigned projects. Students' total authority and exertion of control over their learning caused a student-centered classroom, where teachers only served as facilitators in assisting students to learn.

The contextual factors resided within the community played major facilitative roles in realizing Teacher A's integration of technology as well. First, given the availability of computer resources and the contextual support from school administrators, parents, and students, Teacher A was allowed to conduct project-based learning in her teaching, and her pedagogical objects – of cultivating students' global vision and training students' English abilities – were maintained. Second, clear rules

established in the computer classroom also helped the implementation of computer projects. Instead of rejecting the idea of taking students to the computer classroom out of the fear that it might lead to complete chaos and students' inattention, Teacher A had no such concerns. Because of such rules, she managed to keep the order and flow of her computer class, and project-based learning thus became a reality in her teaching. Third, the support she had from her school, colleagues and parents also gave Teacher A the flexibility to integrate technology in her teaching. Lastly, students' nature also enabled them to have more receptive attitudes toward the idea of technology integration.

The conceptual mapping of the activity system emerged from the analysis of interviews with Teacher A and classroom observations is shown in Figure 4.4.
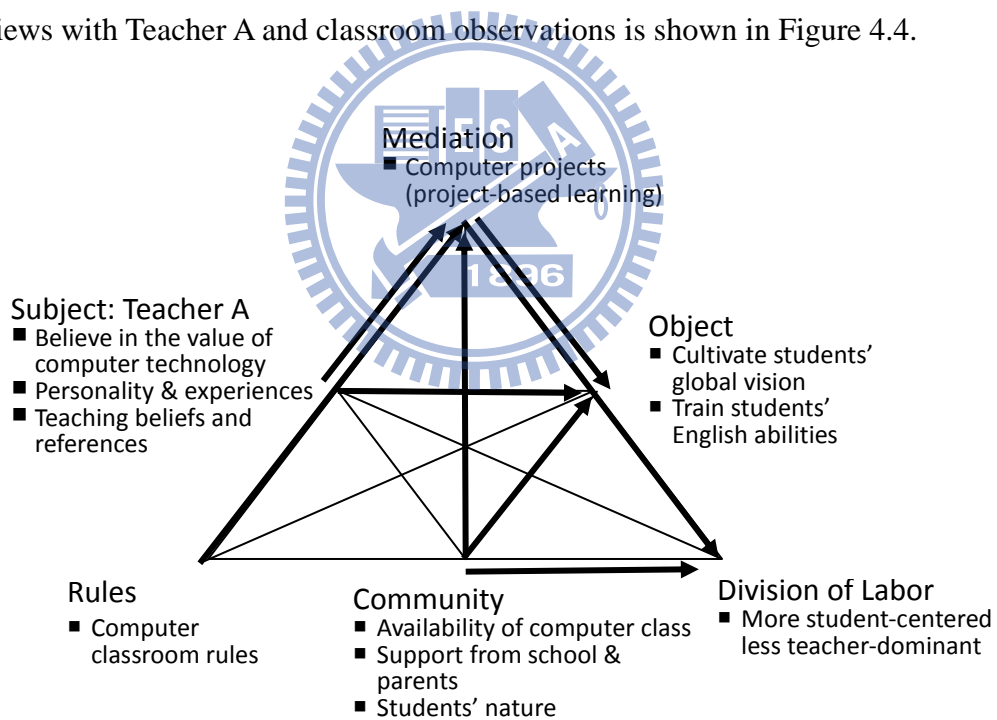

Figure 4.4 Conceptual mapping of Teacher A's activity system in the spring semester

When students turned 9th grade in the fall semester, however, the community changed at this point, and conflicts arose among different elements in Teacher A's activity system, causing her to make compromises.

For Teacher A's activity system in this semester, contextual factors from the

community seemed to exert strong influence upon Teacher A's pedagogical choice and practices. She was no longer assigned a computer class, and this deprived her of the time and resources needed for any conducting project-based learning as she did in the last semester. As students would soon face the *BCT*, preparing students for the tests became the dominant and unifying goal among all the community members – school administrators, parents and students alike. The unification need among all 9th grade teachers also became the embedded convention that aimed for the same goal. Such test-driven atmosphere deeply rooted within the community, however, conflicted with Teacher A's belief of providing students with multiple possibilities of learning English as well as her desired goal of cultivating students' global vision. Unable to fight against the school norm and the larger educational need for test preparation, Teacher A reported herself as abandoning not only computer project as the mediated tool in her teaching, but also her original desired goal of cultivating students' global vision. Consequently, textbook became the dominant source of mediation in her instruction, and she also reformed her object into one that was consistent with the communal goal, i.e., preparing students for the upcoming *BCT*. Furthermore, students' heavy school load yet lack of autonomy jointly also reduced the possibility for Teacher A to integrate technology in the classroom.

With textbooks being the major instructional material, the unification need among all 9th-grade teachers and all the contextual factors, the nature of division of labor in Teacher A's classroom also underwent transformation. Given that textbook was the predominant tool used to lead students through test preparation, the classroom was dominated mostly by teacher lectures, with students being passive recipients of knowledge. The unification required among all the 9th-grade teachers also left Teacher A with no alternatives but to teach in traditional ways as well, thus constituting a teacher-dominant instead of student-centered classroom.

It should be noted, however, that while Teacher A struggled to maintain the balance between what she believed, her goal, and contextual factors, she did not fully change or discard her entire belief systems. She still held that students would have a lot of exposure to written English, and her overseas experiences also confirmed her belief of the importance in reading and writing over speaking. As a result, despite the tight schedule in her class, she insisted on finding supplementary reading materials from the Internet and used them as an additional mediation in her teaching. She also trusted that such diverse and extensive reading would favor their preparation for the upcoming test as well. Due to the fact that this corresponded with the larger contextual need to prepare students for the test and yielded no conflicts, Teacher A was finally able to keep her bottom line of providing students with multiple possibilities of learning English outside of textbook.

For the conceptual mapping of Teacher A's activity system in the fall semester of 2009, please refer to Figure 4.5.

Mediation
- Textbooks
- Supplementary reading from online sources

Subject: Teacher A
- Believe students have great exposure to written English
- Reading& writing > speaking
- Online materials could help students with their test

Object
- Prepare students for the Basic Competence Test

Rules
- Unification among 9th-grade teachers

Community
- No more computer class
- School & parents' focus on student grades
- Students' lack of autonomy & school load

Division of Labor
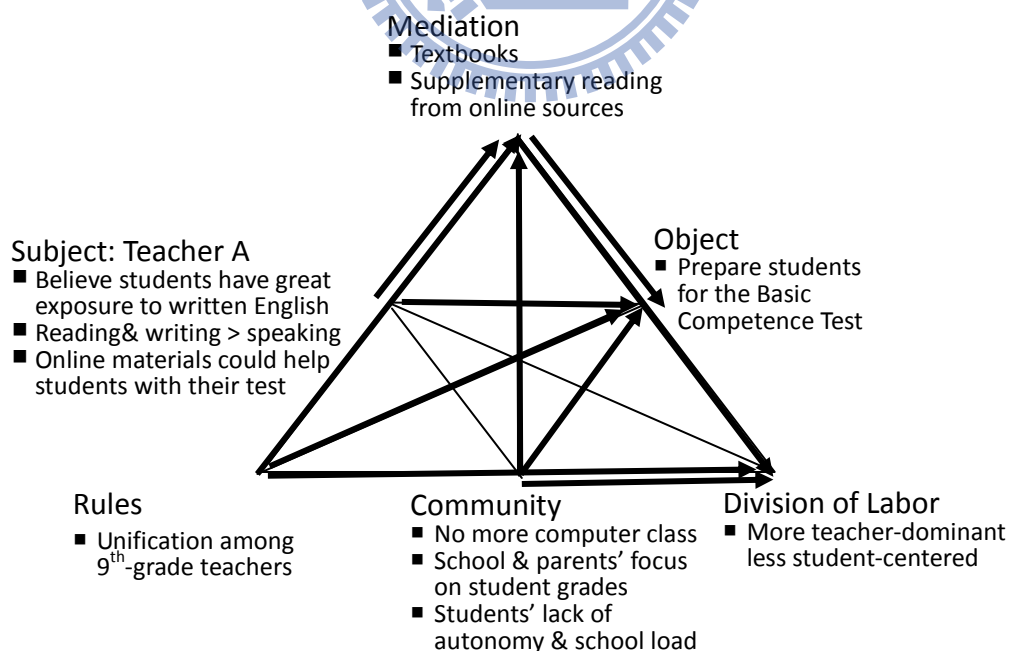- More teacher-dominant less student-centered

Figure 4.5 Conceptual mapping of Teacher A's activity system in the fall semester

Case Two: Teacher B

Teacher B's Teaching Beliefs

 Teacher B's teaching beliefs in general

  Teacher B had three classes accounting for 12 hours of teaching in the fall semester, 2009. One of her classes was the 7th grade, while the other two were 8th grade. Her experiences of studying overseas led her to form her current belief of teaching, i.e., her belief in the importance of offering students what they could use or apply in the future. This included students' understanding of western cultures as well. From Teacher B's point of view, she felt that English teaching was more than merely teaching them to excel in exams; rather, she remarked,

> "…I feel there should be some understanding of American or western cultures too, and also some…some skills or things of that sort that they [students] could use in the future if they would like to learn further about English." (interview #1, Sep. 14, 2009)

Considering that the students were only learning the basics in junior high and would yet face a lot more challenges upon graduation, Teacher B hoped that she could impart self-learning methods that students could put to use even without a teacher present. While currently student still relied mostly on the teacher when learning English, she hoped she could still facilitate them with those skills despite test-oriented instructions.

 Teacher B's beliefs in technology integration

  Teacher B defined technology integration as "teachers' use of current technology to facilitate students' English learning", such as ready-made materials and resources from the Internet and even CDs played through the computer. According to Teacher B, such definition was not confined particularly to in-class teaching, but encompassed pre-teaching preparation, during-teaching instruction, and after-teaching practices which students would do at home. Furthermore, Teacher B also considered technology integration into teaching as "giving learning back to students". Under this definition,

students were expected to use technology to gain knowledge and took more ownership over their learning.

With regard to her attitude toward technology, Teacher B held mixed dispositions toward technology integration. From her understanding, the integration of technology had manifold advantages for teaching and learning. First, it could attract students' attention. Second, teachers could freely use computers to present material and test papers, thus saving a lot of resources. Third, students were given the chance to learn on their own instead of always having teacher-dominant lectures. However, Teacher B also acknowledged certain drawbacks of technology integration, which included lack of computer equipment and access at her school and the difficulty for class time arrangement. She also confessed about her unfamiliarity with computers, and she was afraid that if there had been any computer glitches, she would not know what to do. Valuable times would also be wasted away in vain while she tried to figure out the solutions, when she could have used those times to teach.

In addition to pointing out the advantages as well as disadvantages of integrating technology, Teacher B also made two remarks about her particular impressions of using computer technology to conduct her classes. First, she commented that such instructions, compared to the traditional type of teaching, lacked communication and "did not seem real enough":

> "…in the classroom the teacher would not waste any seconds of any time; you just keep on giving lectures, and students would just listen, but at computer labs you would give a lot back to students; you can't just lecture all along, because you're just showing something to the students, and then you leave them to do it on their own. So sometimes I would get the feeling that it's [having class at computer labs] not so real, almost like casual and slack…I don't know…" (interview #2, Jan. 21st. 2010)

According to Teacher B, there would not be much interaction going on at all if she used computer to teach in class. She described computers as "something surreal and

stiff" because ideas were projected through screen; without any sense of communication, it was easy for students to grow tired and lose their interests after some time.

Second, Teacher B also argued that the use of computer in teaching actually limited the amount of textbook content she could deliver. She stated,

"[…] because textbooks are more fixed; it's just the way it is, but when you use computers to teach, you might 'pull in' all the other related stuff, so it's a lot more. So for example, when I teach a word and its historical background and stuff like that, I would just end quickly there if I lecture. But when I use computer to show the concept, I would post like images and maybe the stories too for students to read […], so the time it took would get longer…" (interview #2, Jan. 21st, 2010)

Whereas up to five of six concepts could be taught within a single class when teaching from the textbook, she felt that 'only this much' could be covered if she used the computer to teach the concepts.

