ABSTRACT

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The simultaneous impact of globalization, the spread of English and technological development have transformed our learning and teaching English as a lingua franca in an unprecedented way (Warschauer, 2004). As a result, both English and ICT have become essential literacy skills for a growing number of non-native speakers of English to ensure full participation in the information society.

The study investigated 591 Chinese university students in an inland city in relation to (a) their technology ownership, usage patterns, and levels of perceived ICT skills; (b) their motivational orientations to learn English; (c) their perceptions of English and technology; and (d) their perceived benefits of and barriers to using ICT in learning English. Findings from the questionnaire, which had both open-ended and close-ended questions, unveiled not only the students' aspirations toward acquiring English and ICT skills but also problems and challenges they have faced in the age of globalization. In addition, the current study revealed that the economic and

sociocultural contexts in which the students found themselves greatly influenced their language learning experience through technology.

Discussing the results of the current study, I echoed recent calls for paradigm shift in the area of (a) English as International Language (EIL), (b) EIL students' motivational orientations, and (c) the digital divide. By highlighting the vital importance of nurturing human and social resources, I suggested creating supportive communities of practice for EIL teachers in a technology-enhanced language classroom. I also provided pedagogical implications with regard to developing multiple literacies.

THE USE OF ICT IN LEARNING ENGLISH AS AN INTERNATIONAL LANGUAGE

By

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Introduction

Background

Unprecedented is the very word one may come across most often in reviewing numerous news articles, research papers, and many kinds of documents discussing globalization, information and communication technology (ICT), English as an International Language (EIL), and the new generation of students. Some of the quotations including the adjective, *unprecedented*, are:

> The arrival of a global language, English, has altered the balance of linguistic power in *unprecedented* way, and generated a whole new set of attitudes about language and languages. (Crystal, 2004, p. 123)

> (The Net Generation) has *unprecedented* mobility. They are shrinking the planet in ways their parents could never imagine. Unlike television which was done to them, they are the actors in the digital world. (Tapscott, 1998, p. 3)

> (The new generation) possesses *unprecedented* levels of skill with information technology; they think about and use technology very differently from earlier student cohorts. (Kvavik, 2005, p. 1)

> The Web places an *unprecedented* amount of information at the hands of individual users all around the globe. (Warschauer, 1999, p. 7)

> Information technology infuses all aspects of modern life, and the growth of digital information continues at an *unprecedented* rate. (Perry, 2004, p. 28)

Indeed, the way in which the information technology revolution has reshaped "the social landscape of human life" (Castells, 2000, p. 1) is unparalleled in history. The social, cultural, historical, political, and economic transformation, in turn, affects our daily lives at a remarkable pace. As Giddens (2000) put it,

> We are the first generation in this [global cosmopolitan] society, whose contours we can as yet only dimly see. It is shaking up our existing ways of life, no matter where we happen to be…It is emerging in an anarchic, haphazard, fashion, carried along by a mixture of influences. (p. 37)

More importantly, the simultaneous impact of those changes on the global status of English language and language education brings us new opportunities, challenges, and besides, a feeling of risk and uncertainty to those who find themselves in the field of Teaching English to Speakers of Other Languages (TESOL). It is widely observed that many people in different parts of the world resisting the global dominance of the US power have a reluctance to learn English as a second or foreign language (Phillipson, 1992; Phillipson & Skutnabb-Kangas, 1996). At the same time, however, a growing number of non-native speakers of English try to achieve their competitiveness in the global market, and make their voices heard in the internationalized world by acquiring English as a lingua franca, while still keeping their mother tongue for unity ("English", 2001; Rohter, 2004; Sifakis & Sougari, 2003). For example, a Chilean government official said in an interview with the *New York Times*, "The quality of the English that will eventually be spoken here may not rival Shakespeare's…We'll speak English Chilean-style, because the important thing is to understand English and to be able to use it as a tool in our favor" (Rohter, 2004). It is also the rise of the information-based network society that makes those who are

learning English as a foreign language come to see English as a tool that enhances their ability to take advantage of contemporary information and communication technology (Warschauer, 2005). In short, both English and ICT, especially to non-native speakers of English, have become the essential literacy skills of our time needed to satisfy the constant human desire to communicate with others, to improve the conditions of work, and to promote full participation in the globalized society (Murray, 2001; Warschauer, 2000; Wenger, 1998).

Therefore, it is timely – and even urgent – for the language learning field to look directly at those issues discussed in relation to use of ICT. The study described below investigated the overall picture of ICT use and skills among Chinese university students learning EIL in an inland city. The study included technology not just for language learning but also for general purposes, since the degree and type of use are likely to differ for various purposes. Also, the current study attempted to unveil what acquiring fluency in English and technology meant to the students, and how the sociocultural contexts in which they find themselves influenced the process of language learning through technology.

Statement of the Problem

> "Do you think me a learned, well-read man?"
> "Certainly," replied Zi-gong. "Aren't you?"
> "Not at all," said Confucius. "I have simply grasped one thread which links up the rest."
> Sima Quian, *Confucius* (as cited in Castells, 2000, p. 1)

It was more than three decades ago when Marshall McLuhan (1962) first introduced the term, "global village", in order to make sense of the impact of

information and communication technologies on our daily lives. Since then, we have witnessed how a technological revolution, bound up with the rise of information-based society and changing economic climate, influences both public and private lives of individuals in the age of globalization. Moreover, all these changes are marching with the spread of English and the Internet at an eye-opening pace, affecting almost all four corners of the world (Giddens, 2000; Crystal, 2003; Warschauer, 2000). What living in the 21st century looks like is best described by McLuhan's 20th century quote, "Today each of us lives several hundred years in a decade" (McLuhan Associates, 1986, n.p.).

The widespread nature of ICTs and the pervasive belief in the promise of technology have led to ubiquitous computing environments in the 21st century, at least in developed countries and to an increasing extent in developing countries, especially in urban areas. These trends have dramatically reshaped educational settings in general. In addition, they, interwoven with other social, cultural, political and economic changes, have significantly affected the skills that learners use to construct knowledge (Dede, 2005).

In the field of language learning, the computer-assisted language learning (CALL) research foci have typically been on enhancing input through technology, using technology to affect proficiency and achievement, providing feedback through technology, and integrating technologies (see discussion in Zhao, 2005). However, the role of individuals in the language learning process has not been sufficiently studied in relation to technology use in language learning (Liu, Moore, Graham & Lee, 2003).

Moreover, it is acknowledged that sociocultural factors influence other learner variables in language learning in general (Oxford, 2002) and, ipso facto, in language learning through technology. Warschauer (2005) similarly pointed out that we can understand CALL completely only if we look at it with its historical, social and cultural contexts. However, CALL research has not successfully responded to this critical issue, as claimed by Egbert (2005); "(CALL) happens at different times and in different economic, cultural, political, social and linguistics realms that embody different understandings, goals, and standards. CALL research currently does not address these differences in context well" (p. 4). In reality, CALL research has not paid sufficient attention to economically less- or underdeveloped contexts where students are still highly motivated to acquire English and ICT skills to improve their social and economic conditions. In particular, studies conducted in mainland China have rarely looked at students from the country's northwestern areas, where technological and educational resources are limited, compared to major cities in the coastal regions.

This means, bluntly speaking, that CALL is not in the center of the "critical turn" or application of critical theory that dominates much of applied linguistics these days (see discussion in Norton & Toohey, 2004). This essentially puts CALL out of the mainstream at a time when CALL must most assuredly place itself at the center. Any effort made to understand the importance of using new technologies in language learning and teaching would not be fruitful without ripe discussion on today's economies and societies.

In addition, despite the high demand for integrating ICT into teaching English

these days, its adoption seems still to be going slowly. Of various reasons that hinder the effective use of technology in teaching and learning, one notable reason is insufficient empirical research evidence about our students' competencies in ICT, which makes it difficult for teachers to know what students can actually do with new technologies (Kaminski, Seel, & Cullen, 2003). Students are only able to benefit from new technologies planned and used appropriately as "a part of coherent education approach" (Commission on Behavioral and Social Sciences and Education, 2000, p. 216). Thus, Kvavik and Caruso (2005) exhort investigators to identify student fluency in both technology and information, given that "technology skills or literacy are a necessary precursor to information literacy, and that the latter cannot be achieved without the former" (Brandt, 2001, as cited in Kvavik & Caruso, p. 43). Given that published CALL research is still somewhat limited to desktop computers, Egbert (2005) also urges researchers to expand the scope of technologies to include "any forms of electronic, chip-driven technology and the software that makes it run" (p. 4). This would include personal digital assistants (PDAs), cell phones, laptops, digital cameras, scanners, printers, computerized piano keyboards and related software, according to Egbert (2005), who asserts that these technologies provide "language, culture, and other content, both explicit and implicit, through a variety of modes including visual, oral, textual, and graphical" (p. 4).

Purposes of Research

The general purpose of the study was to explore the use of ICT in learning EIL among Chinese university students in an inland city. More specifically, the current study aimed to illuminate (a) students' technology ownership, usage patterns,

and levels of ICT skills; (b) the relationships among learner demographic characteristics (e.g., gender, age, major nationality) and ICT use and skills; (c) their reason(s) to study English, (d) their concepts of computers, the Internet, English and learning English; and (e) sociocultural contextual information as to their learning ICT and English.

Theoretical Framework

The current study adopts the concept of "Multiliteracies" (New London Group, 1996) as the theoretical underpinning for guiding and informing the whole procedure of the research. The main idea is to design students' social future through ever-changing multiple literacies and technology, which perfectly fits into the current study. It also emphasizes taking on a new identity and bridging our old identities to the new one by the process of learning (Gee, 2003).

Multiliteracies

The term, "Multiliteracies" coined by New London Group (1996)[1], addresses two major changes in the concept of language use and literacy of our time. The first change is social, cultural and linguistic diversity, and the second change is the emergence of new information and communication technologies. These two changes increasingly influence the pedagogy of English as a foreign language. The first change, diversity, challenges us to deal with differences in our local and globally

[1] In September 1994, a group of professionals gathered in New London, New Hampshire, U.S.A. to discuss the future of literacy teaching that can respond to the changing social conditions. Those educators and researchers include: Courtney Cazden, Bill Cope, Norman Fairclough, James Paul Gee, Mary Kalantzis, Gunther Kress, Joseph Lo Bianco, Allan Luke, Carmen Luke, Sarah Michaels, and Martin Nakata. To address the ideas developed during the meeting, they published an article, "A pedagogy of multiliteracies: designing social futures", in the Spring 1996 issue of the *Harvard Educational Review*.

interconnected communities. For example, linguistic diversity makes us negotiate two different situations as to English: English as a global language and World Englishes. Another example is, while globalization makes the world more connected than ever, regionalization and localization (e.g., European Union, Asia-Pacific Economic Cooperation) are under way as well. The second change, emergence of new information and communication technologies, is radically altering our way of making meaning. Meaning is made in interactive, multimodal ways, which requires today's learners to acquire different sets of literacies such as digital literacy, ICT literacy, visual literacy, information literacy, in addition to traditional print literacy. Therefore, the New London group argues that our old pedagogy of a single standard version of English is not valid anymore. Instead, it is time for us to come up with "an open ended and flexible functional grammar which assists language learners to describe language differences (cultural, subcultural, regional/national, technical, context specific, etc.) and the multimodal channels of meaning now so important to communication" (Cope & Kalantzis, 1997, para. 5). In that process, both language learners and teachers should be active participants sharing responsibility of designing their future (Cope & Kalantzis, 2000).

In summary, the concept of "multiliteracies" will be used to expand the view of language learning in the 21st century, embracing the multiple linguistic and cultural differences and the use of computer-mediated technology. Furthermore, it is hoped that the findings of this study can be served as an indicator of "multiliteracies" in TESOL and second language education.

Research Questions

This study aimed to answer eight major questions below:

Question 1: What kinds of information and communication technologies (ICT) do the participants in this study own and have access to?

Question 2: How do they use information technologies for general purposes and for language learning?

Question 3: How skilled are the students in using ICT?

Question 4: How do learner variables (e.g., gender, class and major) relate to their information technology use and skills?

Question 5: What are their reason(s) to learn English?

Question 6: How do they perceive English, computers, the Internet, and learning English?

Question 7: What are their perceived benefits of using ICT in learning English?

Question 8: What are their perceived barriers to using ICT in learning English?

Significance of the Study

Before getting down to a full-blown discussion about the significance of this study, it is worth addressing Egbert's (2005) claim about what Computer-Assisted Language Learning (CALL) research should entail:

> When we talk about CALL research, then we are talking about studies that take an analytic approach by looking at one or more variables (e.g., learners, language, context, tools, tasks/activities and peers and teachers) in any number of ways or studies that look at the system of which these variables

> are part, at their interactions and complexities and their effects on one other. (p. 5)

In this regard, it is reasonable to say that the current study perfectly fits into CALL research in that it looked at learners, contexts, language, and the tools provided as a whole picture. More precisely, this study unfolded three levels of contextual factors affecting the process of learning EIL: (a) global situations, (b) regional and/or local situations, and (c) ICT as a set of learning environments. It is also worth noting that learners would be the center of discussion. The current study would be significant in the following reasons:

Totally new context

Given that little or no research in the field of TESOL has investigated the use of ICT in learning English looking at Chinese university students in an economically less developed region, this study demystified how the sociocultural and economic contexts influenced their use of ICT in learning EIL and what language learning through technology meant to them living in the information society. It was hoped that the results of the current study would provide researchers and educators with valuable implications, in relation to teaching and learning EIL through technology.