Teacher B's Instructional Practices

In most of the observed classes, Teacher B had similar patterns of instructions when teaching, and she would follow along the textbook and gave lectures for most of the time. She would introduce lots of new vocabulary words, explain grammatical concepts, and guide students through completing their workbooks.

Occasionally at the beginning of a lesson, however, Teacher B would use some ready-made CDs, which, from Teacher B's own definition, was considered a form of technology integration. She reported this as one of the most common technology she adopted in her teaching, and in those CDs there were videos and materials related to the textbook content. The purpose of using CDs, according to Teacher B, was for student to understand more about what they were learning in a particular lesson, which helped them prepare for the *BCT* as well. Such use of CDs was affirmed by students as positive: "It can help us learn, like it can add on to our impression of the content, so it's easier [for us] to remember and memorize" (interview with two

students, Feb. 2nd, 2010). The use of textbook and CDs served as major tool used in Teacher B's instruction, and it resulted in a teacher-centered classroom, with the teacher exerting absolute control over students' learning.

In addition to using CDs, from time to time Teacher B would also introduce students to certain websites or information from the websites. In one particular observed class where Teacher B taught "Penghu" as a vocabulary, she asked students to go home and check out the website of *Penghu National Scenic Area*, inviting them to come back the next day and see if information on the website corresponded to what were shown in the textbook. To this Teacher B reported that she would sometimes find some additional materials for the students; examples include new vocabulary from *Yahoo* news, materials on western cultures, and certain learning-related websites from other countries. She would also let students know how she located the information she gave them, so that students could also follow the same way in finding them.

The action for students to visit websites and find information was optional, and she did not request students to do so. However, she frankly admitted that, given students' enormous pressure, it was highly unlikely for students to actually browse the websites when they went back home. This was substantiated by the students when they were asked about whether they would visit those websites. They explained, "[I feel it's] not so useful, because most students wouldn't go home and spend time on that kind of stuff; [I suppose] it might be more of an extra burden to us" (interview with two students, Feb. 2nd, 2010)

Teacher B's school had long been promoting one particular contest called "*Educities*[8]", and one of the contest entries was the *English words marathon* in which

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[8] Educities was an online educational platform administered by National Central University and Chunghwa Telecom, and it provides a virtual place where everyone can learn and exchange for

participants could practice and test their words through online spelling and listening

practices. In order to practice this, students needed to have access to computers.

However, Teacher B reported difficulties in reserving the computer labs. In her school,

there were only two computer labs, with one reserved almost exclusively for

computer teachers. Left with only one computer classroom available for the entire

school of teachers, she felt it nearly impossible to use it even if she wanted to. As

Teacher B's schedules were tight and there were no time for students to practice

within class hours, her students had to use the after-school time to practice. Yet as

some parents were under the impression that students might be 'playing' computers

and wasting their time, Teacher B had to resort to purposely keeping the students after

school and trying to find an appropriate place for them to practice.

In addition to regular classes, Teacher B also led a student club in which she

would guide students to get to know American cultures. Different from her regular

classes, during club hours Teacher B reported that she was able to used computer

technology more often to find online sources, present certain concepts, as well as

show students online clips related to western cultures. She attributed to this to the

nature of student clubs:

> "…it's just different from the regular, 'orthodox' teaching; it's more of relaxed
> learning so that's why you could do this. If this really is classroom teaching I
> think it would be very difficult, [there is] time, and there's no assessment, no
> traditional pressure in the [educational] system, then it would be possible"
> (interview #1, Sep. 14, 2009)

Thus, due to the informal settings of student clubs and its rather casual atmosphere,

integration of technology became more feasible.

Contextual Factors Affecting Teacher B's Technology Integration

Despite Teacher B's positive attitude toward technology integration in teaching,

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educational purposes.

she nonetheless was not able to incorporate too much technology use in her instructions due to several contextual factors within the community she was situated in. Five different contextual factors constituted constraints that led Teacher B to become doubtful about the practicality of technology in her instructions. These included insufficient computer infrastructure, lack of teaching hours, the test-driven atmosphere, pressure among colleagues, and finally, students' passive nature.

First, Teacher B reported that there were not enough computer infrastructures built on campus for teachers' use. During the data collection semester, projectors were equipped only in the 7th-grade classrooms, whereas the 8th- and 9th-grade classrooms had no such equipments[9]. When teachers wanted to use the projector to teach 8th- and 9th-grade students, they would have to borrow the projector with a tool box in advance and connect all the wires. Consequently, similar to the difficulty in reserving computer labs, Teacher B noted that the inconvenience and the time it took to bring, set up, and later dismantle altogether constituted a major impediment that kept her from wanting to use computer in her classroom practices. In response to this phenomenon, school administrator explained that they were given only certain amount of budget to buy a small number of projectors. Considering that 7th-grade classrooms were nearby the administration offices, and that students at this point had not yet faced the exam pressure, the school decided to give first priority to the 7th grade over the other years.

Second, one particular problem that kept resurfacing was the lack of teaching hours assigned to her, and this was the biggest difficulty she reported to have in her attempt to integrate technology even after she already grew familiar with the school. She clearly counted out all the materials she had to cover:

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[9] The researchers were later informed that by the 2nd semester (Spring, 2010), overhead projectors were equipped in ALL classrooms. However, the researchers did not probe into teacher's use of technology during that particular semester.

"We have about 6 weeks of time in between exams, and you need to cover 3 lessons within those 6 weeks, so think about it, that's 1 lesson every 2 weeks. But then it's not just the textbook, you also have workbook and also some test papers to review. […] There's also Let's Talk in English too, […] which is also included in the exam. For Let's Talk in English, it's about 5 or 6 pages for every exam, so adding all these up there are actually a lot. […] You had to be in a hurry, because every time you're done teaching one lesson, the exam is coming up too, and of course you still have to review the lessons…" (interview #1, Sep. 14, 2009)

Such content coverage was the convention in for every teacher in Teacher B's school, and it jointly limited what kind of mediations she could use in her instructions. She had only four class periods every week, yet with so much to cover within a set amount of time, Teacher B was thus occupied with the designated content materials, and she could not incorporate many supplementary materials. She felt that if she could have been given or assigned more class periods, she would have been able to do additional teaching outside of textbooks. Nonetheless, she also admitted that such was very unlikely, as every subject teacher was also complaining about not enough time and asking for more.

Third, the test-driven atmosphere was pinpointed as another factor from the community that confined Teacher B's technology integration in her teaching. As explained earlier, given there was the pressure to cover the schedule, Teacher B would give priority to materials that were within the curriculum design (such as textbook), because at this point students were still confronted with the stress to face the *BCT*. If she were to give any supplementary materials, they would still be around and related to the curriculum. Distancing from the norm of curriculum would also lead to students' inability to grasp the key concepts needed for test preparation. The school was also concerned if teachers failed to finish covering the content material or when students' grades were too low. The primary goal here was therefore to teach those that students needed to learn, in this case, those that would be covered in the test.

Fourth, Teacher B also expressed her stressed feeling among her colleagues. In her school, it was a convention that they printed out the average grades of every single class for teachers' references. Teacher B described this as a source of stress for her personally, because she would, on an unconscious level, be regulated by that transcript, and she would pay particular attention to students' academic performances in relation to those in other classes. Nonetheless, rather than regarding it as pressure for competition, Teacher B described it as pressure to catch up with others' schedule:

> "That pressure is huge. Usually when we meet other English teachers we would always ask the same questions, like 'how's your class doing in the exam this time?' if we're using the same test paper. Or we would ask 'where are you at [teaching progress] right now?' […] You just want to know if your progress is okay or if your teaching methods have any flaws that lead to students' poor performance." (interview #1, Sep. 14, 2009)

Finally, students' passive nature also restricted her from integrating technology according to her defined way. Based on Teacher B's definition, students were expected to take more responsibilities over their learning. However, Teacher B confessed that while she made such definition, whether it can be realized was another completely different matter. Whereas senior high or college students are more aware of their learning purposes, she indicated that students in junior high school were mostly passive and unable to control themselves, and they relied mostly on the teacher to guide them in their learning. Therefore, such students' nature posed difficulties to her definition of technology integration.

Summary of Teacher B's Case through Activity Theory

When reviewed through the activity theoretical perspective, Teacher B's case showed that her past experiences and her beliefs in technology, along with the contextual factors from the community, altogether influenced what kind of mediated tool Teacher B would use in her instructions as well as the objects she set for her teaching.

Teacher B as a subject carried distinct subject agency that affected her choice of the meditational means in her teaching and guided her to form particular objects in her activity system. Her overseas experiences, for instance, led her to believe that in addition to preparing students for the test, it was also important to teach students various western cultures and skills they could put to use in the future. Such objects in turn directed her to incorporate website as one of the mediated tool she used, and she used them to teach students western cultures and ways of locating information, a skill that she hoped students could apply in the future. Furthermore, her belief in technology as rather casual and limited in the amount of content delivered also caused her to integrate little technology but to use textbook and ready-made CDs as the major mediation in her teaching. As Teacher B still had to prepare students for the *BCT*, such use of textbook and CDs helped her achieve this goal as well.

Contextual factors from the community where Teacher B situated in also acted as the constraint for her technology integration. For example, having students' grades printed out on transcripts formed a sense of pressure among all colleagues, as teachers subconsciously would be regulated by that transcript and wanted to catch up with others. The content coverage unified among teachers also led her to feel that there was not enough teaching hours for her to incorporate much technology in her instructions. Other contextual factors such as insufficient computer infrastructure during the data collection semester, the test-driven atmosphere rooted in her school, and students' heavy reliance upon teachers also made it difficult for her to integrate technology in the classroom. Given these contextual constraints, Teacher B's teaching materials involved mainly the textbook, CDs, and, occasionally, some websites. Likewise, even though she desired to teach students things they could put into use in the future, the larger test-oriented context forced her to strike a balance between her original object and the need for students' test preparation. Consequently, in the end she could only

integrate little technology in her teaching.

With regard to the division of labor in Teacher B's activity system, the mediation used, the convention embedded within the school, and contextual factors altogether led to teacher-centered classroom. Because textbooks was used as the major tool and not much technology was adopted in Teacher B's teaching, she was considered the sole expert for knowledge, and she was accountable for completing the content coverage assigned to every English teacher in her school. Contextual factors such as students' passive attitude in learning and the test-driven atmosphere also compelled Teacher B to conduct teacher-centered instructions where, for most of the time, she would give lectures to guide students through test preparation.

Figure 4.6 shows the conceptual mapping of the Teacher B's activity system based on the analysis of interviews with Teacher B and classroom observations.
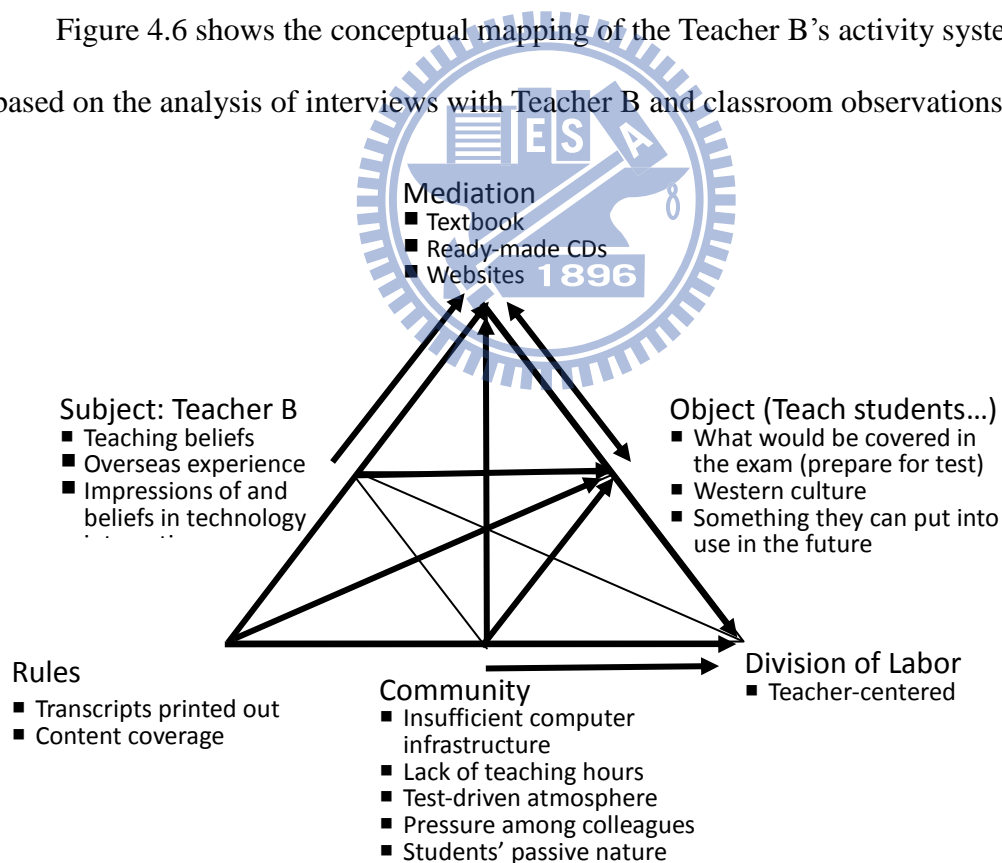

Figure 4.6 Conceptual mapping of Teacher B's activity system

Case Three: Teacher C

Teacher C's Teaching Beliefs

Teacher C's teaching beliefs in general

In the fall semester, 2009, Teacher C had 16 hours of teaching in total and three classes to teach, with all of the students coming from second year. As an English teacher, Teacher C held two teaching beliefs that guided her instructional practices. Briefly summarized, she believed that it was important for her to project the image of a professional English teacher, and she also believed that when teaching, students' learning status should be taken into consideration in order to allow students' learning to take place.

First, being a young English teacher who had been teaching for 4 years only, Teacher C considered herself as rather inexperienced in teaching. Accordingly, her priority lied in trying to present herself as a professional teacher, and one of her teaching goals was to give clear explanations and complete content coverage of the textbook to the students. As she stated,

> "…I felt my principle was that, I could be like other teachers in general, to cover the textbook fully and clearly, so that my students would not question my profession as a teacher […]. Some day when I know it [textbook] well enough, my brain could be just like a bookshelf, okay, so this is 1st grade, you only need to learn until here, and we can leave it there when we get to 2nd grade […] I could know very well, no matter which edition it is, all the things they need to learn within the three years in senior high, then I think I would start to think if I should begin something else […]. But now I'm still not able to, so sometimes I'm not entirely sure if this is something that I should now give them as supplement; sometimes I would give too much…" (interview #2, Oct. 28th, 2009)

Teacher C confessed that, as inexperienced as she was, if she were to add something different to her teaching, things would be in complete chaos, and she was afraid that students would regard her as an incompetent teacher.

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Second, Teacher C asserted that English instructions should always be 'student-centered'. According to her definition, the concept of student-centered instructions did not necessarily mean students having full autonomy and take ownership over their learning. Instead, it referred to teachers' ability to take into consideration students' levels and status and help them learn in their instructions, so the priority was to see if students could indeed learn something from the instructions. If students were not in the condition, additional materials and activities might all pose as burdensome rather than beneficial to the students.

To address and illustrate the above point, Teacher C recounted her previous experiences where she made distinct efforts in preparing supplementary materials on Emily Dickinson, the American poet. Nonetheless, despite all her endeavor, she concluded that the one who learned the most about the poet were not the students but the teacher herself. Likewise, she also challenged the necessity to conduct fancy activities to attract students' attention, questioning whether from them students could indeed face the conscientious academic style characteristic in college training. As Teacher C questioned, "who exactly should be the one learning here?" (interview #3, Jan. 25th, 2010) Such experiences led her to set students' learning as her primary goal to achieve.

Teacher C's beliefs in technology integration

Teacher C defined technology integration in terms of how computers were generally used in her class. However, she claimed that her definition was, according to her own words, very "basic". She explained that compared with adopting computer technology to foster students-centered learning as advocated in the line of research on technology integration, her own definition was "at a lower level" and involved the use of computer in any forms. For instance, even though using PowerPoint and computer teaching aids such as movie clips might not differ drastically from the traditional

lectures, Teacher C considered them part of technology integration as well.

Having defined what technology integration meant to her, Teacher C also stated that she believed the potential of computer technology to broaden students' vision, yet at the same time she was also held back regarding its applicability in the classroom. This was because of students' tendency to get distracted by the technology used, the lack of interaction it posed in teaching, and finally, her uncertainty as to how assessment could be carried out.

First, in line with her goal of letting students learn, Teacher C felt that the use of fancy technology would not necessarily guarantee students' comprehension; rather, students might be distracted to the extent that they forgot about learning. For instance, when PowerPoint was used in class, Teacher C reported that students tended to quickly and casually glance through without necessarily learning anything. Unless such became the norm in her instructions, she suggested that it was highly unlikely for students to obtain much from PowerPoint slides. Compared to computer technology, she preferred traditional chalks and blackboard as her tool for teaching, because she considered the latter more time-saving and practical. Referring back to internship experiences she had when she used flash to present her teaching demonstration, she recalled the comments her advisor gave her, which particularly stroke and influenced her:

> "She [the advisor] remarked that the demonstration was far too impractical because not everyone could do flash […] She thought it the best that I could just use chalks to teach, in very clear terms, all the essence and concepts in a curriculum, and that students could understand it too. That's the best. […] Afterwards I thought, yeah, we're making all these worksheets – I used to do worksheets for almost every single lesson – but later I found out that for students those worksheets were just 'good to see' […], but did they really learn? I started to doubt […]" (interview #1, Sep. 14, 2009)

Second, Teacher C was under the impression that the use of computer technology

in teaching failed to attend to the interactive aspect required in an English classroom. Interaction was of primary importance to Teacher C as an English teacher, and she could not stand students' inattention to her. Without such interaction, she would be uncertain if students indeed learn anything. She commented that using computer technology, however, often resulted in teacher getting held up by the computer and distanced from the students. Her emphasis on the idea of interaction was mirrored in the interview with one of the school administrators as well. Also as an English teacher himself, when asked upon the overall extent of teachers' technology integration in class, he frankly admitted that English was actually "one of the subject areas that used technology the least". He remarked that English was a subject that required a lot of communication with the students; the teacher needed to ask students questions from time to time, and prompt feedback from the teacher was also needed. Nonetheless, the use of computer technology often prevented teachers from, for instance, going down and check students' progress during practices. As a result, English teachers tended not to integrate much technology in their classes.

Third, the issue of assessment was another major concern that Teacher C had toward the feasibility of technology integration, and she reported unsure about how to assess her students. When integrating technology in teaching, she naturally assumed that her students would be evaluated by means of computer technology as well; yet because she had neither been able to locate any effective assessment nor learned any, she reported that she would end up with traditional evaluations that made students complain. Teacher B went on to that raise another question even when she was able to successfully evaluate her students through computer technology:

"…will it be used in the exam[10]? Will the exam be receptive toward this kind of evaluation? If today the exams were all administered this way [by using

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[10] The exam referred to Join College Entrance Exam (*JCEE*) held by the Ministry of Education to assess senior-high -school students' level after graduating from senior high schools.

computer technology], then we would go completely 'technologized', and technology integration would then be greatly promoted and practiced." (interview #1, Sep. 14, 2009)

Teacher C's Instructional Practices

It should be noted that during the data collection semester, Teacher C was on a short leave due to the fact that she was getting married and would soon be on her honeymoon. Consequently, she recognized that she basically had little time to carry out her instructions. As she was forced to rush through her classes, none other than textbook became the major tool she used in her teaching. While the classroom was equipped with a projector and a screen, Teacher C did not seem to make much use of it. For most of the observed classes, her teaching pattern was repetitive, and her classes were mostly conducted in traditional ways, i.e., teacher giving lectures throughout the class time, with students passively receiving knowledge downstage. For example, Teacher C would introduce new words, text, and grammar, and the students would do constant practice and drills of what had been learned. Such repetitive style of instruction was visible in students' reflections too. In their interviews, they recalled that in class they were "mostly memorizing lots of vocabularies" and "doing a lot of practices" (interview with two students, Jan. 5th, 2010).

However, Teacher C reported that sometimes she would also bring students to the audio-visual classroom, where students would watch videos related to their textbooks. While it was not very often for her to conduct her classes in such fashion, the main purpose was for students to get to know more about the texts in the textbooks, particularly when students were learning about novels. The use of videos thus helped her make sure that students could indeed learn. Students also acknowledged that watching videos were in fact helpful in increasing their understanding of the text,

"…we were reading novels and things like that in our textbook, and so we would watch videos which were about the storylines of the novel. Otherwise [without it] we really wouldn't be able to understand it at all, and with videos, we could know roughly what it's about, and we could understand more when we're reading too." (interview with two students, Jan. 5th, 2010)

Contextual Factors Affecting Teacher C's Technology Integration

In addition to Teacher C's beliefs and past experiences with computer technology, Teacher C also expressed certain contextual factors that made her hesitate in integrating technology in her classroom. These were lack of time, the pressure for preparing students for the *Joint College Entrance Examination* (hereafter referred to as *JCEE*), students' learning conditions, as well as the dispositions toward the nature of English in Taiwan all played major roles in influencing Teacher C's pedagogical decision concerning technology integration.

First of all, Teacher C felt that there was not enough class hours assigned to her. As both an English teacher and a homeroom teacher, Teacher C found herself busy all the time, having to prepare for classes, correct students' assignments, and reading their weekly journals. Her preference for teaching students new vocabulary from context also caused her to spend a lot of time looking up English-to-English definitions, synonym as well as antonyms. Moreover, unlike college teachers who could exert total control over their instructions, teachers in senior high school usually have a unified schedule. The responsibility to cover it all became a distinct norm rooted within the senior high-school context that she had to follow. From Teacher C's perspective, integrating technology often implied spending additional hours on one particular lesson and the possibility of giving up teaching certain parts of the lessons. This contradicted her desire to give complete content coverage of the schedule, and it made her feel rather uneasy. Students themselves also preferred that teachers finish covering the schedule:

"[…] Finishing the classes is more important I guess […], because it [what needs to be taught] will come out in tests, so if the teacher did not finish it, you would feel really strange and anxious…" (interview with two students, Jan. 5th, 2010)

Thus, the time pressure to cover the textbook content was one of the factors that stopped her from integrating technology in her class. Teacher C reflected that, had she been given more class hours, she probably would have been more willing to incorporate computer technology in her classroom.

Second, the reality that students still have to face *JCEE* was another contextual factor that made her question the necessity for technology integration. In the exam, students' reading and writing abilities were tested, and the focus was on how much preciseness and correctness students could deliver in the exam. Referring back to the experiences her colleague had using technology, she recalled,

"…He really went to find some foreign students, and they would exchange their diaries […]. In the end all they knew was, okay I got to know a foreign friend; I had achieved something and I had confidence. But you know what? Their English proficiencies did not really improve […]. But what now when he take *JCEE* or any other exams? What about their grammatical accuracy? Would foreigners tell you that your grammar is weird? Not really, as long as it's comprehensible it's okay..." (interview #1, Sep. 14th, 2009).

Thus she started to doubt if the use of technology in this way would actually facilitate students' learning. Furthermore, she also pointed out that so far *JCEE* was still in the traditional paper-and-pencil format. If computers were to be used in *JCEE* to assess students' abilities, she inferred that technology integration would also be prevalent in teachers' classroom practices. Nonetheless, the truth was that such was not the case. As her school emphasized students' ability to enter privileged universities, she questioned if technology integration in instructions would really help students with the exam when eventually they were still to be tested in traditional ways.

Third, Teacher C stated that students' learning condition was one more factor that often left her doubtful toward the applicability of computer technology. According to

Teacher C, most of her students were still unable to study by themselves, and they relied heavily on the teacher to lead them through the textbook. Unlike students in reputed high schools who might carry better competencies in English, her students were neither sufficient in their abilities nor attending cram schools. While integrating technology in the classroom suggested skipping some of the textbook content or quickening the pace in teaching, she was unable to do so. Students also had a lot of homework and tests to take as well as English magazine to read in addition to the regular textbooks. There were also some other reports from, for example, music and art classes. With such heavy school loads, Teacher C thought that students would be unable to handle if they had been asked to use computers to complete additional assignments.