Use of new questionnaire

This was the first study that employed the Information and Communication Technology Use and Skills (ICTUS) for learning English (Jung, 2006, see Appendix A), the modified version of the Student Information Technology Use and Skills in Higher Education questionnaire developed by EDUCAUSE Center for Advanced Research

(ECAR, 2005). Considering meaningful findings from the current study, it is desirable to replicate this research in different countries, especially where students learn EIL through technology.

Use of metaphors as a research tool

Employing four open-ended questions that asked for the metaphors of computers, the Internet, English and learning English provided valuable information with regard to how Chinese university students in an inland city perceived EIL and ICT.

In the field of second/foreign language education, a number of studies have proved that using metaphors is a powerful research tool to explore: (a) how learners perceive their language teachers (Oxford, 2001; Oxford, Tomlinson, Barcelos, Harrington, Lavine, Saleh, et al., 1998), (b) how learners construct themselves (Ellis, 2001), and (c) how researchers craft theoretical frameworks, research questions, methodological approaches, and interpretations (Meskill, 2005). As Johnson (as cited in Meskill, 2005) comments, "(through metaphor), our understanding is our bodily, cultural, linguistic, historical situatedness in and toward our world" (p. 27), the metaphors held by the students in this study will "underpin and channel a great deal of our thinking" (Meskill, 2005, p. 26) about their concepts of and attitudes toward ICT and the English language.

Definitions of Key Terms

Computer-Assisted Language Learning (CALL): The search for and study of applications of the computer in language teaching and learning (Levy, 1997, p. 1).

Diglossia: Charles Ferguson (1959) introduced this term, saying "a *diglossic* situation exists in a society when it has two distinct codes which show clear functional separation; that is, one code is employed in one set of circumstances and the other in an entirely different set" (p. 87).

Digital Divide: The term is used to address the gap between those with regular, effective access to digital technologies and those without (Dickard & Schneider, 2005).

English as a Foreign Language (EFL): According to Oxford (2001), a foreign language is "a language studied in an environment where it is not the primary vehicle for daily interaction and where input in that language is restricted" (p. 359).

English as an International Language (EIL): McKay (2002) defines, "International English is used by native speakers of English and bilingual users of English for cross-cultural communication. International English can be used both in a local sense between speakers of diverse cultures and languages within one country and in a global sense between speakers from different countries" (p. 132). This term is often used interchangeably with English as a Lingua Franca (ELF), English as a Global Language (EGL), English as a world language, or English as a medium of intercultural communication (Jenkins, 2006; Phan Le Ha, 2005; Seidlhofer, 2003).

Globalization: The complex set of processes which result from social interaction on a world scale. It is useful to distinguish economic, political, cultural, and technological aspects of globalization, although all four aspects are closely intertwined (Mok & Welch, 2003).

Information and Communication Technology (ICT): It is defined as a range of technological tools and resources used to communicate, and to create, disseminate, store, and manage information (Tinio, 2003). The previously dominant generic term for interactive electronic media, *Information Technology* (or simply *IT*), is now increasingly being replaced by *Information and Communications Technologies* (*ICTs*) (Richards, 2000).

Informationalism (or Information Age): A technological paradigm based on the augmentation of the human capacity of information processing and communication made possible by the revolutions in microelectronics, software, and genetic engineering (Castells, 2004, p. 11).

Network society: The term was coined by Manuel Castells (2000). Network society is structured in its dominant functions and processes around networks and current manifestation is capitalist, but very different from industrial capitalism (Castells, 2000).

Ubiquitous computing: Integrated computation into the environment, rather than having computers as distinct objects (Hui, 2005; Toporkoff, 2005). In ubiquitous computing, many computers serve each person (Weiser, 1991).

Limitations

First, since the participants of this study came from one institution, they cannot be a statistical representation of Chinese university students. The findings of this study clearly demonstrated university students' learning experiences in an inland city of which economic, sociocultural and educational conditions are quite different from major cities in a coastal region such as Beijing and Shanghai. In relation to this fundamental problem, it is worth quoting Boyle's (2001) comments:

> China is vast geographically and it is impossible to generalize about it sensibly; it is not 'a monolithic society, but a complex interlocking web of often contradictory relationships and interests; it is in a process of rapid change' which instantly converts today's commonsense judgments into tomorrow's aberrant anachronisms. (p. 150)

Second, using self-reported questionnaires has its own weakness caused by participant's awareness of their behaviors, tendency for giving socially favorable answers, and ability to recall the past events (Johnson & Christensen, 2004; Johnson & Van de Vijver, 2003). However, it was essential to use a questionnaire to investigate such a large number of students in northwest China overcoming time and distance barriers. Also, the study's results showed highly honest answers, to the point of being painful in some instances.

Third, because of using short-answer open-ended questions, some answers from the students were too telegraphic to figure out the exact meaning.

Fourth, my role as an outsider might have hindered accomplishing a thorough interpretation of the data. However, I checked my analysis with native informants from China throughout the study and tried to do my best to take advantage of my

position as an outsider providing balanced etic perspectives. In addition, my in-depth review of the literature on English language education and ICT in mainland China, presented in Chapter 2, enormously helped me to better understand the students and the context in which this research took place.

Summary of Chapter 1

This chapter delineated an overview of the current study. I have discussed the social, cultural, historical, and economic changes of our time, which has affected our use of ICT and EIL. First, I presented the problem statement and the study purpose, pointing out that CALL research has not paid sufficient attention to the organic relationship between individuals using technology and their society in which technology-enhanced language learning occurs. Then, I introduced the concept of "Multiliteracies" (New London Group, 1996) as the framework of the current study. I also presented what would make this study a significant contribution to the body of knowledge, followed by eight major research questions. Last, after listing definitions of key terms, I described possible limitations of the study.

Chapter 2
Literature Review

> The new electronic interdependence recreates the world in the images of a global village.
> (McLuhan, 1962, p. 31)

The purpose of this chapter is to provide a comprehensive review and synthesis of literature and research related to the theoretical framework, the problems, and the research questions. Rationale for the study undertaken is also addressed. The literature review consists of four sections: (a) English as an International Language (EIL) in the information age, (b) expanded concepts of language and literacy, (c) the use of ICT in education and in language learning and teaching, and (d) history of English language education and its relationship to ICT in China.

English as an International Language in the Age of Globalization

The Spread of English around the World

Globalization and technological development have markedly transformed our ways of learning and teaching English as a lingua franca in the 21st century (Block & Cameron, 2002; Burns & Coffin, 2001; Warschauer, 2000a). New technologies have dramatically increased the possibility of interaction and mobility among people around the globe, overcoming many barriers of time and space. Countries are much more interdependent than ever in human history in terms of politics, business, and academics, uniting themselves to various regional and international organizations (e.g., the European Union, the United Nations, the Organization of Economic

Cooperation and Development, and the Asian Pacific Economic Cooperation) (Crystal, 2003, 2004). As a result, Crystal (2003) noted, "There are *no precedents* in human history for what happens to languages in such circumstances of rapid change. There has never been a time when so many nations were needing to talk to each other so much…And there never has been a more urgent need for a global language" (p. 14). The Economist (1996) predicted even before the wide diffusion of high-speed internet service, "[Electronic communications] have created a need for a global language—and English will fill that slot" (para. 3).

Few would argue against the fact that English has achieved a global status, becoming a means of international communication in the early 21st century (Brutt-Griffler, 2002; Crystal, 2003, 2004; McKay, 2002; Seidlhofer, 2001, 2003; Warschauer, 2000a). According to Crystal (2003), English enjoys a genuinely global status with a special role that is recognized in every country. English is now an official language for 85% of about 12,500 international organizations (Crystal, 2003), the most widely taught as a second and foreign language in the world (Crystal, 2003), the operating standard for technology, science and medicine (Economist, 1996), and a global lingua franca of international banking, economic affairs, trade, advertising global brands, international conferences, international law, science publication, international tourism, tertiary education, Internet communication, entertainment and many other sectors (Graddol, 1997). The British Council's (1995) *English 2000 Project* found that (a) over two-thirds of the world's scientists read in English, (b) three quarters of the world's mail is written in English, (c) 80% of the world's electronically stored information is in English, and (d) of the estimated 40 million

users of the Internet, the majority communicate in English (Graddol, 1997). In addition, as Warschauer (2001) points out, in the 21st century, using "English is not only for simple communication, but rather for the kinds of complex negotiations, collaboration, analysis, critique, and construction of knowledge required by an information economy and society" (p. 56).

As Graddol (1997) suggests in *The Future of English?,* the awareness of factors that ensure the spread of English is crucial in order to fully understand the role English is playing in the information age. What makes a language global is inevitably related to the power of those who speak the language. Just as Latin swept throughout the Roman Empire and elsewhere, backed by the military power of Romans and the religious power of Roman Catholics, the English language established its ruling status first through the colonial expansion of the British Empire in the 18th and 19th centuries. More recently, English has promoted and maintained its dominant status all over the world thanks to the political, economic, and technological power of the United States (Crystal, 2003). In consequence, for the majority of us living in the early 21st century, it does not come as a surprise any longer to read the 19th century Chancellor Otto von Bismarck's statement of the decisive factor in modern history: "The fact that the North Americans speak English" (Economist, 1996, para.1).

The number of non-native English speakers has also increased, backed by the remarkable advances in information technology. Speakers of English as a second and foreign language outnumber first-language speakers of English. According to Crystal (2003), the estimated total of native speakers of English is approximately 400 million in the early 21st century. He also presents some conservative estimates that the

number of people speaking English as a second language is roughly estimated 450 million, and the total of 750 million represents speakers of English as a foreign language. In short, three out of four English users are now non-native speakers (Crystal, 2004). The growing number of non-native speakers of English begs major questions such as: (a) What kind of role will speakers of English as a foreign language play in the future?, (b) What impact will globalization and technological innovation have on language education?, and (c) If the global dominance of English will continue throughout the 21st century, how can speakers of English as a foreign language possibly reap the benefit of using it in a global society?

To answer these questions, one might recall that the worldwide spread of English, backed by the global penetration of the Internet, parallels the process of globalization. Moreover, the fast growth of its linguistic power is closely related to the post-industrial economic order, informationalism (Castells, 2004). The phenomenon indicates that the English language, the global economy and new technologies share a similar path in the process of dissemination, which is characterized as globalization and re-localization, facing "an overriding contradiction between global networks and the struggle for local identity" (Warschauer, 2000, p. 512). It is consistent with Giddens' (2000) assertion about globalization that "not only pulls upwards, but also pushes downwards, creating new pressures for local autonomy" (p. 31). He adds that globalization squeezes sideways as well, creating new economic, cultural and political blocks within and across nations. Similarly, Yano (2001) pointed to the paradoxical nature of globalization,

> Economic globalization provides equal access, opportunities and benefits, but at the same time accelerates the digital divide, the information divide, and the economic divide…As regional economic development accelerates global interdependence, that global interdependence accelerates the digital and other divisions and inequalities rather than building bridges. (p. 119-120)

Converging and Diverging Forces

Both centrifugal and centripetal forces can be found everywhere in recent days (see Crystal, 2004 and Oxford, Massey, & Anand, 2005 for detailed examples related to language and language teaching). As for English as a lingua franca, Burns (2003) argued that it means both "compliance and resistance as speakers, native and non-native, pull in different linguistic directions" (p. 22). The number of people learning English as an international language is rapidly growing throughout the world, more countries have adopted English as an official language, and American culture permeates the world accompanied with the spread of American English. In short, globalization requires mutual intelligibility and common standards (Crystal, 2003; Graddol, 1997; Yano, 2001). At the same time, however, varieties of English are developed in different regions, non-native speakers strive for keeping their local identities, and there is a growing concern about linguistic imperialism that marginalizes indigenous languages around the world (Canagarajah, 1999; Phillipson, 1992). Kubota's (2002) comments on three dimensions of English language education in Japan (i.e., increased ethnic, linguistic, and cultural diversity in the local communities, the prevalence of English, and increased linguistic and cultural nationalism) clearly manifest two different sides of the same coin – the existence of both converging and diverging forces of globalization. Moreover, the center of

gravity has been gradually shifting from speakers of English as a first language to those of English as a second/foreign language (Crystal, 2003; Yano, 2001). Thus, it may well say that all English users, both native- and non-native speakers, should have a right to take a share in the future of English and should be considered as legitimate owners of English language in the 21st century since "language is an immensely democratizing institution" (Crystal, 2004, p. 23).

Furthermore, like the way globalization affects the United States, as it does other countries (Giddens, 2000), the spread of the English language is not particularly of great advantage to monolingual, native speakers of English over all bi- or multi-linguals in the global age. Rather, it is increasingly becoming an opportunity in the disguise of a threat or challenge, especially to those who learn English as an international language. In other words, in the age of global networked society and diglossia (i.e., using English for international communication, and other languages for local, regional and national communication), the ability to speak two or more languages may enable one to have a head start over those who speak only English.