Lastly, Teacher C commented that how English was generally viewed in Taiwan's context also largely reduced the possibility for her to integrate computer technology in her teaching. From her viewpoint, technology would have been prevalent if the focus of English in classes had been on oral skills. Viewing computer technology as a platform for training students' communication competency in speaking, she proposed,

> "…Unless all the English classes [in senior high school] became elective classes that focused primarily on oral conversation and communication; our 'English' became 'English conversation' [….] If our core materials in senior high all turned this way, [the purpose was to] train students how to bridge the information gap, then for sure, our context would change, and technology would become very popular." (interview #3, Jan. 25th, 2010)

However, the fact remained that so far English classes in the senior high level still focused largely upon reading and writing abilities. Moreover, students were in an EFL environment (Taiwan) where there were no urgent needs for students to use or speak English. In such a context, Teacher C argued that English was deemed as knowledge to be assessed rather than tool to be used, and it created a test-driven approach in

English learning. Students were thus often told to take numerous tests, and parents would equate good performances in English tests with good English abilities. Under this type of circumstances, Teacher C thus suspected if the integration of computer technology could really be of any help to the students in significant ways.

Summary of Teacher C's Case through Activity Theory

Examined through the lens of activity theory, Teacher C's case presented a picture in which both her subject agency and contextual factors rooted within the community worked together, causing her to integrate little technology in her instructions.

As a subject in her activity system, Teacher C brought distinct beliefs and experiences that shaped the meditational means she used in her class as well as her intended goal for teaching. Inexperienced as she was, Teacher C would like to present herself as a professional English teacher; this led her to form her object of wanting to give complete content coverage and offer clear explanations to the students. Moreover, her concern over students' learning outcome also functioned as another leading object, and it shaped her choice of which meditational mean is to be used in her teaching. As she believed that the use of computer technology in class often resulted in lack of interaction required for ensuring students' comprehension and meaningful learning, she resorted to using the traditional textbooks and chalks as the major meditational tool in her teaching. Occasionally she would also use video clips in her instructions, but the purpose was still to satisfy her goal of students' learning in meaningful ways. Her past experiences during internship also formed a part of subject agency and added to confirm that without computer technology, chalks and textbooks alone would still suffice.

Situated in the context of senior high school in Taiwan, Teacher C's technology integration was also limited by multiple contextual factors. First, as she wanted to

provide complete content coverage for the students but was only given certain amount of time, technology integration did not seem possible since it implied giving up some textbook content. The unified schedule required for Teacher C to cover also served as the norm in her teaching that largely reduced the time for technology integration. Second, the reading and writing aspects tested in *JCEE* and its paper-and-pencil format also made Teacher C hesitate in integrating technology, as she questioned if it could indeed help students in preparing for the correctness needed in the exam. Third, because her students tended to be passive in nature and often carried heavy school load, such learning conditions kept her from integrating technology in a student-centered fashion as well. Fourth, as that reading and writing were mostly emphasized in English classes, and English was considered knowledge to be assessed, Teacher C doubted the usefulness of computer technology in the current context of Taiwan. Therefore, these contextual factors, coupled with her subject agency (i.e., her past experiences and beliefs), altogether kept her from integrating technology instructional practices.

The use of textbooks chalks as the primary mediated tool in teaching, the need for covering the unified schedule, and the above contextual factors all jointly influenced how the power status was divided among Teacher C and the students. Acting as the authority and expert for textbooks, Teacher C predominantly delivered teacher-centered instructions in the classroom. Additionally, she was also responsible for giving full coverage of the unified schedule as well. Thus, in the classroom Teacher C was the main source and authority of knowledge; the students, on the other hand, were merely receiving information transmitted by the teacher in a passive fashion.

The conceptual mapping of the Teacher C's activity system based on the analysis of interviews with her and classroom observations can be seen in Figure 4.7.

Mediation
■ Textbook; chalks
■ Videos

Subject: Teacher C
■ Inexperienced teacher
■ Internship experiences
■ Intolerance for teaching
  with no interaction
■ Belief in technology

Object
■ Clear explanations &
  complete content coverage
■ Students' meaningful
  learning

Rules
■ Unified schedule
  to cover

Community
■ Not enough time
■ Joint College Entrance Exam
  to face & prepare
■ Students' learning conditions
■ The dispositions toward
  English in Taiwan

Division of Labor
■ Teacher-centered

Figure 4.7 Conceptual mapping of Teacher C's activity system
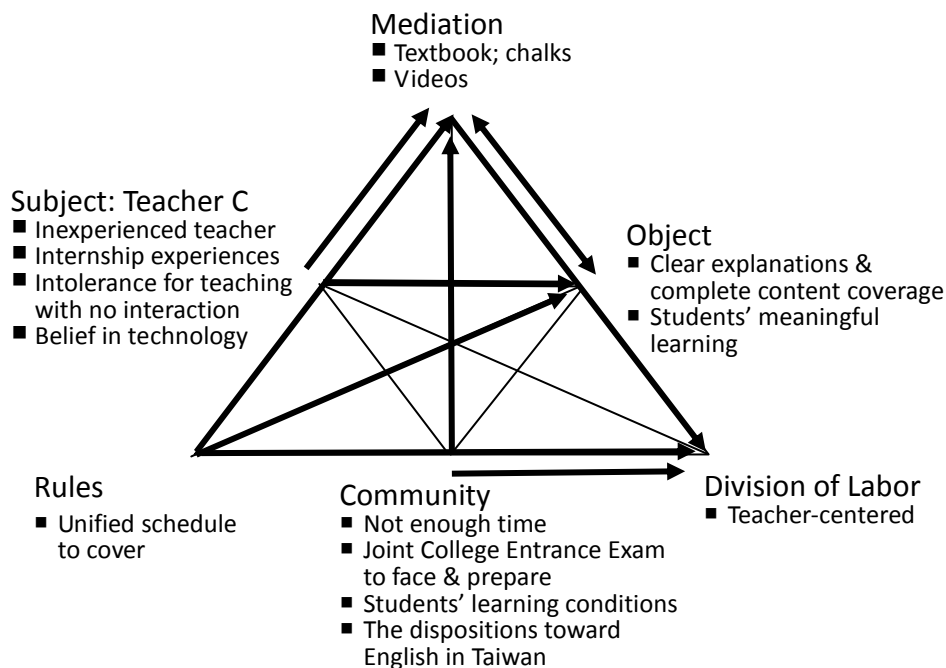
This chapter described the three participating teachers in terms of their beliefs,

practices, and contextual factors affecting their technology integration. In Chapter 5,

the findings of this study are further discussed and summarized. Pedagogical

implications, limitations of the study, and suggestions for future research are also

presented at the end of Chapter 5.

CHAPTER 5
DISCUSSION AND CONCLUSION

In this chapter, the findings are discussed in depth to address the research questions of this study. In the last section of this chapter, the conclusions for this study are outlined, which include a brief summary of the study findings, pedagogical implications, and suggestions for future research.

Discussion

The findings of the current study are discussed through addressing the two research questions framed in this study.

Research question 1: How do English teachers' beliefs lead to their practices regarding technology integration?

Examining three teachers' cases through the analytical lens of activity theory, the findings indicate that as the subject of their own activity system, each teacher brought with them a dynamic set of beliefs and concerns about the values as well as the nature of computer technology in the classroom. These subjects' beliefs then largely contributed to teachers' instructional decisions regarding technology integration. In the current study, whereas Teacher A held positive beliefs in the potential of computer technology that enabled her to adopt technology as the mediation in her teaching, Teacher B and Teacher C questioned the practicality of technology in the classroom, which ultimately led them to resort to use traditional lectures instead of technology integration as the major mediation in their classroom.

Asserting that computer technology should serve as a facilitative role to mediate her English instructions, Teacher A believed that the greatest merit of computer

technology was its potential in offering students' multiple possibilities of English learning experiences and cultivating students' global vision. Whereas textbooks normally were deemed as the dominant authority for knowledge and often criticized for being blend and rigid (Lin, 2007), computer technology can present to students various English learning sources and open up students' horizon, which cannot be achieved through textbooks alone. Such advantages became the objects in Teacher A's instructions. Acknowledging the value of computer technology in teaching, she was thus willing to integrate technology and conduct computer projects as the mediation to reach those objects. Moreover, the positive experiences she had and feedbacks received from students when conducting these project-based learning also led her to confirm her belief in the benefits of technology and continued to integrate technology in her teaching.

The fact that Teacher A's positive beliefs and experiences with computer technology enabled her integration of technology echoed with findings from previous research. In Bullock's study (2004), for instance, a preservice teacher's positive in-class experiences with technology and her observations of successful modeling were important enablers that triggered her to perceive and use technology as an integral part of her instruction. As witnessed in Teacher A's case, in Windschitl and Sahl's study(2002), teachers' beliefs regarding technology were also consistent with their practices, and those beliefs filtered their interpretations of how technology was to be used. The transfer of beliefs into practices also follows Drenoyianni and Selwood's suggested model (1998), in which rationales were changed into goals and instructional decisions. In Teacher A's case, her beliefs in the potential of technology became the rationales for her to integrate technology in her teaching, the advantages technology brought were transformed into the goals or objects she would like to achieve, and they ultimately were realized in her decisions to integrate technology

through computer projects.

On the other hand, Teacher B's and Teacher C's instructional practices in technology integration as mediation was largely framed upon their beliefs in whether technology could enhance their teaching. They appeared to evaluate the pros and cons of technology in terms of its practicality in their English classrooms, and they finally decided that its restrictive nature did not fit into their instructions. For both teachers, three major concerns played a role in affecting their decisions, including (a) their uncertainty about how technology could be implemented in their instruction, (b) their questioning about its effect on students' learning, and (c) lack of teacher-students interactions posed by technology integration. These concerns thus formed a strong subject agency that resulted in their limited use of technology in teaching.

First, Teacher B acknowledged that her unfamiliarity with technology prevented her from integrating it in her teaching, because she was afraid of wasting valuable time figuring out what to do if any unanticipated computer glitches took place. Similarly, Teacher C also reported she was unsure of how assessment could be implemented by means of computer technology, and whether such assessment could be proved as effective when students were still assessed via the traditional paper-and-pencil test. Consequently, such uncertainty as to what to do caused both Teacher B and Teacher C to either integrate little or no technology at all in their instructions. According to previous studies, avoiding uncertainty and exerting control were of crucial importance to teachers (Chen, 2008). In a study on secondary school teachers' use of technology, for example, teachers' comfort or intolerance for uncertainty was also found to determine teachers' use of technology (Saye, 1998). While it seems that most teachers tend to rely on routine or familiar practices, it has also been suggested that such fear or doubts toward uncertainty and the lack of confidence in taking risks or incorporating changes should be regarded as an

acceptable and normal part of a teacher's professional development (Levin & Wadmany, 2008).

Second, both Teacher B and Teacher C were held back toward the effect of computer technology on students' learning. Teacher B argued that when she integrated technology in her teaching, she could only teach limited amount of textbook content in certain amount of time. Given the tight schedules teachers in high schools usually had to cover in a semester, this may jointly affect students' learning process too. Students might not be able to learn that much when compared with the traditional teaching of 'chalk and talk', where teachers could simply deliver more concepts. Teacher C also questioned students' ability to comprehend, as she was under the impression that the fanciness of technology was likely to distract students from learning target points. Shaped by her previous experiences during internship, she preferred the traditional 'chalk and talk' as more practical, effective, and time-saving. From both cases, it could be found that, consistent with the findings drawn from Lam's study (2000), teachers unconvinced of the benefits of technology in teaching – as evidenced in Teacher B's and Teacher C's cases – would result in their lack of technology use. Unless teachers themselves can perceive the potential of technology to their teaching, it is very likely that technology would just remain untouched even when computer access is made readily available

Third, Teacher B and Teacher C also remarked that technology integration lacked a sense of interaction. Teacher B, for example, argued that little communication would be involved between teacher and students when technology was used in class. Unease with computer technology in particular was also spotted when she reported her feelings toward letting students learn through computer technology. It seemed that compared with conventional teacher lectures by which teacher usually exert total authority over students' learning and interact with students a lot, Teacher B's

descriptions of computer technology as 'casual and slack' as well as 'stiff and surreal' suggested her unwillingness adopt computer technology in her teaching. Likewise, Teacher C preferred having students' full attention because such authority helped her be reassured of students' understanding. However, the use of technology in class, as Teacher C commented, often resulted in the teacher getting held up and distanced from students. Particularly in an English classroom where teachers often need to interact with students a lot, the use of computer technology seemed to fail to attend to this area.

Acting as the authority in the classroom, teachers often believe that surrendering such authority is likely to hinder students' learning, and they would choose to assume substantial control of their classrooms (Chen, 2008). Such was proven to be true in Teacher B's and Teacher C's cases as well. As the integration of technology respectively implied giving students more autonomy in learning and the possibility of teacher getting distanced away from students, they seemed rather uncomfortable and reluctant to do so. Consequently, their beliefs of computer technology as surrendering control and authority prompted them to integrate little technology in their teaching. Additionally, what previous studies on teachers' use of technology did not seem to address was the nature of an English classroom. In a language class, communication needs to be in place, and teachers usually have to do constant on-the-spot interactions with students, asking students questions and providing them with prompt feedbacks. Such function is likely to be reduced, however, when the presence of computer technology often requires teachers to teach and operate computer at the same time. The complexity involved within perhaps can explain why the two teachers did not integrate much technology in their classrooms.

Overall, the current study were compatible with the findings from earlier research, which demonstrated that teachers' beliefs in technology or technology

integration can largely determine how technology is to be defined and integrated in their classroom practices. As concluded in Levin and Wadmany's final remark (2008), "[…] we should also consider the broader profile of teachers' educational beliefs, their cognitive and emotional disposition to face novel, uncertain situations, their actual teaching practices, and their views on technology and its supportive and restrictive nature" (p. 255). Accordingly, for successful technology integration to take place, it is vital to examine teachers' activity system, looking into what teachers believe technology could bring to the classroom and how it can be integrated.

Research question 2: How do contextual factors interplay with English teachers' classroom practices in technology integration?

Using activity theory to explore possible attributions to teachers' practices in technology integration, it can be found that in addition to individual teacher's subject agency, contextual factors embedded within teachers' situated communities also contributed to shaping teachers' integration of technology. Due to various contextual constraints from the community, in the fall semester Teacher A was unable to integrate technology through computer projects as she did in the spring semester. Likewise, Teacher B and Teacher C were rather reluctant to integrate technology in their instructions as a result of similar contextual factors.

Teacher A was able to adopt computer projects as the mediation in the spring semester because of the availability of computer access, joint support from colleagues, school and parents, and the nature of her students who attended cram schools and carried higher English proficiency than those in remote areas. The source of these facilitative factors, however, became inhibitions when Teacher A transited to a whole new semester and her students reached the 9th grade. No more computer class was assigned in the 9th grade, and the support from colleagues and flexibility that was once

present in the 8th grade was replaced with the requirement that all the 9th-grade

teachers had to have a unified teaching schedule. Such requirement formed a

community rule which regulated teacher A's teaching and the mediation she could use.

Instead of continuously sustaining teachers' instructions, school and parents started to

demand for students' academic performances in the new semester. Students at this

point were also confronted with heavy school load to attend to, but they were

insufficient in their autonomy to monitor their own learning process. All of these

contextual limitations confined Teacher A from conducting any computer projects to

mediate her teaching, and she could only use minimal technology by finding online

supplementary materials for her students.

Tracing the source for such drastic change between two semesters, we found that

the need and pressure to prepare students for the upcoming *Basic Competence Test*

(BCT) appeared to mark the divide between her classroom practices in the spring and

fall semester in 2009. The emphasis on preparing students for the ultimate exam was

in line with the findings highlighted in previous literature (Chen, 2008). High grade in

the exam is often equated with entering prestigious schools, or vice versa. As such

high-stake exam has been practiced in Taiwan for many years, they become the

underlying convention that is deeply rooted within every secondary schools that are

hard to be challenged. The stakes involved is so high that getting students to score

high in the exam becomes the prioritized goal in teaching. In addition to teachers,

other stakeholders such as school's administrative body, parents, and even students

also consider students' exam performance of primary importance. Under such

circumstances, the integration of technology in innovative ways is likely to be

discouraged, since it often implies teachers taking risks to conduct teaching that is

more student-centered and creative but also time-consuming. Moreover, in

comparison with technology integration, teachers may be more concerned with more

pressing priority they need to attend to, that is, improving students' grades in the exam (McGrail, 2005). In Teacher A's community, this priority surpassed her original teaching object, and ultimately had to make compromises.

When comparing Teacher A's case in the fall semester with Teacher B's and Teacher C's cases, certain contextual factors in common can be identified as preventing them from integrating technology. These factors include the pressure for exams, the lack of time, nature of students, and the stress among colleagues. Some other factors such as insufficient infrastructure and the nature of Taiwan's EFL environment, while may not be shared among all teachers, were also pinpointed as significant for influencing teachers' practices in technology integration as well.

First, all of the participants unanimously stated that the pressure to prepare students for the upcoming test and exam (*BCT* for junior high school students and *Joint College Entrance Examination* (JCEE) for senior high school students) was one major reason that pulled them back from integrating technology. In Taiwan, test or exam has been considered and used as the gatekeeper to success, and scoring high in exams often infers getting the ticket to reputed high schools and colleges. This test-oriented atmosphere within schools and classrooms drove them to conduct teaching that focus primarily on knowledge retention, memorization and test preparation. This corresponded with Teacher A's reported concern in her second semester of teaching, and it shows that preparing students for the examination is an issue of utmost importance to all teachers alike in educational settings. Occupied with this particular goal, teachers may not be able to spare extra time or efforts to integrate technology in their instructions.

Second, all three teachers stated lack of time or teaching hours as one of the factors inhibiting their technology integration, and this has been proven throughout much literature (e.g., Chen, 2004; Chen, 2008; Cuban, Kirkpatrick, & Peck, 2001;

Huang, 2003). The integration of technology oftentimes implies that teachers spend additional hours on locating and preparing the appropriate computer resources for their classes. However, oftentimes it is the school's norm that teachers attend to homeroom class supervision and administrative work in addition to curriculum design (Hsu, 2003). With the need to follow such norm, it is not surprising why the teachers in the current study were complaining about not having enough time to integrate technology into teaching. Furthermore, the pressure to prepare students for the test also drives teachers to act as an 'academic specialist' (Cuban, Kirkpatrick, & Peck, 2001) who are primarily concerned with covering large body of content information that may be related to the items appear in the test. Given that technology integration might suggest allocating valuable class hours to adjust technical issues or for students to explore on their own, most teachers are hesitant to do so at the expense of affecting their class schedule (Lee, 2008). Content coverage thus becomes the dominant focus for teachers in secondary schools, and this urge prevented them from integrating technology in their classes.

Third, the nature of the students was also referred to as one factor inhibiting teachers' integration of technology. Students' passivity in receiving knowledge and heavy reliance upon teachers to guide them through reduced the possibility for teachers to spend additional time on technology integration. Such passivity has been addressed and discussed in various literature (e.g., Cheng, 2000; Kember, 2000; Littlewood, 2000), and a common attribution would be the Asian cultural norm that asserts teachers' authoritative figure and students' reticence. While some argued that such stereotypical misconception of Asian learners is only 'situation specific rather than culturally pre-set' (Cheng, 2000, p. 435) that cannot be generalized into all Asian educational settings, this appears to be true for all three of the teachers in the current study. This might due to the fact that students in general are not exposed to

occasions that require necessary use of English, thus lowering their autonomy and motivations for English learning (Chang, 2003, as cited in Chen, 2008).

In addition to students' passivity, their heavy school load was another factor that restrains teachers' technology integration. With the intention of raising students' performance in *BCT* or *JCEE*, students are often asked to read and prepare as many English materials as possible besides regular textbooks. These might include workbooks, test papers, English magazines, and other practice books as well. Students' such school load naturally made it impossible for teachers to conduct technology-integrated activities that might pose as extra burden for the students.

Fourth, both Teacher A and Teacher B cited the pressure among colleagues as the source for their unwillingness to adopt or integrate technology as the mediation in their teaching. Teacher A faced the unification requirement among her colleagues, and Teacher B, regulated by the transcript spread among teachers, experienced the pressure to catch up with other teachers' teaching schedule. Institutional or organizational culture from teachers' situated community should be taken into consideration when examining teachers' technology integration, as its culture can largely shape individual teacher's effort, either positively or negatively, in adopting any technology (Adamy & Heinecke, 2005). In Teacher A's and Teacher B's cases, the need for unification and printing out the transcript could be considered part of an institutional culture that had been established and practiced for years in their respective community. Such practices were deeply in-grained in their schools, and they formed certain pressure that inhibited the extent of their technology integration.

Some other factors such as insufficient infrastructure also served as contextual influences that determined teachers' practices in technology integration. During the data collection semester, there was no projectors built in Teacher B's classroom, and there were only two computer labs available for the entire faculty in her school.

Similar to the participants in Chen's study (2008) who had no intention of reserving computer labs, such inconvenient and limited access to computer technology also deprived Teacher B of the fundamental condition she needed for technology integration.

Teacher C also cited the nature of Taiwan's EFL environment as one particular factor that inhibited her technology integration. She stated that the focus of English subject on reading and writing as well as lack of opportunity to use English in Taiwan altogether limited the extent of her technology integration. This comment suggests that Teacher C associated the concept of technology integration with English oral training and communication, and for her it was one particular platform that teachers can adopt to train students' speaking proficiency. While it remains true that the context in Taiwan might not be able to encourage the development of students' oral skill, it should also be noted that the integration of technology into English teaching is not necessarily confined to one particular skill only. Students' listening, reading, and writing skill can also be trained and enriched through the help of computer technology.

To sum up, the teachers in the current study looked at the role of technology in teaching "from the perspective of a practitioner and a realist who knows his or her limitations as well as the constraints of his or her own contexts" (McGrail, 2005, p. 18). As found in previous literature (e.g. Levin & Wadmany, 2008; McGrail, 2005; Zhao, 2007), these teachers' technology-related decisions were largely based on practical considerations such as time, access, exams, students' abilities, and institutional culture. The results of this study also confirmed Engeström's activity theory as adopted in this study. Levin and Wadmany (2008) proposed that "internal-mental activities cannot be understood when analyzed in isolation from external activities" (p. 253). Therefore, under such theory, it can be suggested that

teachers' perspectives of the factors assisting or inhibiting their technology integration are developed as a result of interaction among teachers, other individuals and related situations in their immediate context.

An Overview of Three Teachers' Activity Systems

From the data analysis, a complex interrelationship involving teachers' personal beliefs, contextual factors within the community, and their practices in technology integration are brought to the surface. It illustrated the ways in which each participating teacher, carrying their own subject beliefs and disposition toward technology, interacted with the outside community, its embedded culture, rules, and reality and decided how technology was to be integrated as the mediation in their teaching.

With positive beliefs in computer technology, Teacher A was willing to integrate technology in her teaching. Her disregard for test-oriented approach and the desire to present students with multiple avenues to English learning also fortified her desire to integrate technology. Nonetheless, positive beliefs alone did not suffice when contextual constraints from her community collided with her beliefs, and she faced the challenge of incorporating her personal beliefs as a subject into teaching. While she still believed in the value of technology in teaching, it conflicted with a more important need to attend to students' exam performances. As she ultimately was forced to make compromises and conduct teacher-centered instructions, it seemed that contextual factors resided within the community exerted stronger influence upon her pedagogical practices at the end.

On the other hand, Teacher B and C's doubt toward the practicality of technology in the classroom formed a subject filter that resulted in their reluctance in adopting technology in teaching. This was also echoed in their lack of technology integration in actual instructions. While certain contextual factors within their communities were

consistent among all three participants and also restricted Teacher B and C's integration of technology, it was their held-back attitude and rather negative beliefs in technology that kept technology integration from initially taking place. Thus, contrary to the contextual limitations in Teacher A's case that held the key to her technology integration, those in Teacher B and C's cases served only as reinforcement that strengthened their beliefs and unwillingness to use technology as a mediation in their classrooms.

Conclusion

In the last part of this chapter, the major findings of the current study are summarized, and pedagogical implications are also provided, followed by limitations of the study and suggestions for future research.

This paper adopted a case study approach to explore three secondary school English teachers' beliefs and practices in technology integration. Activity theory was employed as the underlying theoretical and analytical framework to map out the complex relationships among individual's subject agency, mediation, and social dynamics in their situated contexts in relation to their classroom practices regarding technology integration. It was revealed that the teacher's choice of actions in terms of technology integration was interwoven by multiple elements, including their personal agency and contextual factors. Shaped by their individual backgrounds and accumulated experiences from the past, participants carried their own belief systems in computer technology. Such beliefs thus became the primary subject filter through which the role of technology is interpreted, and it determined the degree of technology integration in teachers' classroom instructions. However, in this study teachers' beliefs were not the sole reasons accountable for teachers' choice of technology integration. Contextual factors from the community where teachers were

situated in also largely influenced their instructional practices regarding technology integration.