Having said that, it is increasingly important to direct our attention to the centroid shift observed in the field of second/foreign language learning through technology, from *accuracy* to *accuracy plus fluency*, and to *accuracy plus fluency plus agency* (Warschauer, 2000b, 2004). As technology advances from the mainframe computer to the personal computer to the networked, multimedia computer, the paradigm of CALL-based English teaching and principal objectives has changed, accordingly. Each phase of CALL development[2] is reflected in social, economic and

[2] Warschauer (1996) classified the development of CALL into three phases: (a) Behavioristic CALL in the 60s and early 70s, (b) Communicative CALL in the late 70s and 80s, and (c)

technological circumstances in a certain period (see Chapelle, 2001; Levy, 1997; Warschauer, 1996). For example, the current phase, Integrative CALL, views language learning as engaging in new discourse communities and developing social interaction, not merely achieving accuracy and fluency (Warschauer, 2000b). In this paradigm of CALL, increasing agency and a sense of identity by using new technologies is considered a prime objective, in addition to authenticity of the input and authorship of the language learner (Kramsch, A'Ness, & Lam, 2000). That is, appreciating human agency, "the power to take meaningful action and to see the results of our decisions and choices" (Kramsch et al., 2000, p. 97, quoting Murray), in the use of English language and information technologies is of vital importance in the 21st century. It is mainly because "[the pleasure of agency] has to do with the power to construct a representation of reality, a writing of history, and impose reception of it by others" (Kramsch et al., 2000, p. 97).

Warschauer's (2000a) comment is also noteworthy in this regard: "if English is imposing the world on our students, we can enable them, through English, to impose their voices on the world" (p. 530). To this end, understanding the impact of individual learner characteristics, ICT, and sociocultural environments on their language learning process should be the starting point in order to gain power over the grip of driving forces.

Integrative CALL from the 90s and thereafter.

Evolving Concepts of Language and Literacy

Multiple Literacies

The changing global economy and the rapid development of ICT have resulted in the critical need for students to possess new 21st century knowledge and skills (Warschauer, 2000a). For example, the report of *enGauge 21st Century Skills for 21st Century Learners* (2003) proposed four skill clusters, digital-age literacy, inventive thinking, effective communication, and high productivity, which are critically needed to succeed in the 21st century: First, *Digital-Age Literacy* includes: (a) basic scientific, economic and technological literacies; (b) visual and information literacies; and (c) multicultural literacy and global awareness. Second, *Inventive Thinking* is composed of a series of life skills such as (a) adaptability and managing complexity; (b) self-direction; (c) curiosity, creativity and risk taking; and (d) higher-order thinking and sound reasoning. Third, *Effective Communication* consists of (a) teaming, collaboration, and interpersonal skills; (b) personal, social and civic responsibility; and (c) interactive communication. Last, *High Productivity* involves skills that increase one's chance of success in the workforce, such as (a) prioritizing, planning and managing for results; (b) effective use of real-world tools; and (c) ability to produce relevant, high-quality products. The technology revolution in today's information society brings us a new opportunity to get involved in every aspect of life and "raises the bar on the competencies" demanded in the 21st century (North Central Regional Education Laboratory, 2003; Kellner, 2000).

Moreover, the concept of literacy has evolved and dramatically expanded due to rapid social, cultural and technological changes of our time (Crulckshank, 2004; Daley, 2003; Kasper, 2000; Kellner, 2000; Leu, Kinzer, Coire, & Commack,

2004; New Media Consortium, 2005; New London Group, 1996; Warschauer, 2001). In light of this situation, Kellner (2000) claimed that "new technologies and cultural forms require new skills and competencies, and if education is to be relevant to the problems and challenges of contemporary life it must expand the concept of literacy and develop new curricular and pedagogies" (p. 249). In fact, we can no longer afford to view literacy as a set of context-neutral, value-free skills, nor limit literacy to the ability to read and write. Instead, we must become aware that literacies are socially constructed and multifaceted. Thus, the process of becoming literate can be understood as acquiring a variety of skills one needs to fully participate in all aspects of modern society (Kasper, 2000; Kellner, 2000).

In responding to the paradigm shift caused by the rapidly changing world, leading scholars developed new concepts of language and literacy. For example, the New London Group (1996) coined the word, 'multiliteracies', to address two issues related to "textual multiplicity": (a) the expansion of communications channels and mass media, and (b) increasing cultural and linguistic diversity. The members of the group also proposed the four elements that constitute the pedagogy of multiliteracies, which includes:

(1) situated practice (i.e., immersion in meaningful practices in a community of learners and the utilization of authentic discourse)

(2) overt instruction (i.e., the introduction of explicit metalanguages)

(3) critical framing (i.e., critical interpretation of the cross-cultural communication and social contexts), and

(4) transformed practice (i.e., transferring meaning to other contexts)

Pointing out that what learners need to know is changing, they argued that teachers are responsible for creating access to the evolving language of working, public and private lives, and engaging learners in designing their social futures. That is, in their multiliteracies framework based on the concept of 'design', both learners and teachers are active participants in social change (i.e., learners as designers of social futures and teachers as designers of learning processes and environments).

Another example of the expanded concept of literacy comes from the New Media Consortium (2005)'s *Report of the 21st Century Literacy Summit.* It presented six characteristics of 21st century literacy. That is, the 21st century literacy

- is multimodal,
- includes creative fluency as well as interpretive facility,
- means learning a new grammar with its own rules of construction,
- encourages interactive communication,
- implies the ability to use media to evoke emotional responses, and
- has the potential to transform the way we learn.

Electronic Literacies

Aligned with those concepts of multiple literacies above, Warschauer (1999) also suggested considering "electronic literacies", which refer to the reading and writing, and the knowledge, skills, and practices involved with the electronic medium (e.g., information literacy, computer-mediated literacy and multimedia literacy) since we are going through a fourth revolution in human communication following the first three revolutions, language, writing and print. In other words, just as the invention of printing revolutionized reading and writing practices in Renaissance Europe, so are

today's desktop and electronic publishing accelerating changes in our notion of literacy, apparently, in a much faster way. Consequently, reading is now seen as a dynamic process of locating, interpreting, and criticizing information reflecting particular sociocultural contexts, as well as creating knowledge from various resources, not merely an activity of decoding information. Warschauer (1999, 2001) addressed five essential skills in reading the digital screen: (a) finding the information to read in the first place; (b) rapidly evaluating the source, credibility and timeliness of information; (c) making navigational decisions quickly; (d) making decisions as to the information storing; and (e) organizing and retrieving saved information.

The writing skills needed for effective online communication have been changed as well, including (a) integrating texts, graphics, audio-visual material into a multimedia presentation; (b) writing in hypertext genres; (c) using internal and external links to communicate a message well; (d) writing for unknown readers on the Web; and (e) writing in various forms and circumstances of computer-mediated communication (Warschauer, 1999, 2000b). Moreover, the distinction between speech and writing has been blurred in cyberspace, which makes them converged in many ways (e.g., instant messages, email, and chat groups) (see discussion in Crystal, 2004). Thus, given that the concept of literacy always echoes the interests and values that particular societies, cultures, and context emphasize, one can reasonably conclude that 21st century literacy pedagogy should center on developing new forms of multiple literacies, highlighting the role of information and communication technologies (Kellner, 2000; Warschauer, 1999).

Essential Skills in the 21ST Century

Furthermore, it becomes evident that the fast-growing information technology and the global network society have challenged us to reconceptualize international language use and second/foreign language learning and teaching (Cameron, 2002; Crystal, 2001, 2004; Kramsch & Thorne, 2002; Sifakis & Sougari, 2003; Warschauer, 1999, 2001). In relation to the worldwide spread of the Internet, Warschauer (2001) noted the concept of language and literacy has been reframed in two significant ways. First, due to the advent of online communication and the development of new technologies, non-native speakers of English now have greater communicative opportunities than ever in history in "a situation of diglossia on the Internet" (p. 54). Thus, it is increasingly important for students to be able to harness "cultural-linguistic pluralism and media diversity" (p. 156) while using English for global interaction. Secondly, a variety of digital media and the growing diversification of linguistic forms and genres have repainted the landscape of second or foreign language learning and teaching. For example, both asynchronous (e.g., email, discussion boards, mailing lists, and blogs) and synchronous (e.g., instant messaging, videoconferencing, chat rooms, and Multi-User Domains) computer-mediated communications (CMC) enable students to hone their skills in reading, writing, and speaking at the same time, and get actively involved in one-to-one, one-to-many or many-to-many communication environments, free from the constraints of time and space. Besides, the nature of hypertext reading and writing on the Internet requires students to learn (a) various types of electronic literacy in support of print literacy and vice versa, (b) the types of genres and rhetorical structures used in particular media, (c)

cultural and dialectical differences for particular audiences, performing purposeful activities (Warschauer, 1999).

Today's students learning English as a foreign language come to perceive both the English language and information technology as a means to "read the world" (Freire & Macedo, 1987, p. 37) and have an impact on the world by using them, not an end in itself (Warschauer, 2004). Therefore, a new expanded conceptual framework as to what kind of foreign language literacy students should acquire is urgently needed. That framework should also reflect the role of emerging information and communication technologies in social, cultural, political and economic transformation, which in turn has a real impact on changes in the characteristics of foreign language literacy in the 21st century. New wine should be served in a new bottle.

Technology Use in Education and in Language Learning and Teaching

Technology Use in Education

It is increasingly assumed that we are entering a ubiquitous computing era. As might be expected, a ubiquitous network society will define our time in many ways, especially in technologically advanced countries. Astonishingly, it was more than a decade ago when Mark Weiser introduced the vision of ubiquitous computing, roughly the opposite of virtual reality, which forces the computer to live out here in the world with people functioning invisibly in the background, and enables people move around and interact with computers (Hui, 2005; Toporkoff, 2005). Weiser (1991) predicted that computers would disappear into the background and become a part of the natural human environment, just as people use things without thinking after learning

sufficiently[3]. Likewise, Oblinger (2005a, 2005b) indicated that, for the Net Generation, technology itself has disappeared. In fact, when asked about what kind of technology they used, members of the Net Generation were puzzled by what the question really meant. Instead, they came up with what they could do with technology (Oblinger, 2005a). It is quite apparent that today's college students have been surrounded by and permanently connected with information technologies. Moreover, they interact with digital media almost everywhere, and using those media becomes a second nature. In short, they take technology for granted as a central part of their lives (Frand, 2003; Kvavik, 2005).

In the field of education, the *2005 Horizon Report* published by the New Medium Consortium (2005b) presented six technological areas that remarkably will emerge in higher education within the next one to five years. The first category is *Extended Learning,* which refers to augmenting traditional instruction with the support of new communication tools such as blogs, wikis, and instant messaging. *Ubiquitous Wireless* is the second category. The rapid penetration of wireless networks into campuses has allowed students to use more portable devices (e.g., cell phones, MP3 players, and laptops) in their learning, to overcome the constraints of time and space, and to increase sharing information and collaboration. The area of *Intelligent Searching* comes third. Numerous search engines, metacrawlers, online directories and other search agent tools have supported locating, organizing and retrieving information more effectively these days. The fourth area is *Educational Gaming* as a learning tool. With

[3] This idea is pretty much related to the concepts many scholars in different fields of study have already proposed, such as Herb Simon's "compiling", TK Gibson's "visual invariants", Hans-Georg Gadamer's "the horizon", Martin Heidegger's "ready-to-hand", Michael Polanyi's "tacit dimension", and John Seely Brown's "the periphery" (Weiser, 1991).

new sophisticated technologies available, games and simulations are considered to have huge potential for promoting peer-interactions, motivation, critical thinking skills, problem-solving ability. The fifth area is *Social Networks and Knowledge Webs.* Social networking tools and websites promise effective knowledge management, collaboration and cooperative decision-making in classroom settings. In addition, knowledge webs serve as a research tool that lets students hold the responsibility for the given information space. *Context-Aware Computing/Augmented Reality* is the final promising area. Context-Aware computing refers to computing devices and applications that can perceive situations in which the user is located and make decisions accordingly (e.g., a context-aware mobile phone). Augmented Reality is the term for a combination of the virtual and the real viewed by technology devices that show a real object or place with a generated virtual scene (e.g., 3D interactive headgear). Both context-aware computing and augmented reality are promising areas in that they can enable students to expand their learning spaces and experiences, and apply their information and knowledge to the real world.

To help pedagogy keep pace with technological advancement with sound education for a new generation of students, however, has been a daunting challenge to higher education. As Kvavik and Caruso (2005) put it,

> A great unspoken fear in the halls of higher education is that these digital sophisticates will arrive at our institutions to find aging technologies, legacy systems, congested (or bandwidth-shaped) networks, and decidedly unsophisticated purveyors of institutional IT services-or even worse, a technologically unsophisticated faculty who will curb their enthusiasm for cyberspace (p. 5).

Recognizing the problems has led a growing number of educators and researchers to make enthusiastic efforts to investigate the actual conditions of students' information technology use and skills, in the hope that it would shed light on students' growing needs and expectations for the use of technology in their learning environments.

Empirical Evidence of Student ICT Use

The 2004 and 2005 EDUCAUSE Center for Applied Research (ECAR) (Caruso, Kvavik & Morgan, 2004; Kvavik, 2005; Kvavik & Caruso, 2005) showed noteworthy findings with regard to undergraduate students' use of information technology to enhance their learning experience. In 2004, they launched the first study on how students use technology driven by four major questions: (a) What kind of information technologies do students use, and what are their preferences? (b) With what levels of skill are they using these technologies? (c) How does this use contribute to their undergraduate experience? (d) What value does the use of information technology add in terms of learning gains? The researchers employed multiple ways to collect data, which involved literature review, review of other higher education ICT surveys, review and comparison with ECAR Faculty Use of Course Management Systems study, quantitative survey of 4,374 students from 13 institutions in the United States, and qualitative interviews with 132 students and 23 administrators. Of 4,374 students who replied to the survey, 95% were 25 years old or younger, and 95% were full-time students. The majority of them (81%) were white, consisting of 38.8% male and 61.2% female students. As for hardware ownership, almost all students (93.4%) owned a computer, a personal desktop (62.8%) and/or a laptop (46. 8%), and 82% of them had a

cell phone. The rates of personal digital assistant (PDA) and smart phone purchases were not significant. Laptop ownership was higher for freshmen than for seniors, and gradually increasing. With regards to the use of IT applications, it was reported that virtually all of them used computers for writing documents (99.5%), emails (99.5%), surfing the Internet for pleasure (97.2%) and classroom activities (96.4%), which indicates that the students' primary use of computers was for communication and study. It turned out, however, that they did not frequently use computers for specialized applications (e.g., creating webpages, creating video/audio). Similar findings emerged when looking at hours of using ICT. That is, the students spent a great deal of time on entertainment and communication activities while very little time on specialized applications (less than an hour per week). When asked about their level of skills, the students rated themselves as highly skilled in e-mail, instant messenger, word processing and web surfing and least skilled in graphics, creating web pages, and creating and editing audio and video. Generally, the students showed a tendency to overestimate their level of skills, which was confirmed by the qualitative interviews indicating insufficient application knowledge or problem solving skills. Some of the findings were not consistent with their expectations. For example, the students' preference for ICT in the classroom was not as high as had it been expected, showing that they preferred classes with moderate use of ICT, instead. This indicated that the students saw ICT as a tool that could be an asset only if appropriately used, not a panacea. The majority of the students had taken a class using Course Management Systems (CMS) (83%) and had positive experiences using CMS (76.1%), especially for finding a syllabus (95%), for online reading (94.7%), and for tracking grades (89.4%).

The primary benefits of using ICT in the classroom turned out to be convenience and control. Surprisingly enough, however, only 12.7% of the students answered that the most valuable benefit was improved learning.

The 2005 ECAR Study was basically a longitudinal extension of the 2004 study of Students and Information Technology, with a similar focus on what kinds of information technologies the students were using, what levels of skill they possessed, how ICT use contributed to their learning experience, and what value the use of ICT added to their learning. It involved a web-based survey of 18,039 freshman and senior students from 63 colleges and universities in the United States, interviews of 82 undergraduate students at seven institutions, and interviews with 20 instructional technology support staff. In addition to these, the ECAR research team carried out a literature review, reviewed U.S.-based and international surveys, and of most importance, used the results of the 2003 ECAR study of Faculty Use of Course Management Systems and the 2004 ECAR study of Students and Information Technology as comparative data for student and faculty perceptions about their ICT experiences. With regard to technology ownership, the findings indicated that laptop purchases were increasing, especially among freshman students, compared to the results of the 2004 study. Of the participants, 96% reported they owned a computer and 55% of them owned a laptop. Ownership of other technologies such as cell phones, PDAs, and electronic music devices was rising as well, suggesting student mobility and interest in communications. The study also revealed that broadband access has penetrated quite fast. Interestingly, it was found that the use of dial-up versus broadband access was related to the students' perception of technology use in the classroom and preferences

for technology-enhanced courses. In other words, Modem users appeared to have more problems in using technology and were less interested in taking technology-enhanced courses than those who had broadband access. In relation to usage patterns, almost all students used computers for writing documents (99.7%), sending email (98.9%), and surfing the Internet for their coursework (98.4%). Moreover, a high percentage of the students actively used computers for accessing library resources (88%), instant messaging (81%), downloading music or videos (75%), online shopping, (71%), and playing games (61%). The activities they were least engaged with were creating Web pages by using software (24%) and creating and editing video/audio (24%). In addition, the students spent between 11 and 15 hours per week using computers, on average. Generational issue and gender differences emerged in relation to the use of ICT for recreational purposes. For example, freshmen were more likely to use instant messaging, play computer games, and download music or videos than seniors. Also, male students were more likely to play computer games, and own electronic music devices and wireless adapters than female students. In addition, both the 2004 and 2005 study found that ICT application usage and skill levels were closely related to a students' major, which implies that academic requirements might help the students move beyond basic types of functionality. As for the students' perceived benefit of technology used in courses, the 2005 results were consistent with the 2004 study. The students came up with (a) convenience, (b) connection (communication with the instructor and other students), (c) control (management of course activities), and (d) improved learning as primary benefits of ICT use. Based on that framework, the research team classified

student activities into four groupings. (see Figure 2.1). In summary, five themes emerged from the 2005 study.

(1) College students live with abundant technology and networks.

(2) College students prefer moderate ICT use in their courses.

(3) College students are comfortable with a basic set of technologies and less comfortable with more specialized technology applications.

(4) College students see technology in the classroom as supplemental to their course experience, not as transformational. They still prefer face-to-face interaction with their instructors and classmates.

(5) Core ICT skill levels are comparable across class status (e.g., freshmen vs. seniors).

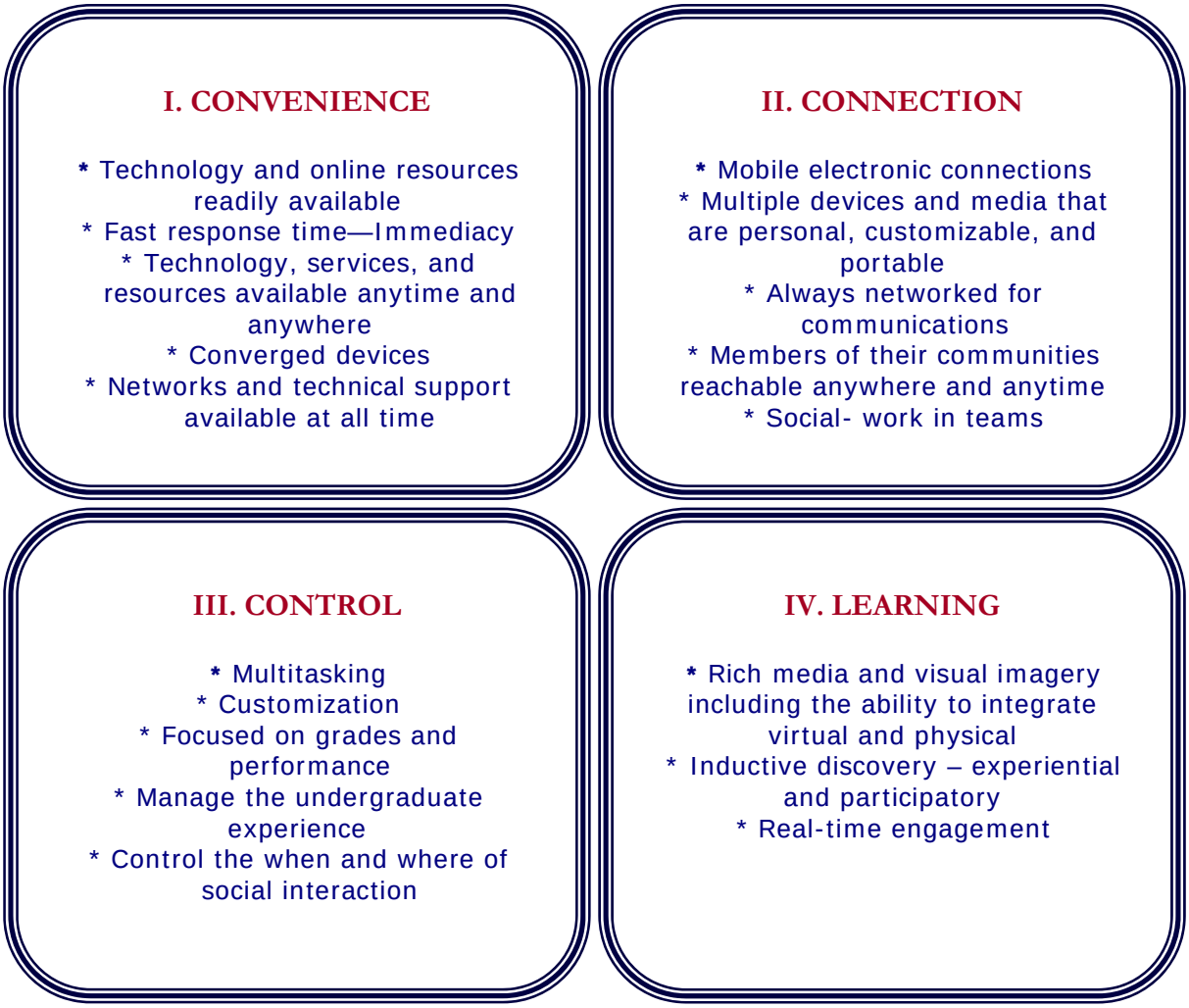


Figure 2.1
Net Generation Student Expectations and Preferences (Kvavik & Caruso, 2005, p. 11)

These findings are consistent with the Pew Internet and American Life Project research on the impact of Internet use on college students' academic and social experiences, undertaken three years earlier. In this US-based study, using surveys and observations, three major findings emerged (Jones, 2002). First, college students are heavy users of the Internet. The majority of them (72%) check email at least once a day and two-thirds use at least two email addresses. They are twice as likely to have downloaded music files and use instant messaging on an average day, compared to the all Internet users. Second, college students believe that the Internet has enhanced their

education. About 80% of college students agree that Internet use has a positive impact on their academic experience; nearly three quarters of them say they use the Internet more often than the library; and two-thirds are on one or more academic-oriented mailing lists related to their studies. They email their professors to set up appointments (62%), discuss grades (58%) or assignments (75%), and report their absences (65%). Half of the students that had taken an online course said, however, that they learned less than in a face-to-face one. Third, college social life has been changed by the Internet. Approximately 42% of college students use the Internet primarily to communicate while only 10% of them use the Internet for entertainment. However, they reported that they prefer using the phone instead of the Internet to communicate with friends. In summary, connectivity, interactivity and relevance are of utmost importance to today's college students in the U.S. in using IT for both their academic and social lives (Frand, 2000; McNeely, 2005; Roberts, 2005).

Student Technology Skills

Whether the tech-savvy college students arrive at higher education with the good ICT skills needed for their study and/or whether they highly demand great use of technology in teaching and learning is a different story. According to the 2005 ECAR study, the students' skills with information technologies and applications vary. The students rated themselves as highly skilled in word processing, computer operating systems, and presentation software. However, they rated themselves as least skilled in advanced technology and applications such as creating graphics, Web pages, and

video/audio. When it comes to problem solving, the qualitative data indicates that the students do not seem to possess sufficient skills to deal with problem solving, new applications and troubleshooting their computers. In addition, the transferability of their skills from entertainment to their use of technology for academic purposes remains dubious (Kvavik & Caruso, 2005).

Concerning issues about students' computer-based skills, two studies of undergraduate students at Southwestern University and Colorado State University provide a glimpse of college students' information technology fluency. To investigate students' perceived information technology fluency, their technology strengths and weaknesses, and technology use, McEuen (2001) conducted a Web-based questionnaire study with 300 students (108 males and 192 females), and then had follow-up interviews with 40 students for additional information. The students, enrolled in Southwestern University, a small, liberal arts university in Texas, were administered a 10-Likert scale self-assessment questionnaire that asked about their foundational concepts, contemporary skills and intellectual capabilities. The responses showed that gender differences existed in computer use patterns and perceived ICT skill levels. Female students mostly use computers for communication (48%) while male students use computers primarily for entertainment (44%). The majority of male students (75%) showed a high degree of (probably to absolutely, scale 8 -10) comfort and confidence when using new technologies whereas less than a half of female students (48%) felt very comfortable and confident in dealing with new technologies. Furthermore, the follow-up interviews revealed that the students were not well-equipped with contemporary skills and knowledge of information technology, in opposition to

pervasive myths about the generation growing up digital. Surprisingly enough, 58% of the students never created Web pages, and 61% of them never designed or worked with graphics. In addition, they did not seem well-informed about the computer operations, networks, computer security, electronic viruses, technology copyright issues, and netiquette. When it came to solving computer problems and learning new features, the students responded that they preferred figuring it out on their own or asking a friend or family member. They reported that they did not feel like reading manuals, calling a help desk, or getting access to online resources and knowledge bases. The concept of learners as problem solvers and independent learners that surfaced in this research is connected with what Emrich (2004) said about the Gamer Generation; "Being forced to learn the rules through trial-and-error, observation, and hypothesis testing is the essence of inductive discovery. 'RTFM' (Read The F-ing Manual) is a term of derision" (p. 9).