Pedagogical Implications

Several pedagogical implications can be drawn from the current study. They should be taken into consideration if computer technology is to be successfully integrated in teachers' classroom teaching.

First, the findings of the present study demonstrate that teachers' beliefs in the role of technology served as significant influence upon teachers' pedagogical choice regarding the extent of technology integration. Thus, their rather reserved attitude toward computer technology would naturally be reflected in their instructional practices, leading to minimal use of technology in their classroom. In this regard, Teacher educators and school administrators alike should try to introduce feasible examples and demonstrations of effective technology integration into teacher training or preparation programs. Teachers need to be informed of how and when technology can be integrated as well as how assessment can be done when computer technology is integrated into the curriculum. Through such training, teachers will be more likely to be convinced of the potential benefits and relevance of technology in their teaching, thus making more use of technology to improve teaching and learning.

Second, contextual constraints from teachers' situated community served as another major limitation that confined teachers' technology integration in their teaching. One of the concerns reported in this study, for example, is the limited amount of time invested in *pre-teaching* preparation and creating computer-assisted materials. It is thus recommended that teachers first start from collaboration with colleagues in finding and designing classroom materials through computer technology and resources. By means of such collaboration, much more time can be saved than

teachers working and devising computer-assisted materials in isolation. Furthermore, the lack in time *during* teaching is another unanimous concern pinpointed in the current study, because teachers, under the enormous pressure of preparing students, often feel obliged to cover as much textbook content as possible and thus tend to spend much time on teaching according to the textbook. To resolve this issue, it is suggested that teachers treat the textbook as a guidance rather than the absolute Bible. Without total adherence to the textbook, teachers can still enrich its content by using computer technology to provide supplementary materials that are more motivating but still fulfill the teaching objectives.

Third, for the above transformation in teacher practice to take place, it is also of vital importance for school administrators, faculty members, and parents to understand more about teachers' needs and concerns regarding technology integration and give full support to teachers' teaching. Communication among all stakeholders has to be in place. In addition to providing teachers with technical support and easier access to computer technology, teachers also need to be granted more flexibility in designing their own instructions with technology. While the exam-driven culture rooted in our educational system may be hard to change, and preparing students for the exam is a shared goal, administrators, faculties and parents need to recognize that the use of technology may not be a waste of time. Instead, it can be beneficial in achieving similar ends as well. Thus, rather than a sole focus upon covering as much textbook content as possible, teachers can be given more space to incorporate computer technology as alternative learning resources and possibilities outside of textbooks.

Nonetheless, although several pedagogical suggestions have been offered here that encourage teachers' integration of technology into teaching, technology should not be integrated for its own sake. Rather, it should be carried out under the premise

that it can indeed assist in meaningful ways that could enhance students' learning and understanding (Harris, Mishra, & Koehler, 2009). Some teachers might appear to reject technology integration as a result of their question over its utility to their teaching. In other words, teachers might be unsure and suspect if the use of technology would necessarily help their instructions due to the nature of the subject they teach (as proved in both Teacher B and Teacher C's cases). Under such circumstances, their doubts should be considered an acceptable part of their belief systems and their decisions respected.

In sum, the Ministry of Education in Taiwan has long been promoting educational reforms and policies that advocate the integration of technology into teaching, yet as suggested in previous literature, "simply imposing reform-based ideas on schools and teachers will not result in substantial change in instruction" (Chen, 2008, p. 73). Accordingly, proper communication among all stakeholders (i.e., school administrators, faculties, students, and parents alike) has to be in place in order to understand teachers' needs and concerns about technology. It is only through mutual support for one another can technology integration be more likely to be realized in the educational picture.

Limitations of the Study

The current study was limited in the following aspects. First, while students' parents were considered partial member of the community where the teachers were situated, the researcher did not collect data from the parents, and statements regarding parents' reactions were generated mostly from the teachers and students' interviews. This may bias and limit us from fully understanding the potential attributions that parents might bring upon teachers' teaching practice.

Second, two of the schools the participating teachers worked were reported to

have more complete computer infrastructure added by the spring semester, 2010. *School B* had purchased more projectors and installed them in every single classroom, and *School C* had a newly built multifunctional language classroom, which was put under the charge of English teachers. Unfortunately the researchers did not collect data during this particular period. As insufficient infrastructure was said to be one of the factors inhibiting Teacher B's and Teacher C's technology use, exclusion of data from this period may overlook some crucial findings about their pedagogical practices when more computer access were added.

The third limitation also concerns the time period for data collection. In Teacher A's case, the data collection time during the spring semester, 2009 did not start until May, where the semester was nearly coming to an end. As a result, the data extracted regarding her implementation process for *My School, Your School* project were recorded mostly from her classroom documents and the interviews. Such short time span might not well grasp Teacher A's integration of technology in the classroom.

Suggestions for future research

This study explored secondary school English teachers' beliefs and practices in technology integration, providing insights into the potential elements accountable for teachers' pedagogical decisions regarding the integration of technology. While this study has its limitations, it is hoped that it can serve as a basis for further research in teachers' beliefs and practices in technology integration.

In order to have a better understanding and a more holistic picture of the how individual subject and a myriad of contextual factors interacts with one another, future studies may find it useful to conduct interviews with all of the members of the community. Such may not only expand the data sources but also further strengthen the reliability of the study, incorporating a more thorough perspective instead of relying

solely upon the words of others. Additionally, to overcome any conceivable shortcoming that might result from short timeframe for data collection, it is suggested that future research may cover a longer time span in collecting data. Schools are in a continual process of building and adding more computer infrastructure, and a longer period of time for data collection may help us trace any possible developments or changes in practices teachers might have as a result of increased access to computer technology. Likewise, data collection starting right from the beginning of the semester may also help better capture teachers' instructional practices in more holistic ways.

REFERENCES

Adamy, P., & Heinecke, W. (2005). The influence of organizational culture on technology integration in teacher education. *Journal of Technology and Teacher Education, 13*(2), 233-255.

Anderson, S. E., & Maninger, R. M. (2007). Preservice teachers' abilities, beliefs, and intentions regarding technology integration. *Journal of Educational Computing Research, 37*(2), 151–172.

Barab, S.A., Barnett, M., Yamagata-Lynch, L., Squire, K,. & Keating, T. (2002). Using activity theory to understand the systemic tensions characterizing a technology-rich introductory astronomy course. *Mind, Culture and Activity, 9*(2), 76–107.

Bauer, J., & Kenton, J. (2005). Toward technology integration in schools: Why it is not happening. *Journal of Technology and Teacher Education, 13*(4), 519–546.

Becker, H. J. (2000). Findings from the teaching, learning, and computing survey: Is Larry Cuban right? Center for Research on Information Technology and Organization.

Belland, B. R. (2009). Using the theory of habitus to move beyond the study of barriers to technology integration. *Computers and Education, 52*, 353-364.

Bitner, N., & Bitner, J. (2002). Integrating technology into the classroom: Eight keys to success. *Journal of Technology and Teacher Education, 10*, 95–100.

Blin, F., & Munro, M. (2008). Why hasn't technology disrupted academics' teaching practices? Understanding resistance to change through the lens of activity theory. *Computers & Education, 50*, 475–490

Borg, S. (2003). Teacher cognition in language teaching: A review of research on what language teachers think, know, believe, and do. *Language Teaching, 36*, 81-109.

Breen, M. P., Hird, B., Milton, M., Oliver R., & Thwaite, A. (2001). Making sense of

language teaching: Teachers' principles and classroom practices. *Applied Linguistics, 22*(4), 470-501.

Brinkerhoff, J. (2006). Effects of a long-duration, professional development academy on technology skills, computer self-efficacy, and technology integration beliefs and practices. *Journal of Research on Technology in Education*, 39(1), 22–43.

Bullock, D. (2004). Moving from theory to practice: An examination of the factors that preservice teachers encounter as they attempt to gain experience teaching with technology during field placement experiences. *Journal of Technology and Teacher Education, 12*, 211–237.

Burnett, J. (1999). Classroom-management-classroom survival: One teacher's story or constructing practice in a computer-equipped foreign language classroom. *Foreign Language Annals, 32*(3), 279-294.

Carballo-Calero, M. V. F. (2001). The EFL teacher and the introduction of multimedia in the classroom. *Computer Assisted Language Learning, 14*(1), 3-14.

Calderhead, J. (1996). Teachers: Beliefs and knowledge. In D. Berliner, & R. Calfee (Eds.), *Handbook of Research on Teaching* (pp. 709-725). New York: Macmillan.

Clark C. M., & Peterson, P. L. (1986). Teachers' thought processes. In Wittrock, M. C. (Ed.), *Handbook of Research on Teaching* (pp. 255-296). New York: Macmillan.

Chen, C. H. (2008). Why do teachers not practice what they believe regarding technology integration? *The Journal of Educational Research, 102*(1), 65-75.

Chen, H. C. (2004). *A study of stages of concern, layers of adoption, encouraging and obstructive factors about integrating information technology into instruction in junior high school language domain teachers in Kaohsiung City.* Unpublished master's thesis study. National Sun Yet-San University.

Chen, H. H. (2008). *Factors affecting attitude toward integrating information technology into teaching: A case study of English teachers in junior high schools.* Unpublished master's thesis study. National Chiayi University. Chiayi,

Taiwan.

Chen, S. J. (2004). *A study of stages of concern, layers of adoption, encouraging and obstructive factors about integrating information technology into instruction in junior high school language domain teachers in Kaohsiung City.* Unpublished master's thesis study. National Sun Yet-San University. Kaohsiung, Taiwan.

Cheng, X. (2000). Asian students' reticence revisited. *System, 28*(3), 435-446.

Cole, M. & Engeström, Y. (1993). A cultural-historical approach to distributed cognition. In G. Salomon (Ed.), *Distributed Cognitions: Psychological and Educational Considerations* (pp. 1-46). Cambridge: Cambridge University Press.

Coughlan, P., & Duff, P. A. (1994). Same task, different activities: Analysis of a SLA task from an activity theory perspective. In J. P. Lantolf & G. Appel (Eds.), Vygotskian Approaches to Second Language Research (pp. 173-193). Norwood, NH: Ablex Publishing.

Cuban, L., Kirkpatrick, H., & Peck, C. (2001). High access and low use of technology in high school classrooms: Explaining an apparent paradox. *American Educational Research Journal, 38*, 813–834.

Donato, R. (2000). Sociocultural contributions to understanding the foreign and second language classroom. In J. R. Lantolf (Ed.). *Sociocultural theory and second language learning* (pp. 27-50). Oxford: Oxford University Press.

Drenoyianni, H., & Selwood, I. D. (1998). Conceptions or misconceptions? Primary teachers' perceptions and use of computers in the classroom. *Education and Information Technologies, 3*, 87-99.

Engeström, Y. (1987). *Learning by expanding: An activity-theoretical approach to developmental research*. Helsinki, Finland: Orienta-Konsultit.

Engeström, Y. (1999). Activity theory and individual and social transformation. In Y. Engeström, R. Miettinen, & R. Punmamäki (Eds.). *Perspectives on activity theory* (pp. 39-52). New York: Cambridge University Press.

Ertmer, P. A. (1999). Addressing first- and second-order barriers to change: Strategies for technology integration. *Educational Technology Research and Development, 47*(4), 47-61.

Ertmer, P. A. (2005). Teacher pedagogical beliefs: The final frontier in our quest for technology integration? *Educational Technology Research and Development, 53*(4), 25–39.

Ertmer, P. A., Gopalakrishnan, S., & Ross, E. M., (2001). Technology-using teachers: Comparing perceptions of exemplary technology use to best practice. *Journal of Research on Technology in Education, 33*(5), Retrieved April 18, 2005, from http://www.iste.org/jrte/33/5/ertmer.htm.

Fang, Z. (1996). A review of research on teacher beliefs and practices. *Educational Research, 38*(1), 47–65.

Gao, X. (2008). You had to work hard 'cause you didn't know whether you were going to wear shoes or straw sandals! *Journal of Language, Identity, and Education, 7*, 169-187.

Graden, E. C. (1996). How language teachers' beliefs about reading instruction are mediated by their beliefs about students. *Foreign Language Annals, 29*(3), 387-395.