A similar picture of students' self-determined ability to use information technology is provided by Kaminski, Seel and Cullen (2003), a survey study with 1,933 freshman students at Colorado State University. While the majority of the students indicated their familiarity with basic IT-based knowledge and skills such as using email, the Web, and Microsoft-type of software, a significant number of them still lacked advanced skills in using Web development-type software and programming software, and information gathering. Of the respondents, 82% said they had the ability to download and install software, 46% said yes to the ability to download and install plug-ins, and 41% responded yes to their ability to download and read pdf files. Pointing to the inconsistency in students' ICT knowledge and skills, results from this study suggested that it is crucial to create awareness of the digital divide in IT-based

knowledge and experience that existed among freshman students. Increased awareness of the current state, in turn, would help educators find the best way to address the students' specific needs, integrate technology into the curriculum, and implement information technology-related initiatives (Kaminiski et al., 2003; McEuen, 2001; Rickman & Grudzinski, 2000).

Technology Use in Language Learning and Teaching

According to Warschauer (2000b, 2004), the innovative development and fast spread of the ICTs have resulted in ten important shifts in our daily lives related to computer-assisted language learning: a move (a) from phone-based to wireless communication, (b) from dial-up Internet connections to permanent, direct online connections, (c) from the use of mainly personal computers to the use of portable computing and online devices (e.g., laptops, personal digital assistances and cell phones), (d) from narrowband to broadband, (e) from expensive personal computing systems to widely affordable computers and other hardware, (f) from seeing the Internet as an exclusive form of communication and information to viewing it as a mass form of communication accessible to the world, (g) from text-based information and communication to audiovisual forms of information and communication, (h) from use of English as the main online language to multilingual Internet use, (i) from non-native to native users of information technology (e.g., children growing up with digital media and having native-like fluency in online communication), and (j) from the language laboratory to the classroom as a result of making computers and wireless access available almost everywhere.

These shifts have brought about new contexts, new literacies, new genres, new

identities, and new pedagogies in the field of TESOL (see Warschauer, 2000b). That is to say, recent technological revolution allows both language learners and teachers to have "multi-tasking experiences, involving in its fullest form four modes- listening, speaking, reading and writing" (Crystal, 2004, p. 93). Learners of English as a foreign language have had unparalleled opportunities to practice English and engage with authentic real-world contexts of language use by making the most of new emerging technologies (Kramsch & Thorne, 2002).

In fact, the range of emerging information and communication technologies used in the field of language education is fast growing, and language professionals are getting more creative and adaptive in using new technologies in their classroom. Students' acceptance and use of new technologies in formal and informal language learning are also noticeably increasing (Godwin-Jones, 2005). Yet, there is still room for creativity and flexibility in making the most of ICT to nourish the language learning experience of the Net Generation. The idea of language partnering and cultural exchange through instant messengers, email, cell phones, electronic message boards, video conferences, moblogs is not totally new, but has been proved by numerous research as a very effective way of indulging language learners in the target language and culture (Chism, 2003; Greenfield, 2003; Hertel, 2003; Jordan, Heredia, & Aguilera, 2001; Katz, 2001) The use of webquests, simulations, educational games, and virtual field trips online is gradually increasing as well (see Pururshotma, 2005) for his commentary on edutainment) although little research endeavor has been made to unearth the valuable experience of using those materials. Moreover, the use of disruptive technologies (e.g., skype and podcasting) in language teaching and learning

has made eye-opening growth in a couple of years. For example, recent success stories concerning the use of iPod in language education from the Grand Island School District in Nebraska and Duke University are quite encouraging (Duke University, 2005; Godwin-Jones, 2005).

It is very true that learners' capacities are enhanced by the interplay between learners' abilities and the tools they use (Commission on Behavioral and Social Sciences and Education, 2000). However, looking only at the interaction between technology and language learners is never enough, and even dangerous in the information age. In every case, we should take language learners' thoughts, behaviors, motivations, cultures, experiences, and understanding into consideration as well. In other words, a deep understanding of "the student experience of ICT and attitudes and behaviors it induces" (Breen, Lindsay, Jenkins, & Smith, 2001, p. 97) and "essential attributes for the ideal learning situations" (Foreman, 2003, p. 14) are crucial for making the most of new technologies and reaping the benefit from using them in language learning and teaching.

English Language Education and Its Relationship to ICT in China

The History of English Language Education

The status of the English language in the People's Republic of China has been full of vicissitudes, reflecting the country's historical, social, political and economic convulsions that the country has experienced since 1949, the year when the civil war ended (Adamson, 2002, 2004). As maintained by Adamson (2002), the English language has been perceived as "the tongue of military aggressors, barbarians,

imperialists and virulent anti-Communists, as well as of trade partners, academics, technical experts, tourists, and popular culture" (p. 231). In other words, there have been ambivalent sentiments, attitudes and values attached to English, both as a threat to the nation's identity and traditions, as well as a conduit for promoting the modernization of the country (Adamson, 2002, 2004; Adamson & Morris, 1997; Lam & Chow, 2004; Zhaoxiang, 2002). Thus, it would be no exaggeration to claim that the history of English language education in China, as the least five decades, is a mirror of China's history and of its relationship with the rest of the world.

Adamson (2002, 2004) classified five distinctive phases to discuss changes in the English language curriculum in China since 1949; (a) Phase 1 (1949-1960), the Soviet influence; (b) Phase 2 (1961-1966), quality in English language education; (c) Phase 3 (1966-1976), the Cultural Revolution; (d) Phase 4 (1978-1993), modernization under Deng Xiaoping; and (e) Phase 5 (1993 onwards), expansion of English language education based on globalization. In each phase, policy documents, syllabi, teaching materials, pedagogical approaches, curricula, classroom practices and students' learning experiences remarkably differ, influenced by the sociopolitical climate of the time (Adamson, 2004; Lam, 2002; Lam & Chow, 2004).

During the first phase between 1949 and 1960, the period that emphasized the restoration of the country after the conflict with Japan and the civil war, Russian was the dominant foreign language due to the country's political and economic ties with the Union of Soviet Socialist Republics (USSR) (Adamson, 2004). The prestige status of Russian at that time is evident from these facts, Russian departments and Russian training courses were established in higher education, national plans to teach Russian

and train teachers were announced and university students were required to learn Russian (Lam & Chow, 2004). Despite its low official status and the anti-US sentiment that prevailed in China, English was not completely put aside because the Chinese government recognized the role of "science and technology transfer, diplomacy and transmission of political messages" (Adamson, 2004, p. 75). English was taught in the Beijing Foreign Language Institute established in 1949, and the draft syllabus for teaching English in the secondary school was issued in this period. The politicization of English teaching and the Grammar-Translation Method, which stressed written language and memorization, were the key features of English language education during this phase, heavily influenced by the Soviet Union (Adamson, 2002, 2004).

In the second phase from 1961 to 1966, as a result of the Sino-Soviet split and new national priority given to economic development, Russian came to lose its popularity, and the main foreign language status was taken up by English. English gained importance in promoting international relationships, cultural exchanges, and scientific knowledge (Adamson & Morris, 1997), as well as innovative experiments in developing new curricula were carried out in this "First Renaissance period of English language teaching" (Adamson, 2002, p. 233). The syllabus and materials for both English majors and non-English majors at colleges and universities were published in 1961 and 1962. Although the main emphasis of the English syllabus was placed on love of the Communist party and the people, political messages were reduced in textbooks. The Audio-lingual method, which entailed sentence-patterns drills, oral dialogues, read-aloud practices, and habit-formation learning, began to

appear on the stage in this period.

However, the Cultural Revolution, which started in 1967, wiped out English language education in China. The government denounced English as the language of enemies and condemned English learners and teachers as bourgeoisie intellectuals and/or traitors (Adamson, 2002, 2004; Adamson & Morris, 1997). The slogan, "It's possible to bring about revolution even without learning ABC," implies the deteriorating status of the English language in the third phase, between 1967 and 1976. In spite of China becoming a member of the United Nations in 1971 and the Sino-American dialogues on commercial, cultural, and educational exchanges in 1972, the full re-emergence of English on the curriculum was attained only after the end of the Cultural Revolution and the death of Mao Zedong in 1976 (Lam & Chow, 2004).

Deng Xiaoping's announcement of Four Modernizations (i.e. the modernizations in the field of agriculture, industry, science and technology, and defense), and the subsequent Open Door Policy led to made significant endeavors to restore the English language curriculum (e.g., publication of new syllabi and materials, recruitment of foreign teachers, support for foreign language teaching in primary and secondary schools, and plans to train teachers) during the fourth phase, from 1978 to1993 (Bolton & Tong, 2002; Hui, 2001; Lam & Chow, 2004; Wang, 2004). Deng's quote appearing in the 1982 English syllabus, "Education has to be oriented towards modernization, the outside world and the future," manifests strong intentions to reform and modernize the nation, achieve economic success, acquire knowledge and information, and foster international understandings through English language education. Therefore, it seems natural that the English language regained its

high official status as a valuable tool for "acquiring technological expertise and for dealing with foreigners" (Adamson & Morris, 1997, p. 20). With the influences from the Western countries, pedagogical approaches gradually moved toward oral practice in contextualized situations and students' independent learning, although traditional Chinese approaches such as memorization and focus on accuracy and written language remained dominant. In addition, several monumental events and work relating to English language teaching were accomplished in this period: (a) the first conference on Applied Linguistics and ELT was held in Guangzhou in 1980; (b) English became the main foreign language in secondary school in 1982; (c) the College English Syllabus began to be implemented in 1985; and (d) China sent its first official delegation to the 1986 TESOL conference held in Anaheim, California (Lam & Chow, 2004).

A series of educational reforms and revisions of the English curriculum continued to progress in the 1990s. In 1993 the most sophisticated curriculum to date, opening "a new era in English language curriculum development in China" (Adamson, 2004, p. 192), was promulgated. Despite some inherited traditional features such as quantification of what has to be learned (e.g., vocabulary, grammar, listening skill, etc.), the 1993 curriculum progressively embraced innovative aspects such as fostering communicative competence, developing students' thinking ability, promoting understanding and knowledge of foreign culture, and conducting research on language teaching (Adamson, 2005; Adamson & Morris, 1997). In addition, the curriculum stressed the role of English in economic modernization:

> A foreign language is an important tool for interacting with other countries and plays an important role in promoting the development of the national and world economy, science, and culture. (Adamson, 2002, p. 240)

Specifically, economic goals, in turn, allowed English language teaching to shift gears toward "more holistic and communication-oriented" (Adamson & Morris, 1997, p. 23) approaches, focusing on integrated language skills, authentic tasks based on students' needs and ability, and contextualized language use. In short, the 1993 curriculum created new momentum for "change and continuity" (Adamson, 2004, p. 192) in English curriculum development in China, and fueled the notion that students should learn how to use the language, rather than learn about the language itself (Adamson, 2005).

As Adamson (2004) claimed, tensions between sociopolitical and pedagogical issues have existed on the English curriculum since 1949, which generated the "oxymoronic status" (Adamson & Morris, 1997, p. 24) of the English language in China. Therefore, there is no doubt that Chinese learners of English and their learning experiences have been greatly affected by the contexts in which they find themselves. With regards to foreign language learning experience, Lam and Chow (2004) conducted a survey study of 222 learners in China, aiming to identify their first foreign language, the age they had started foreign language learning, and a variety of activities they did outside the classroom. The participants were classified into five age groups: (a) those aged 46-50, who had entered primary school from 1956 to 1960, (b) those aged 41-45, had entered primary school from 1961 to 1965, (c) those aged 36-40, who had entered primary school from 1966 to 1970, (d) those aged 29-35, who had entered primary school from 1971 to 1977, and (e) those aged 24-28, who had

entered primary school from 1978 to 1982. All of them were university graduates, non-foreign language majors and Han Chinese in terms of ethnicity. The time they had started learning a foreign language differed in terms of age. Compared with the other three groups, the two youngest groups, who entered secondary school in 1977 or afterwards, had started their foreign language learning earlier, i.e., from primary or secondary school. The results indicate that the age of starting to learn a foreign language became lower. For instance, while none of the youngest group said that they had started learning a foreign language at university or at work, 54.5% of the oldest group had started learning a foreign language after entering university.

The activities they did outside the classroom to increase their proficiency appeared to be influenced by age, as well. For example, it was reported that the younger the participants were, the more they seemed actively engaged in having conversations with classmates outside the classroom in secondary school, using tapes and materials, watching TV, seeing movies or watching video tapes, listening to or singing songs, reading newspapers or magazines, and reading books. However, no or little age differences were found in the activities such as having conversations with classmates outside when in university, speaking in the foreign language with another family member or others, listening to the radio, checking the dictionary, and writing letters. In addition, all the age groups were rarely engaged in the activities such as conversing with others and writing letters using the foreign language, while the majority of them reported they used the dictionary, materials and books when learning on their own.