Grossman, P. L., Smagorinsky, P., & Valencia, S. (1999). *Appropriating conceptual and pedagogical tools for teaching English: A conceptual framework for studying professional development*. State University of New York: National Research Center on English Learning and Achievement.

Haneda, M. (2007). Modes of engagement in foreign language writing: An activity theoretical perspective. *The Canadian Modern Language Review, 64*(2), 297-328.

Harris, J., Mishra, P., & Koehler, M. (2009). Teachers' technological pedagogical content knowledge and learning activity types: Curriculum-based technology integration reframed. *Journal of Research on Technology in Education, 41*(4), 393-416.

Haser, C., & Star, J. R. (2009). Changes in beliefs after first-year of teaching: The case of Turkish national curriculum context. *International Journal of Educational Development, 29*, 293-302.

Hew, K. F., & Brush, T. (2007). Integrating technology into K-12 teaching and learning: Current knowledge gaps and recommendations for future research. Educational technology. *Research and Development, 55*(3), 223–252.

Hollingsworth, S. (1989). Prior beliefs and cognitive change in learning to teach. *American Educational Research Journal, 26*(2), 160-189.

Hopwood, N., & Stocks, C. (2008). Teaching development for doctoral students: what can we learn from activity theory? *International Journal for Academic Development, 13*(3), 187-198.

Hsu, W. H. (2003). *Integrating information technology into elementary science class: A case study of teacher knowledge transformation into action.* Unpublished master's thesis study. National Sun Yat-sen University. Kaohsiung, Taiwan.

Huang, Y. F. (2003). A study of high school English teachers" behavior, concern, cognition, and other factors of integrating information technology into English instruction. Unpublished master's thesis study. National Sun Yat-sen University, Kaohsiung, Taiwan.

International Society for Technology in Education. (2000). *National educational technology standards for students: Connecting curriculum and technology* (1st Ed.). OR: International Society for Technology in Education.

Jacobsen, D. M. (2001). *Building bridges: Technology integration, engaged student learning, and new approaches to professional development*. Paper presented at the Annual Meeting of American Educational Research Association, Seattle, WA.

Johnson K. E. (1996). The vision versus the reality: The tensions of the TESOL practicum. In D. Freeman & J. C. Richards, (Eds.), *Teacher Learning in Language Teaching* (pp. 30-49). Cambridge, Cambridge University Press.

Johnson, K. E., & Golombek, P. R. (2003). Seeing teacher learning. *TESOL Quarterly, 37*(4), 729-737.

Jonassen, D. H., Howland, J., Moore, J., & Marra, R. M. (2003). *Learning to solve problems with technology: A constructivist perspective* (2ⁿᵈ Ed.). NJ: Pearson Education.

Jonassen, D. H., Peck, K.L. & Wilson, B.G. (1999). *Learning with technology: A Constructivist Perspective*. Upper Saddle, NJ: Merrill, Prentice Hall.

Jonassen, D. H., & Rohrer-Murphy, L. (1999). Activity theory as a framework for designing constructive learning envioroments. *Educational Technology Research and Development, 47*(1), 61-79.

Judson, E. (2006). How teachers integrate technology and their beliefs about learning: Is there a connection? *Journal of Technology and Teacher Education, 14*, 581–597.

Jurdak, M. E. (2006). Contrasting perspectives and performance of high school students on problem solving in real world, situated, and school contexts. *Educational Studies in Mathematics, 63*(3), 283-301.

Kagan, D. M. (1990). Ways of evaluating teacher cognition: Inferences concerning the Goldilocks principle. *Review of Educational Research, 60*, 419-469.

Kagan, D. M. (1992). Implication of research on teacher belief. *Educational Psychologist, 27*, 65–90.

Kahveci, A., Gilmer. P. J., & Southerland S. A. (2008). Understanding chemistry professors' use of educational technologies: An activity theoretical approach. *International Journal of Science Education, 30*(3), 325-351.

Lam, Y. (2000). Technophilia vs. technophobia: A preliminary look at why second-language teachers do or do not use technology in their classrooms. *The Canadian Modern Language Review, 56*(3), 389-420.

Lantolf, J. P. (2000). Second language learning as a mediated process. *Language Teach, 33*, 79-96.

Lantolf, J. P., & Genung, P. (2002). "I'd rather switch than fight": An activity-theoretic study of power, success, and failure in a foreign language. In C. Kramasch (Ed.), *Language acquisition and language socialization. Ecological perspectives* (pp. 175-196). London: Continuum.

Lantolf, J. P., & Thorn, S. L. (2005). *Sociocultural theory and the genesis of second language development*. Oxford, UK: Oxford University Press.

Lee, Y. J. (2008). *Factors of Teachers' Tendency toward Innovation with Information Technology and the Acceptance Level of Integrating Information Technology into Teaching*. Unpublished master's thesis study. National Chiayi University. Kaohsiung, Taiwan.

Leont'ev, A. N. (1978). *Activity, consciousness and personality*. Englewood Cliffs: Prentice Hall.

Leont'ev, A. N. (1981). The problem of activity in psychology. In J. V. Wertsch (Ed.), *The concept of activity in Soviet Psychology* (pp. 37-71). Armonk, NY: Sharpe.

Levin, T., & Wadmany, R. (2006). Teacher's beliefs and practices in technology-based classrooms: A developmental view. *Journal of Research on Technology in Education, 39*, 157–181.

Levin, T., & Wadmany, R. (2008). Teachers' views on factors affecting effective integration of information technology in the classroom: Developmental scenery. *Journal of Technology and Teacher Education, 16*(2), 233-363.

Lin, S. Y. (2007). IEARN as project-based telecommunication activities for EFL learning: A case study on two junior high classrooms. Unpublished master's thesis study. National Chengchi University. Taipei, Taiwan.

Littlewood, W. (2000). Do Asian students really want to listen and obey? *ELT Journal, 54*(1), 31-36.

Lortie, D. C. (1975). *Schoolteacher: A sociological study*: Chicago: University of Chicago Press.

Lumpe, A. T., & Chambers, E. (2001). Assessing teachers' context beliefs about technology use. *Journal of Research on Technology in Education, 34*(1), 93–107.

Martin, D. (2008). A new paradigm to inform inter-professional learning for integrating speech and language provision into secondary schools: a socio-cultural activity theory approach. *Child Language Teaching and Therapy, 24*(2), 173-192.

McGrail, E. (2005). Teachers, technology, and change: English teachers' perspectives. *Journal of Technology and Teacher Education, 13*(1), 5-24.

Ministry of Education. (1998). *General Guidelines of Grade 1-9 Curriculum of Elementary and Junior High School Education*. Taipei: MOE.

Ministry of Education. (2001). *Blueprint of information education in elementary and junior high schools*. Retrieved July 10, 2009, from http://masterplan. educities.edu.tw/conference/index1.shtml

Mondada L., & Doehler, S. P. (2004). Second language acquisition as situated practice: Task accomplishment in the French second language classroom. *The Modern Language Journal, 88*(4), 501-518.

Nelson, C. P., & Kim, M. K. (2001). Contradictions, appropriation, and transformation: An activity theory approach to L2 writing and classroom practices. *Texas Papers in Foreign Language Education, 6*(1), 37-62.

Nespor, J. (1987). The role of beliefs in the practice of teaching. *Journal of Curriculum Studies, 19*, 317–328.

Newby, T. J., Stepich, D. A., Lehman, J. D., & Russell, J. D. (2006). *Educational technology for teaching and learning* (3rd Ed.). NJ: Pearson Education.

Newell, G. E. Gingrich, R. S., & Johnson, A. B. (2001). Considering the contexts for appropriating theoretical and practical tools for teaching middle and secondary English. *Research in the Teaching of English, 35*, 302-343.

Norton, S. J., McRobbie, C., & Ginns, I. S. (2007). Problem solving in a middle

school robotics design classroom. *Research in Science Education, 37*(3), 261-277.

Pajares, M. F. (1992). Teachers' beliefs and educational research: Cleaning up a messy construct. *Review of Educational Research, 62*(3), 307-332.

Park, S. H., & Ertmer, P. A. (2007). Impact of problem-based learning (PBL) on teachers' beliefs regarding technology use. *Journal of Research on Technology in Education, 40*(2), 247–267.

Patton, M.Q. (2001). *Qualitative research and evaluation methods*. Thousand Oaks, CA: Sage Publications.

Prabhu, N. (1987). *Second Language Pedagogy*. Oxford: Oxford University Press.

Reigeluth, C. M. (1999). What is instructional-design theory and how is it changing? In C. M. Reigeluth (Ed.), *Instructional-design theories and models: Vol. II. A new paradigm of instructional theory* (pp. 5-29). NJ: Erlbaum.

Roblyer, M. D., & Edwards, J. (2000). *Integrating educational technology into teaching* (2nd Ed.). NJ: Merrill.

Rogoff, B. (1990). *Apprenticeship in thinking: Cognitive development in social context*. Oxford: Oxford University Press.

Sandholtz J., Ringstaff, C., & Dwyer, D. (1997). *Teaching with technology: Creating student-centered classrooms*. New York: Teachers College Press.

Saye, J.W. (1998). Technology in the classroom: the role of dispositions in teacher gatekeeping. *Journal of Curriculum and Supervision, 13*(3), 210-34.

Sprague D., & Dede, C. (1999). If I teach this way, am I doing my job? *Learning and Leading with Technology, 27*(1), 6-9.

Stake, R. E. (1995). *The art of case study research*. Thousand Oaks, CA: Sage Publications.

Storch, M. (2004). Using activity theory to explain differences in patterns of dyadic

interactions in an ESL class. *The Canadian Modern Language Review, 60*(4), 457-480.

Theriot, S., & Tice, K. C. (2009). Teachers' knowledge and developmental change: Untangling beliefs and practices. *Literacy Research and Instruction, 48*, 68-75.

Valencia, S. W., Martin, S. D., Place, N. A., & Grossman, P. (2009). Complex interactions in student teaching: lost opportunities for learning. *Journal of Teacher Education, 60*(3), 304-322.

Vygotksy, L. S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.

Vygotsky, L. S. (1987) *Thinking and speech*. New York: Plenum.

Wang, C. M. (2004). *A study on information technology infused instructional innovation behavior and the influencing factors for Taipei municipal vocational high school teachers.* Unpublished master's thesis study. National Taipei University of Technology. Taipei, Taiwan.

Wang, L. (2005). The advantages of using technology in second language education. *T H E Journal, 32*(10), 38-42. Retrieved October 30, 2009, from the Academic Search Premier Website.

Wertsch, J. V. (1998). Mind As Actions. NY: Oxford University Press.

Windschitl, M., & Sahl, K. (2002). Tracing teachers' use of technology in a laptop computer school: The interplay of teacher beliefs, social dynamics, and institutional culture. *American Educational Research Journal, 39*, 165–205.

Yin, R. K. (2003). *Case study research: Design and methods*. Thousand Oaks, CA: Sage Publications.

Zeungler, J., & Miller, E. R. (2006). Cognitive and sociocultural perspectives: Two parallel SLA worlds? *TESOL Quarterly, 40*(1), 35-58.

Zhao, Y., & Cziko, G. A. (2001). Teacher adoption of technology: A perceptual control theory perspective. *Journal of Technology and Teacher Education, 9*, 5–30

Zhao, Y. (2007). Social studies teachers' perspectives of technology integration. *Journal of Technology and Teacher Education, 15*(3), 311-333.