Lam's (2002) case studies with four Han Chinese learners of English also

suggest that foreign language learners and their learning experience are inseparable from historical, cultural, sociopolitical, and economic climates of the time when language learning takes place. Deng, a 45 year-old male learner who had experienced the Cultural Revolution and interrupted schooling when in secondary school, felt ashamed of his poor ability in English after studying it by himself for almost 30 years. He pointed out that unsystematic instruction, lack of learning materials, and the Grammar-Translation Method hindered him from acquiring authentic, everyday English. Xue, a woman born in 1956 in the Inner Mongolia Autonomous Region, shared a similar experience in learning English through memorization and focusing on grammar. As an English teacher, however, she was able to have opportunities for professional development, such as teacher training programs, and the Sino-British teacher exchange program, which made her English improve faster than before. Similarly, another female English teacher, Ling, born in 1963, actively sought opportunities for exposure to English, and was successful in gaining access to higher education. She recalled that her extroverted personality was an advantage that enhanced her ability in oral English. Although she was seemingly confident in her proficiency, she still felt that she had a problem in teaching English, which was "talking like a book" (p. 254). Hua, 25-year-old female learner, had "more favorable learning circumstances" (p. 255) than the other three learners, especially Deng and Xue, who rarely had the luxury of being able to use foreign language learning resources such as movies, books, and cassette tapes. In addition, stimulated by high English fluency that her friends had achieved, she kept challenging herself to improve in English. These stories provide a glimpse of substantial barriers and motivation that

the four Chinese learners of English from different times experienced. One thing all of them obviously had in common is the growing awareness of the importance of English.

English Teaching in China in the Age of Globalization

Two historic events occurred in 2001, Beijing's winning of the 2008 Olympic bid and China's entry into the World Trade Organization. These marked a momentous turn in English language education in the People's Republic of China (Adamson, 2002, 2004; Bolton & Tong, 2002; Fang & Warschauer, 2004; Jin & Cortazzi, 2004; Lam, 2002; Nunan, 2003; Pang, Zhou, & Fu, 2002). In fact, the events represent "an important milestone in this battered society's re-emergence from decades of international isolation, economic privation and political upheaval" (Smith, section A3, p. 1). They signaled China's "active involvement in the process of economic globalization and international cooperation" (Pang, Zhou, & Fu, 2002, p. 202), and were indicators of the country's economical aspirations and political ambitions (Jin & Cortazzi, 2004; Shenkar, 2005). The announcement by the former President Jiang Zemin in celebration of winning the Olympic bid, "All the people of the whole country and of the capital must rouse their efforts and get down to serious work to make sure that the 2008 Olympics are a success!", shows the country's eagerness to secure a place on the world stage as a rising global and economic power (Smith, 2001; "What the Games will do", 2001, p. 60). In reality, as part of the effort to improve local residents' English proficiency and Beijing's image as an international city for the 2008 Olympics Games, the city of Beijing introduced the Beijing English Testing System (BETS) designed to test candidates' listening,

speaking, reading and writing skills ("Beijing launches BETS exams", 2006).

The events clearly have played a role of "immediate impetuses" (Lam & Chow, 2004, p. 251) in encouraging the whole nation to learn English. The status of English in China is now climactic, perceived as "the bridge to the future" (Jin & Cortazzi, 2004, p. 120) and "a must for all" (Wang, 2004, p. 149). At the national level, promoting English is seen as essential to enhance international communication, economic reform and modernization, which will supposedly bring technological, social and financial benefits to the country (Lam, 2002). At the individual level, English is considered as a gate-keeper for academic, professional, and business success for many young Chinese planning to enter a senior high school, looking for access to higher education, applying for a job, and seeking promotion in workplace (Adamson, 2004; Jin & Cortazzi, 2004; Qixin, 2001). The introduction of English as a compulsory subject has been lowered to grade three from grade five; some universities have started using English as medium to teach science, technology, trade, finance, economics and law; and the English language plays a paramount role in university entry, graduation, recruitment and promotion in workplaces (Nunan, 2003). Moreover, in 2000, the Ministry of Education stipulated that all university students must pass at least the College English Band Four examination – there are six levels, or bands in College English – for graduation. Since then, some highly competitive universities have forced their students to move far beyond the Band Four level, requiring them to pass the College English Band Six, and to study Subject-Based English and Advanced English (Zhaoxiang, 2002). In short, as Wang (2004) mentioned, English has become "a national yardstick for measuring the quality of

individual talents and a threshold for determining who was able to get what other could not" (p. 154) in contemporary China.

The circumstances described above suggest that China's motivation for learning English is rather pragmatic (Boyle, 2000). Thus, by and large, there is some reason in what Pang, Zhou and Fu (2002) claimed:

> [In China], English is now learnt not for the prestige of knowing a foreign language or appreciating the cultural heritage of Anglo-American societies, but for patriotic and utilitarian reasons, and for national modernization as well as personal advancement and material gain. (Pang, Zhou, & Fu, 2002, p. 203)

Technology-Enhanced English Language Learning and Teaching

Undoubtedly, China is one of the countries boasting the fastest diffusion of ICT products and technological innovation, supported by rapid economic growth. The country has strategically promoted the ICT sector (e.g., the semiconductor industry, the electronic industry, and telecommunications), anticipating that it will accelerate the modernization process and will "project an image of a country that is developing fast, liberating its economy and therefore a good place to invest" (Katsuno, 2005, p. 8). According to the Organization for Economic Co-operation and Development (OECD) report on *Status and Overview of Official ICT Indicators for China* (Katsuno, 2005), the production of personal computers in China exceeds production levels in many OECD countries, and the penetration of mobile phones is doubling every year, especially in urban areas. Moreover, there is a steady increase in the number of persons employed in the ICT services sector where wages are about three times

higher than the national average. The number of Internet users also continues to climb rapidly although the overall penetration rate of the Internet is still low. The 17th statistical survey report on *Internet Development in China* (China Internet Network Information Center, 2006) indicates that, as of December, 2005, China has approximately 111 million Internet users, which is 179 times larger than in 1997. While the number of people using dial-up has decreased from 59 million to 51 million compared the same period of 2004, the number of broadband users has gone up to 64.3 million, increased by 50.2%.

With the national development of the ICT industry and the realization of the significance of information literacy in the 21st century, the Chinese government and the Ministry of Education have taken a strong role in integrating ICT into the education system, based on the notion that technology is an essential tool to enhance the quality of education and research in the information age (Li, 2003). To increase the use of emerging technologies in teaching all subjects, long-term goals planned to be achieved by 2010 were set up by the government (Li, 2003):

- Constructing ICT-based infrastructure,
- Promoting ICT education, distance education, and lifelong education,
- Improving the competence of ICT for all,
- Training ICT specialists,
- Operating software-producing centers and ICT corporations, and
- Increasing the general level of infrastructure development and ICT applicatio n in education.

Of a vast array of steppingstones initiated by the government to meet the long term goals, the establishment of the China Education and Research Network (CERNET) in 1994 is regarded as the most phenomenal achievement. Launched with an aim to extend network coverage to the whole country, the CERNET, as the second largest network in mainland China, provides information transmission services for about 20 million users in about 1,500 universities and institutions (China Education and Research Network, 2006; Li, 2003). Moreover, the CERNET plays a crucial role in operating major national learning initiatives (e.g., Modern Distance Education Project, School Connection Project, and Computer Network Construction Project for the Western University Campus), connecting most universities in China to the educational network, and supplying learning resources to rural areas (Fang & Warschauer, 2004; Li, 2003). The Chinese government is also keen on training ICT specialists and teachers (Zhang, Dong, & Chen, 2005; Li, 2003). For example, the national steering committee on higher education educational technology, assigned by the Ministry of Education, has established training centers at 127 higher education institutions, developed rules, regulations, courses, and materials for higher education teacher trainings, and delivered certificate-issued training programs (Zhang, Dong, & Chen, 2005). Furthermore, *Training Guidance for Teacher Training about Information School* was published in 2000 by the Teacher Education Department of the Ministry of Education in order to encourage all primary and secondary teachers to participate in the process of educational "informationization" (Li, 2003).

The field of English language education is also keeping pace with the progress of educational informationization, sparked by a growing awareness that English and

information literacy skills would maximize the opportunity to interact with the outside world and eventually bring about the country's economic wealth and geo-political leadership (Fang & Warschauer, 2004; Ma & Hu, 2002). Moreover, in the belief that a good command of the English language is of vital importance in reaping the benefits of new technologies, and vice versa, the Chinese government strenuously stresses the significance of multiple levels of literacy in the 21st century (e.g., basic literacy in Chinese and in English, computer literacy, and information literacy), and actively undertakes technology-enhanced curriculum reform in English language education (Adamson, 2005; Jin & Cortazzi, 2004; Ma & Hu, 2002). As a result, the official syllabus and the College English Curriculum Requirement drafted in 2001 and 2003, respectively, highlighted the use of ICT for learning and teaching English to foster communication skills, formative evaluation and student-centered learning (Jin & Cortazzi, 2004). According to *People's Daily Online* (2006), the Ministry of Education, with much regret for Chinese university students' lack of oral proficiency even after spending more than 3000 hours on learning English, called for integrating computer-based teaching materials and software into English teaching and learning in universities. Toward this end, a sum of 3.6 million dollar was invested for the pilot use of English learning software among 200,000 students in 180 universities. The Chinese Ministry of Education also supports distance education and on-line English teaching programs, alongside formal English language teaching within the education system in an effort to expand the population of English language users and increase their English proficiency (Jin & Cortazzi, 2004; Wu, 2001). Furthermore, as collaboration with foreign publishers and foreign English language teaching

professionals in the textbook publication became operative, incorporation of ICT into textbook supplements aimed at facilitating technology-enhanced English lessons has been promoted. The collaboration among the Ministry of Education, People's Education Press (PEP) and the Ohana Foundation, a Hawaii-based educational software company, to create the interactive DVD-based multimedia software package in *Junior English for China* series, is an example (Adamson, 2005).

In this regard, it seems reasonable to say that English language teaching in China is undergoing a sea change, accompanied with changes in national policy, international relationships, and new technology. However, as Fang and Warschauer (2004) mentioned, the processes and outcomes of technology-enhanced ELT curricular and pedagogical reform undertaken in China have rarely been reported to the outside. Likewise, pointing to the dearth of systematic research, Wu (2001) called for organizing nationwide Chinese research teams that would effectively inform TESOL professionals about the effects of English curriculum reform on learning environment, pedagogical approaches, and teaching methodology and technique.

Challenges in English Language Teaching and ICT application

In the midst of unprecedented demand and national-level enthusiasm regarding English education in general and technology-enhanced language learning in particular, new challenges and problems have also emerged in English language education in China (Adamson, 2005; Hu, 2003, 2005; Nunan, 2003; Wu, 2001).

There are huge differences in terms of access to technology and English language education and the distribution of information infrastructure and resources

among three regions, Coastal, Central, and Western, which are classified according to geographical locations and administrative divisions (Wang, 2002). The Coastal region, in which major cities such as Beijing, Shanghai, and Guangzhou are located, is the most developed economically, holding 60% of the country's GDP (China Internet Network Information Center, 2006), whereas the Western region is seen as the poorest region.

According to Harrington (2001), almost 50% of Internet users live in the well-developed Coastal region and the percentage gradually moves westward. Similar results appeared in Guo and Wang's (2004) study on Internet adoption in China's small cities. They used questionnaires; archives; documents; interviews with local government officials, local IT companies and Internet café owners; and focus group discussions with Internet users. Results showed that although there was a high demand for Internet access, the overall percentage of Internet use in small cities is lower than in major cities in the Coastal region. Although isolated from the big cities geographically and culturally, people living in small cities wanted to be connected with the outside via Internet as much as those who in the Coastal region for the same reasons: information, entertainment, and future careers.

The 17th Statistical Survey Report on the Internet Development in China published by China Internet Network Information Center (2006) also revealed a huge regional gap in Internet development in China. According to this national-level survey, as of December 31, 2005, the number of Internet users and computer hosts were about 111 million and 49.5 million, respectively. Of the Internet users, more than 91 millions live in cities. The Internet penetration rate in urban areas was 16.9%

while the rate in rural areas was 2.6%. Considering that Internet usage was related to users' monthly income, it was evident that the existing socioeconomic inequalities have resulted in regional discrepancies of Internet usage and development.

Regional differences have also been observed in "access to effective English language instruction" (Nunan, 2003), which indicates the close relationship between English language education and the socioeconomic situation (Hu, 2003, 2005; Lam, 2002). According to Hu (2003, 2005), there is a noticeable regional gap in the educational infrastructure (e.g., teaching facilities and instructional equipment), which, in turn, further worsens the existing differences in relation to curricular and pedagogical practices such as curricula, textbooks, teaching approaches and methodologies and syllabi. In Hu's survey of 252 secondary school graduates from various parts of the country, teaching methodologies varied according to the regions the participants came from, and those methodologies were affected by resources factors and sociocultural influences. Participants from the economically well-developed Coastal provinces encountered richer curricular resources, more communicative approaches, more technology facilities, and more authentic materials than their counterparts from the inland provinces.

There is also lack of professional development opportunities for English teachers. The fact that in the world China has the greatest number of English language learners, roughly estimated over 200 million, coupled with lowering the introduction of compulsory English instruction to age 9 (grade 3) since 2001, has caused a great shortage in qualified English teachers (Hu, 2002; Nunan, 2003). Moreover, many pre-service and in-service teachers need adequate training to help

them gain a strong pedagogical knowledge base and catch up with new English teaching methodologies that reflect social and economic changes in the 21st century. In reality, however, the undergraduate teacher education programs are, by and large, geared toward enhancing their language skills, instead of promoting their instructional knowledge and pedagogical experiences. In-service teachers also suffer from lack of opportunities to update their teaching methodologies and approaches (Cheng & Ren, 2002).

Such a situation makes it more difficult for English language teachers to implement technology-enhanced language teaching, despite the key role that technology takes in the top-down government-initiated educational reform. In a survey study of 527 higher education teachers, technical personnel, and administrative staff, Zhang, Dong and Chen (2005) found that inadequate theoretical knowledge and skills in educational technology and insufficient ideas were considered the greatest difficulties in applying educational technology. These difficulties were caused by lack of binding policies and problems with training and funding. Self-assessed knowledge of educational technology also revealed the participants' lack of confidence in their ability to use information technology procedures for instructional assessment and for educational and administration. It is worth noting that they felt rather confident in their basic knowledge of and ability to use computers, which provides the significant implication that teachers should be offered ongoing pedagogy-oriented training rather than short-term, skill-based training.

In summary, aspirations and challenges associated English language education

in China are very much similar to Warschauer's (2003) comments on the Egyptian case.

> Problems identified include large class size; poorly trained teachers with low wages…and a centralized, test-driven curriculum focusing on rote memorization of unimportant materials (p.299).

Thus, as in many developing countries, in China, integrating technology into teaching English is seen as a solution to tide over the difficult situation based on the belief that it would lead the country to keep pace with the world and narrow the gap between the country's elite and its poor at the domestic level (Wang, 2002). However, there are a vast array of challenges that hinders adopting technology in English language education: These include unequal diffusion of ICT and the educational infrastructure, high cost of Internet access, lack of qualified staff, inadequate policy, and lack of resources (Wang, 2002).

Summary of Chapter 2

This chapter provided an extensive review of both theoretical literature and empirical research. The review of the latest, most crucial literature generated four major themes of the study: (a) globalization, technological revolution and English as an international language; (b) expanded concepts of literacy and language in the age of information; (c) the use of ICT in education and in language learning and teaching, and (d) history of English language education in China and emerging challenges. The review serves as a basis for the current study.

Chapter 3
Research Methodology

This chapter details the research methodology employed in this study. After listing eight research questions, I discuss the rationale for the research design, and then provide information about setting, participants, and instrumentation. Data collection procedures and detailed description of analysis procedures are also provided.

Research Questions

The current study attempted to answer eight major questions:

Question 1: What kinds of information and communication technologies (ICT) do the participants in this study own and have access to?

Question 2: How do they use information technologies for general purposes and for language learning?

Question 3: How skilled are the students in using ICT?

Question 4: How do learner variables (e.g., gender, class and major) relate to their information technology use and skills?

Question 5: What are their reason(s) to learn English?

Question 6: How do they perceive English, computers, the Internet, and learning English?

Question 7: What are their perceived benefits of using ICT in learning English?

Question 8: What are their perceived barriers to using ICT in learning English?

Research Design

Rationale for the Research Design

This study employed a within-stage mixed model research design integrating quantitative and qualitative approaches by using a questionnaire that included both open-ended and closed-ended questions. In other words, the quantitative and qualitative data were collected concurrently in one phase of the research study (Cresswell, 2003). The research design was chosen to best accommodate the research questions addressed in the current study in a holistic view.

Quantitative and qualitative purists have confronted each other for more than a century, advocating their contrasting paradigms of research (e.g., beliefs, values, and assumptions) (Cresswell, 2003; Johnson & Onwuegbuzie, 2004). While quantitative researchers argue for time- and context-free generalizations, theory/hypothesis-testing, explanation, and prediction, qualitative researchers favor value-bound, multiple-constructed realities, discovery, exploration, and theory/hypothesis-generation (Johnson & Onwuegbuzie, 2004).

However, numerous educational researchers have tried to stop the research paradigm war by basing their knowledge claims on pragmatism (Creswell, 2003; Johnson & Onwuegbuzie, 2004; Tashakkori & Teddlie, 1998, 2003). They view the differences between the two dominant paradigms as important and state that these differences should not be ignored (Maxwell & Loomis, 2003). Instead, in an effort to make sense of interdisciplinary, complex social phenomena in the postmodern era, they choose more than one method within a single study (Cresswell, Clark, Gutmann, & Hanson, 2003; Greene & Caracelli, 1997; Morse, 2003; Newman, Ridenour, Newman, & Demarco, 2003).

The current study collected both quantitative and qualitative data simultaneously by using the questionnaire to explore the use of ICT among Chinese university students learning EIL. It was especially hoped that the analysis of qualitative data from a series of open-ended questions would further elaborate the findings from quantitative data.

This study was intended to benefit from all that questionnaires can ever measure through factual questions, behavioral questions, and attitudinal questions. Factual questions are used to identify demographic characteristics such as gender, major and class. Behavioral questions are employed to uncover the participants' use of and skills in ICT. Attitudinal questions are also used to elicit their perceived benefits of and barriers to integrating ICT into learning English (Dörnyei, 2003; Johnson & Turner, 2003).

Settings

The study was conducted in one of the leading universities, which is located in a capital city of a northwest province in mainland China (see Appendix B). Directly administered by the Ministry of Education, the university has about 32,000 students offering 67 undergraduate programs. As a part of the national reform project, the university has actively participated in international academic cooperation and exchanges and has carried out remarkable scientific research and application of technologies.

The university is located in the largest city in northwestern China, with a population of more than six million. As of 2003, the city's GDP per capita was

US$3,397, ranked 39th among 659 Chinese cities (Bureau of Commerce of Municipal Government, 2006). Although the city is one of the most industrialized and developed cities in the northwest, compared to major coastal cities such as Shanghai and Guangzhou, it is economically far less developed.

In this university, undergraduate students are required to complete 16 credit hours (8+4+4) of College English. According to the curriculum reform being undertaken, they are supposed to take eight credit hour of basic skill class in the first academic year. The four in the middle refers to four credit hours that they have to take during the first semester of the second academic year when instructional focus moves to intermediate or upper intermediate level communication skills. Different course books and materials are used to meet the needs of students at different levels. The four in the last position indicates that students can select four credit hours of any practical English courses offered by the university (13 selective courses are currently offered, such as Western Culture, Business English, Movies, and Idioms and Expressions in Greek Myths and the Bible). More than 85% of the English courses are held in a language lab equipped with multimedia facilities. The students have to pass the National College English Test CET Band 4 for graduation. They are also encouraged to pass the National College English Test CET Band 6, which is desired but not compulsory (Meng, personal communication, June 20, 2006).

Participants

Undergraduate students enrolled in College English courses at the university described above. A total of 591 students (464 male students and 127 female students) from 21 different majors participated in this study. The participants consisted of 452 freshmen, 30 sophomores, 90 juniors, and 19 seniors, taking required English courses in the spring, 2006. The mean age was 19.66.

Instrument

The questionnaire below used for the current study was *Information and Communication Technology Use and Skills (ICTUS) for Learning English* (Jung, 2006, see Appendix A), the modified version of the *Student Information Technology Use and Skills in Higher Education: 2005 Survey Questionnaire* (EDUCAUSE Center for Applied Research, 2005).

The questionnaire was originally developed in 2004, by the EDUCAUSE Center for Applied Research (ECAR) team, and updated in 2005 based upon the results of a study with the research team presented in 2004 (see Chapter 2 for the results of this study). Since the focus of the current study is on the use of ICT in learning English as a foreign language, I modified the original questionnaire to make it more relevant to the language learning experience of higher education students in Asian contexts.

I contacted the core researchers of the ECAR study team, Dr. Robert B. Kvavik and Dr. Judith B. Caruso, at first to obtain permission to use the *2005 Student Information Technology Use and Skills in Higher Education* questionnaire. Then, Dr. Kvavik directed me to EDUCAUSE Vice President, Richard N. Katz, who authorized me to adapt and use the questionnaire.

The resulting questionnaire consists of three sections: (a) background information, (b) your use of ICT for general purposes, and (c) your use of ICT for learning English. Questions concerning demographic variables (e.g., gender, major, class, and perceived proficiency levels in reading, writing, speaking, listening, grammar, and vocabulary) were incorporated into the first section. Open-ended questions asked respondents to report (a) reason(s) to study English and (b) metaphors for English, computers, the Internet, and learning English. The second section, the general use of technology, has questions concerning ownership of electronic devices (e.g., computer, PDA, cell phone, smart phone, electronic music devices, wireless adapter, etc), hours of use of the electronic devices, ICT usage patterns, and the students' perceived ICT skills. The third section has questions related to the use of ICT in learning English, such as hours spent on using ICT for learning English. Open-ended questions regarding perceived benefits of and barriers to using ICT in learning English were also added in this section. It was estimated to take the participants approximately 15-20 minutes to complete the 95-item questionnaire.

The Cronbach Coefficient Alpha test was used to find internal consistency for the quantitative part in the *Information and Communication Technology Use and Skills (ICTUS)* for Learning English. The Cronbach alpha was .860. Although retaining at least .70 or higher is accepted in most social science research, a cut-off value of .80 or higher is widely considered evidence of good reliability (Becker, 2000; George & Mallery, 2003).

Data Collection Procedures

Data collection occurred during the spring semester, 2006. I contacted seven instructors teaching College English courses through Ms. Meng, who was a visiting scholar at the University of Maryland. I sent a letter via email to explain the purpose of the research and ask for their consent. To ensure that data collection would be conducted in an efficient way, avoiding disruptions to normal, daily classroom sessions, I let them know that they could ask participants to complete the questionnaire at home.

I obtained Institutional Review Board (IRB) approval and shared it with the teachers before conducting data collection. The participants were required to complete and sign an informed consent form translated into their own language, mandarin Chinese. The informed consent form specified that participation is strictly voluntary, that participants have the right to withdraw at any time, and that they would not be penalized or lose benefits due to the withdrawal. Moreover, in the consent form, I clearly mentioned that I would protect their confidentiality by using a code for identification instead of their name (see Appendix C).

In the beginning of the 2006 spring semester, 700 questionnaires were administered to students taking required English language courses. The rationale for using the pen-and-pencil version of the questionnaire, instead of using the online version, was that surveys using an email or web response mode tend to have lower response rates than those using a mail response or pen-pencil response mode (see Schonlau, Fricker, & Elliott, 2002, for detailed information). In addition, it was hard

for me to find a web survey system supporting Oriental characters such as Chinese.

I was introduced to a graduate assistant by Ms. Meng. As soon as the teachers agreed to assist in data collection, I contacted the graduate assistant to provide detailed descriptions of all possible entailments of data collection procedure (e.g., how to administer the questionnaire). In early March, 2006, the graduate assistant delivered the questionnaire and the IRB to the instructors so that they could distribute the documents to the students attending their courses. The seven instructors asked their students to take the questionnaire home and bring it back as soon as they finished answering the questions. Over a span of two weeks, they reminded the students several times to return the completed questionnaire several times. Of 700 questionnaires disseminated, 591 valid ones were returned. The response rate was 84.4%, which is a very high rate for an international study such as this. The instructors handed over the returned questionnaires to the graduate student who translated the answers for open-ended questions written in Chinese by the students into English before sending them to me. She inputted the data to an electronic template that I created using *Microsoft Excel* and sent them to me via email. Throughout the study, she and I exchanged numerous emails to make sure the data collection process was on the right track and clarify all the unexpected procedural issues that arose during the procedure. As soon as I received the data, I entered all the quantitative data into a database using Statistical Package for Social Science (SPSS) 12.0 software and the qualitative data into *Microsoft Word* documents.

Data Analysis Procedures

Quantitative data analysis from closed-ended questions

Quantitative data collected from the questionnaires were analyzed using the SPSS in order to answer Research Question 1, 2, 3, and 4. Data analysis procedures involved the following:

(1) Descriptive statistics (e.g., means and standard deviations) was used to describe the basic features of the data (Hinkle, Wiersma, & Jurs, 1998).

(2) A series of independent t-tests, chi-square analyses, and analysis of variance (ANOVA) were computed to find out the relationship between independent variables (e.g., gender, class, and major) and dependent variables (e.g, hours spent using ICT, ICT activities engaged by students, and perceived ICT skill levels).

(3) Multiple regression analysis was performed to test relationship between each set of predictor variables (e.g., gender, class, major, and desktop ownership) and outcomes variables (e.g., hours spent using ICT, perceived ICT skill levels), and to find out the contribution of each predictor in accounting for validity in the outcome variable (Ross & Morrison, 2001).

Qualitative data analysis from open-ended questions

I analyzed the qualitative data from open-ended questions by using a grounded theory approach (Strauss & Corbin, 1998). I identified, named, categorized themes and emerging patterns from the data while reading and re-reading the data several times. Specifically, as I read through the data, I detected certain words and phrases that repeatedly appeared and stood out and looked for regularities, patterns and topics that emerged from the data (Bogdan & Biklen, 2003; Cresswell, 1998). Questions that O'Callaghan (1996) suggested were useful in searching through the data:

- What is happening in this data?
- What is the basic socio-psychological problem?
- What accounts for it?
- What patterns are occurring here?