Zhong, Y. X., & Shen, H. Z. (2002). Where is the technology-induced pedagogy? Snapshots from two multimedia EFL classrooms. *British Journal of Educational Technology, 33*(1), 39-52.
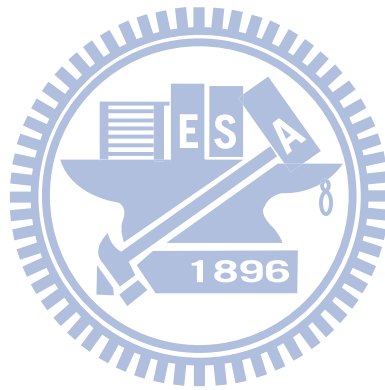
APPENDICES

Appendix A
Consent Form for Teachers

老師您好！

　　我是林郁婷，是國立交通大學英語教學研究所的研究生，目前正在進行碩士論文的研究。我的研究主要探討中學英語教師利用電腦輔助語言教學(Computer-Assisted Language Learning)課堂上實際的使用狀況，以及教師針對此電腦輔助英語教學所抱持的態度與信念。

　　本研究主要的進行方式包括以下三點：(1)課室觀察，基本上我將會在您於課堂中使用電腦等資訊科技來輔助英語教學時，觀察您課前的教學準備及上課的狀況，(2)至少三次的訪談，訪談的內容將會錄音及騰寫，每次訪談以不超過 1 小時為原則，(3)將須要收集您在運用電腦輔助語言教學上的一些教學相關資料(例如教案、網站資源、教學檔案等)。確切的觀察與訪談次數將視您個人實際的教學情況再做調整。

　　參與這項研究並沒有任何風險，若是選擇不參與對於您也不會有任何的影響。所有於研究中取得的資料也將會予以保密，除了我與指導教授外將不會有第三者知悉，您一切個人資料也將採匿名方式。研究資料將僅用於學術用途，絕對不會非法散佈；而這些資料在研究分析完成後也會立即銷毀。研究期間若是您感覺到不愉快或是無意願繼續參與，您亦可以隨時退出，而一切相關的資料也將退還給您亦或是銷毀。

　　如果您對於本研究或是研究過程中有任何疑問與建議，您可透過電話 0963168126 或電子郵件信箱 dantee12@yahoo.com.tw 與我連絡。或者您也可以與我的指導教授張靜芬老師連繫，電話為(03)7512121#52715，電子郵件信箱為 cfchang@mail.nctu.edu.tw。

　　我在此誠摯地邀請您參與本項研究計劃，而您的參與將能夠幫助學校單位及英語教學工作者更加進一步瞭解關於電腦資訊科技融入英語教學的現況。為了感謝您的參與，以及回饋彌補在本研究過程中對您有可能造成的任何不便，我將提供一個精美小禮品以示感激。

　　如果您已閱讀以上說明，**並願意**參與這項研究計劃，請您在下方參與者的欄位簽上您的全名，並有一份同意書交由您參考存查。在此先感謝您的參與與合作！

參與者簽名 _____   _____ **(日期)**

研究者簽名 _____   _____ **(日期)**

Appendix B
Consent Form for Students

同學您好！

　　我是林郁婷，是國立交通大學英語教學研究所的研究生，目前正在進行碩士論文的研究。我的研究主要探討中學英語教師利用電腦輔助語言教學(Computer-Assisted Language Learning)課堂上實際的使用狀況，以及教師針對此電腦輔助英語教學所抱持的態度與信念。

　　本研究除了將針對老師進行訪談外，為了能夠求得資料的客觀性與全面性以求得更全盤的理解，我亦將會須要針對學生進行訪談，因此我在此誠摯地邀請您成為我研究參與的對象之一。訪談內容大致上會涵蓋您對於英語教師實施資訊融入於教學的看法、意見與期望，以不超過 30 分鐘為原則，訪談的過程亦將會錄音及騰寫。

　　參與這項研究並沒有任何風險，若是選擇不參與對於您也不會有任何的影響。所有於研究中取得的資料也將會予以保密，除了我與指導教授外將不會有第三者知悉，您一切個人資料也將採匿名方式。研究資料將僅用於學術用途，絕對不會非法散佈；而這些資料在研究分析完成後也會立即銷毀。研究期間若是您感覺到不愉快或是無意願繼續參與，您亦可以隨時退出，而一切相關的資料也將退還給您亦或是銷毀。

　　如果您對於本研究或是研究過程中有任何疑問與建議，您可透過電話 0963168126 或電子郵件信箱 dantee12@yahoo.com.tw 與我連絡。或者您也可以與我的指導教授張靜芬老師連繫，電話為(03)7512121#52715，電子郵件信箱為 cfchang@mail.nctu.edu.tw。

　　我在此誠摯地邀請您參與本項研究計劃，而您的參與將能夠幫助學校單位及英語教學工作者更加進一步瞭解關於電腦資訊科技融入英語教學的現況。為了感謝您的參與，以及回饋彌補在本研究過程中對您有可能造成的任何不便，我將提供一個精美小禮品以示感激。

　　如果您已閱讀以上說明，並**願意**參與這項研究計劃，請您在下方參與者的欄位簽上您的全名，並有一份同意書交由您參考存查。在此先感謝您的參與與合作！

參與者簽名 _____　　_____ **(日期)**

研究者簽名 _____　　_____ **(日期)**

Appendix C
Consent Form for School Administrators

老師您好！

　　我是林郁婷，是國立交通大學英語教學研究所的研究生，目前正在進行碩士論文的研究。我的研究主要探討中學英語教師利用電腦輔助語言教學(Computer-Assisted Language Learning)課堂上實際的使用狀況，以及教師針對此電腦輔助英語教學所抱持的態度與信念。

　　本研究除了將針對老師進行訪談外，為了能夠達到資料的客觀性、全面性以求得更全盤的理解，我亦將會須要與貴校的行政人員進行訪談，因此我在此誠摯地邀請您成為我研究參與的對象之一。訪談內容大致上會針對學校內所提供的相關資訊設備、在資訊融入教學上學校所給予的支持、以及學校教師大致在資訊融入教學上的狀況。訪談以不超過 30 分鐘為原則，其過程亦將會錄音及謄寫。

　　參與這項研究並沒有任何風險，若是選擇不參與對於您也不會有任何的影響。所有於研究中取得的資料也將會予以保密，除了我與指導教授外將不會有第三者知悉，您一切個人資料也將採匿名方式。研究資料將僅用於學術用途，絕對不會非法散佈；而這些資料在研究分析完成後也會立即銷毀。研究期間若是您感覺到不愉快或是無意願繼續參與，您亦可以隨時退出，而一切相關的資料也將退還給您亦或是銷毀。

　　如果您對於本研究或是研究過程中有任何疑問與建議，您可透過電話0963168126 或電子郵件信箱 dantee12@yahoo.com.tw 與我連絡。或者您也可以與我的指導教授張靜芬老師連繫，電話為(03)7512121#52715，電子郵件信箱為 cfchang@mail.nctu.edu.tw。

　　我在此誠摯地邀請您參與本項研究計劃，而您的參與將能夠幫助學校單位及英語教學工作者更加進一步瞭解關於電腦資訊科技融入英語教學的現況。為了感謝您的參與，以及回饋彌補在本研究過程中對您有可能造成的任何不便，我將提供一個精美小禮品以示感激。

　　如果您已閱讀以上說明，並**願意**參與這項研究計劃，請您在下方參與者的欄位簽上您的全名，並有一份同意書交由您參考存查。在此先感謝您的參與與合作！

參與者簽名 _____   _____ **(日期)**

研究者簽名 _____   _____ **(日期)**

Appendix D
Interview Questions for Interview #1

■ **基本資料背景方面**
1. 請問您的年紀約為？（20-30 歲；30-40 歲；40-50 歲；50 歲以上）
2. 請問您的最高學歷及畢業系所是？
3. 請問老師您任教於英語教學的年資是幾年？可否簡述一下您的教學經驗？
4. 請問您是否曾經參加過電腦資訊科技融入教學的相關研習？
5. 請問您從開始使用電腦科技於教學相關目的的時間約有多久了？
6. 每星期大約花多少時間在使用電腦或 Internet 網際網路於教學相關的目的上？

■ **關於教學以及資訊融入教學的信念(beliefs)、態度(attitudes)方面**
1. 可否請您簡述一下您自己對於「資訊科技融入教學」的認知跟定義是什麼？
2. 請問您對於資訊融入教學的態度是？
3. 可否請您簡述一下您對於英語教學以及學生學習的理念是什麼？
4. 請問您自認是怎麼樣的一位英文老師呢？
5. 以英語教學而言，請問您個人認為使用資訊科技在輔助您的英語教學上的優點及缺點為何呢？
6. 請問您認為針對資訊科技融入教學或是融入英語教學，教師本身所須具備的資訊能力為何？
7. 請問您覺得藉由資訊科技來輔助您的英語教學與一般較為傳統的英語教學方式，有何差異？

■ **關於資訊融入英語教學的實施方面**
1. 您（不管是之前或是現在）若是有在實施資訊融入英語教學的部份，大部份會應用到哪些硬體軟體設備或是資源呢？又是如何使用於您的英語教學上？
2. 承上，當您使用這些硬軟體設備或是資源時，您是應用於英語教學上的那個層面或是為了什麼理由或目的而使用？對您的英語教學有哪些幫助？
3. 您想要使用資訊科技來融入您的英語教學時，會考慮到哪些因素／什麼因素會影響到您是否採用資訊科技於教學上的意願？有沒有哪個（些）因素對您而言是最為重要或是最具影響力的？
4. 以英語教學而言，在您過去使用資訊融入英語教學時，曾經遭遇到的困難有哪些？這些困難有被克服嗎？如果有，又是如何克服呢？
5. 若是以接下來的這學期而言，您覺得您若是想要使用資訊融入英語教學，您有可能會遇到哪些困難呢？這些困難有可能被克服嗎？能夠如何克服呢？

Appendix E
Interview Questions for Interview #2

1. 請問平均一課大約需要花多久時間才能上完？
2. 請問您如何決定今天的進度為何？
3. 請問最近這一課是上什麼單元？上課模式是？
4. 請問老師為何要使用某些特定教學輔助工具？通常是在什麼樣的情況下會使用？
5. 請問老師為何不使用某些特定教學輔助工具？
6. 請問您如何決定要不要做特定的補充？那些補充的來源是從哪裡來的，又通常會以什麼方式給學生呢？
7. 請問您如何分配節數於要使用的教材上？

Appendix F
Interview Questions for Interview #3

1. 可否簡單敘述一下這學期上課大概的教學模式？
2. 請問這學期在課堂有運用任何資訊科技融入的部份嗎？不管是在課前、課中或課後？
3. 請問老師您教學是希望能夠達成什麼樣的目標？那資訊科技可以怎麼樣去幫助這樣子教學理念的實行？
4. 目前教育部在提倡資訊融入於各科教學，老師覺得高中有被這樣的政策引導或影響嗎？對於這樣子的政策有沒有什麼看法？
5. 升學壓力有明顯影響到目前使用資訊融入與否跟程度嗎？
6. 請問學校方面在對於資訊融入教學方面的態度及支持程度上是？
7. 學生在面對資訊融入教學在課堂上的態度有可能會是？
8. 家長那方面對於資訊融入教學有可能的觀感會是？
9. 之前提到面對資訊融入所會遇到的問題或是阻礙，有沒有辦法克服呢？有試著去克服或是反抗過嗎？或是選擇妥協呢？

Appendix G
Interview Questions for Students

1. 對於英語還有英語課的感覺是什麼？
2. 目前想要從英文老師身上得到什麼(學習的目標)？
3. 對於老師用電腦科技來輔助教學(依據各個老師不同的實際使用情況而言)有什麼樣的心得意見或是看法？有沒有覺得有什麼優缺點？會希望老師多用一些嗎？
4. 你本身有補習嗎？有的話補習班的進度跟學校的進度比起來是怎麼樣？
5. 假設老師今天因為要把資訊融入於英文課程內，而可能必須捨棄掉一些課本的東西或有一課不要上，你覺得如何呢？
6. 承上，會想要趕快把課上完比較重要，還是覺得其實可以犧牲掉一些時間來用電腦科技做些比較跟傳統上課不一樣的事呢？

Interview Questions for School Administrators

● 教學組長訪談問題
1. 請問學校大致上老師有沒有在做資訊融入教學？程度大概是如何呢？
2. 請問學校最主要的教學目標是？
3. 請問學校的配課時數問題是怎麼安排跟決定的呢？
4. 請問學校對於升學這塊的注重程度是？對於老師教些什麼或是怎麼帶班怎麼教會不會有去介入的狀況？

● 資訊組長訪談問題
1. 請問學校現有的電腦教室是幾間？視聽教室呢？兩間各有什麼樣的配備？在借用上會不會很困難？有沒有規定是哪個科目的老師才能夠使用？大部份又是哪些老師在使用呢？
2. 請問學校配備於一般教室內現有的設備為哪些？
3. 學校是怎麼樣去決定要不要購買某些電腦相關設備/配備？有什麼樣的考慮因素？
4. 對於教育部資訊融入教學的政策,學校有做什麼樣的宣導鼓勵或是支持嗎？學校對於資訊融入教學的定義是到什麼程度？
5. 學校有安排什麼樣的資訊相關研習給老師參加嗎？
6. 請問學校大致上老師有沒有在做資訊融入教學？程度大概是如何呢？