Then, I explored them in a holistic fashion to answer the research questions addressed in the current study, grouped them into coherent, meaningful categories, and constantly compared them to identify possible links (Goulding, 1999; Strauss & Corbin, 1998).

Throughout the study, I consulted existing literature, colleagues currently enrolled in the Second Language Education and Culture program at the University of Maryland, and other cultural informants from China to elicit theoretical interpretations from the data and make sure that my interpretation was appropriate.

Establishing Validity and Reliability of the Study

Several steps were taken to establish validity and reliability of the study. These included:

(1) Back-translation technique: The questionnaire was translated into Mandarin Chinese first. Then, the translated questionnaire was back translated into English by a different person, who did not participate in the first translation process. Working with the translators, I corrected errors and nuances and revised the instrument.

(2) Interrogating interpretations: I coded the data thoroughly checking cultural contexts, developing categories, and checking development of ideas. (Cresswell, 2003).

(3) Corroboration: Throughout the research, I frequently checked if data were analyzed appropriately with native cultural informants from China. (Cresswell, 2003; Johnson & Christensen, 2004).

(4) Quantitative reliability: Reliability for the quantitative part was assessed by using Cronbach alpha as noted earlier.

Summary of Chapter 3

This chapter presented research design within-stage mixed model research. I outlined research questions that guided the current study first. Then I provided a detailed description of participants, settings, and questionnaire used for this study. In addition, Chapter 3 laid out data collection and analysis procedures in depth. The

ways of establishing validity and reliability were also discussed in this chapter. The results of the quantitative analysis will be found in Chapter 4, followed by the results of the qualitative analysis in Chapter 5.

Chapter 4
Results of Quantitative Questions

In this chapter, quantitative results from close-ended questions are reported. Several statistical analyses were employed to answer the Research Questions 1, 2, 3 and 4.

Question 1: What kinds of information and communication technologies (ICT) do the participants own and have access to?

Question 2: How do they use information technologies for general purposes and for language learning?

Question 3: How skilled are the students in using ICT?

Question 4: How do learner variables (e.g., gender, class and major) relate to their information technology use and skills?

Background Information

Of 591 respondents, 78.5% were male students and 21.5% were female students. This is a reflection of the gender ratio of the university. They were 452 freshmen (76.5%), 30 sophomores (5.1%), 90 juniors (15.2%), and 19 seniors (3.2%) from 21 different majors. The 21 majors were classified into four major clusters for convenience in data analysis: engineering, math and science, management, and arts and humanities, (see Table 4.1).

Since the majority of the participants were freshmen, it was not surprising to find that their self-reported levels of English skills were quite low. When asked to

choose their proficiency levels among basic, intermediate, and advanced in the areas of listening, speaking, reading, writing, grammar, and vocabulary, approximately half of the respondents said their level was basic in all areas but reading and grammar. Even in the reading and grammar part, only small percentages (2.7% and 5.0%, respectively) were reported as 'advanced'. Among the skills, a large number of the students rated themselves as basic in speaking (72.3%) and listening (53.7%), indicating that they felt relatively incompetent in communicative skills. More students rated themselves as intermediate in reading (66.2%) and grammar (56.9%) compared to intermediate in listening (44.4%), speaking (26.5%), writing (49.4%) and vocabulary (49.7%), as Table 4.2 indicates.

Table 4.1
Majors

Group	Major	Participants
Group 1: Engineering	Electronical Engineering and Automation	32
	Electric Information and Engineering	19
	Telecommunication	8
	Engineering Mechanics	27
	Energy and Power Engineering	46
	Light Information Science and Technology	23
	Information and Computing Science	48
	Industrial Engineering	59
	Information Engineering	23
	Mechanical Engineering and Automation	28
	Materials Physics	30
	Energy Dynamics	9
	Total	352 (60.2%)
Group 2: Math & Science	Applied Mathematics	27
	Applied Physics	51
	Computational Mathematics	1
	Applied Chemistry	31
	Total	110 (18.8%)
Group 3: Management	Management Science and Engineering	40
	E-Commerce	28
	Accounting	23
	Total	91 (15.6%)
Group 4: Arts & Humanities	Art Design	2
	English	30
	Total	32 (5.5%)
	Missing=6	N= 585

Table 4.2
Self-rating of English Proficiency Levels

	N	Basic	Intermediate	Advanced
Listening	583	313 (53.7%)	259 (44.4%)	11 (1.9%)
Speaking	584	422 (72.3%)	155 (26.5%)	7 (1.2%)
Reading	583	181 (31.0%)	386 (66.2%)	16 (2.7%)
Writing	581	287 (49.4%)	287 (49.4%)	7 (1.2%)
Grammar	580	221 (38.1%)	330 (56.9%)	29 (5.0%)
Vocabulary	580	286 (49.3%)	288 (49.7%)	6 (1.0%)

For the question about foreign language(s) other than English, 89 students said that they had learned one or more foreign languages other than English but the lengths of the studies were very short from one week to one year. In addition, of those 89 students, 23 were from English department. Foreign languages they reported were Japanese (51), French (20), German (15), Korean (6), Russian (3), Cantonese (2), Malayan (1), and Arabic (1).

General Use of ICT

ICT Ownership

With regard to ICT ownership, the results showed that most of the respondents were generally not well-equipped with advanced technologies. It was found that 100 students (16.9%) had none of the eight selected technologies. Especially, only 31.5% of the students owned desktop computers and 9.6% of them owned laptops, indicating that laptop computers have not yet penetrated the students' computing experience. Other new technologies such as PDAs, smart phones, digital cameras, and camcorders have not been widely diffused either. Interestingly, however, more than half of the students answered that they owned cell phones (55.6%) and music devices (55.8%), as Table 4.3 shows. The relatively high possession of cell phones, compared to computers, reflects the fact that China has become the largest mobile phone market in the world, which surpassed the United States in 2001 (Harrington, 2001; Wensheng, 2002).

Table 4.3
Ownership of Selected Technologies

Technologies	Ownership
Desktop (n=591)	186 (31.5%)
Laptop (n=591)	57 (9.6%)
PDA (n=591)	30 (5.1%)
Smart Phone (n=591)	61 (10.3%)
Cell phone (n=590)	328 (55.6%)
Music Device (n=591)	330 (55.8%)
Digital Camera (n=591)	61 (10.3%)
Camcorder (n=591)	13 (2.2%)

Such a low rate of computer ownership might be the result of the university being located in a less socioeconomically developed region, and of the fact that the majority of the participants (76.5%) were freshmen who had just entered the university. In fact, more seniors owned desktops (94.7%) than juniors (78.9%), sophomores (50.0%), and freshmen (18.1%) did. As for ownership of other technologies, juniors had the highest rates in laptops, smart phones and digital cameras while PDAs and cell phones were mostly owned by sophomores (see Table 4.4).

Table 4.4
Technology Ownership by Class

	Freshman (452)	Sophomore (30)	Junior (90)	Senior (19)
Desktop	82 (18.1%)	15 (50.0%)	71 (78.9%)	18 (94.7%)
Laptop	40 (8.8%)	1 (3.3%)	15 (16.7%)	1 (5.3%)
PDA	16 (3.5%)	4 (13.3%)	10 (11.1%)	0 (0%)
Smart phone	41 (9.1%)	4 (13.3%)	15 (16.7%)	1 (5.3%)
Cell phone	244 (54.1%)	23 (76.7%)	49 (54.4%)	12 (63.2%)
Music device	241 (53.3%)	21 (70.0%)	54 (60.0%)	14 (73.7%)
Digital Camera	41 (9.1%)	3 (10.0%)	15 (16.7%)	2 (10.5%)
Camcorder	8 (1.8%)	0 (0%)	4 (4.4%)	1 (5.3%)

Note: (% within class)

Chi-Square analyses were used to see if there is a significant relationship between class and ownership of the selected technologies. The results showed that desktop

ownership (χ^2 = 171.102, df= 3, p = 0.000) and PDA ownership (χ^2 = 14.278, df= 3, p = 0.003) were significantly related to class, according to Table 4.5 and 4.6.

Table 4.5
Chi-Square for the Relationship between Class and Desktop Ownership

	N	Value	df	Sig. (2-sided)
Pearson Chi-Square	591	171.102	3	.000

Table 4.6
Chi-Square for the Relationship between Class and PDA Ownership

	N	Value	df	Sig. (2-sided)
Pearson Chi-Square	591	14.278	3	.003

As far as gender was concerned, surprisingly enough, more female students owned all of the selected technologies than male students, except laptops (see Table 4.7). The interesting finding that females owned more technologies (e.g., desktops, cell phones, and music devices) than males needs further attention and cautious interpretations because other uninvestigated factors (e.g., socioeconomic background of the participants) may have influenced their ownership of the selected technologies.

Table 4.7
Technology Ownership by Gender

	Male (464)	Female (127)
Desktop	134 (28.9%)	52 (40.9%)
Laptop	45 (9.7%)	12 (9.4%)
PDA	21 (4.5%)	9 (7.1%)
Smart Phone	46 (9.9%)	15 (11.8%)
Cell phone	243 (52.4%)	85 (67.5%)
Music Device	244 (52.6%)	86 (67.7%)
Digital Camera	42 (9.1%)	19 (15.0%)
Camcorder	8 (1.7%)	5 (3.9%)

Note: (% within gender)

The follow-up chi-square analyses also revealed that there was a significant gender difference in the ownership of desktops ($\chi^2 = 6.730$, df= 1, p =0.009), cell phones ($\chi^2 = 9.140$, df= 1, p = 0.003), and music devices ($\chi^2 = 9.257$, df= 1, p = 0.002), as Table 4.8, 4.9, and 4.10 show.

Table 4.8
Chi-Square for the Relationship between Gender and Desktop Ownership

	N	Value	df	Sig. (2-sided)
Pearson Chi-Square	591	6.730	1	.009

Table 4.9
Chi-Square for the Relationship between Gender and Cell Phone Ownership

	N	Value	df	Sig. (2-sided)
Pearson Chi-Square	590	9.140	1	.003

Table 4.10
Chi-Square for the Relationship between Gender and Music Device Ownership

	N	Value	df	Sig. (2-sided)
Pearson Chi-Square	591	9.257	1	.002

In relation to major, students from management and arts and humanities were more likely to own technologies than engineering or math and science majors.

Specifically, desktops, laptops, digital cameras, and camcorders were mostly owned by management-related majors studying management science and engineering, e-commerce, and accounting. Arts and humanities majors owned more smart phones, cell phones, music devices than any other major groups. Math and science majors showed the lowest rate of technology ownership among all major groups (see Table 4.11).

Table 4.11
Technology Ownership by Major

	Engineering (N=352)	Math &Science (N=110)	Management (N=91)	Arts & Humanities (N=32)
Desktop	102 (29.0%)	17 (15.5%)	51 (56.0%)	15 (46.9%)
Laptop	30 (8.5%)	8 (7.3%)	18 (19.8%)	1 (3.1%)
PDA	16 (4.5%)	5 (4.5%)	5 (5.5%)	4 (12.5%)
Smart phone	34 (9.7%)	13 (11.8%)	10 (11.0%)	4 (12.5%)
Cell phone	184 (52.3%)	56 (51.4%)	61 (67.0%)	25 (78.1%)
Music device	191 (54.3%)	55 (50.0%)	60 (65.9%)	23 (71.9%)
Digital Camera	33 (9.4%)	8 (7.3%)	16 (17.6%)	4 (12.5%)
Camcorder	6 (1.7%)	3 (2.7%)	4 (4.4%)	0 (0%)

(% within major)

The Chi-Square results indicated that major had a significant relationship with ownership of desktops ($\chi^2 = 42.979$, df= 3, p = 0.000), laptops ($\chi^2 = 13.378$, df= 3, p = 0.004), cell phones ($\chi^2 = 13.764$, df= 3, p = 0.003), and music devices ($\chi^2 = 8.954$, df= 3, p = 0.030), as shown in Table 4.12, 4.13, 4.14, and 4.15.

Table 4.12
Chi-Square for the Relationship between Major and Desktop Ownership

	N	Value	df	Sig. (2-sided)
Pearson Chi-Square	585	42.979	3	.000

Table 4.13
Chi-Square for the Relationship between Major and Laptop Ownership

	N	Value	df	Sig. (2-sided)
Pearson Chi-Square	585	13.378	3	.004

Table 4.14
Chi-Square for the Relationship between Major and Cell Phone Ownership

	N	Value	df	Sig. (2-sided)
Pearson Chi-Square	584	13.764	3	.003

Table 4.15
Chi-Square for the Relationship between Major and Music Device Ownership

	N	Value	df	Sig. (2-sided)
Pearson Chi-Square	585	8.954	3	.030

Internet Access

A total of 691 responses were gathered for the question concerning the means of access to the Internet, since multiple answers were accepted. According to Table 4.16, the majority of students (91.0%) used wired broadband access. Of those broadband users, 27.8% reported having commercial broadband service, while 63.2% used school-operated broadband, suggesting that a large number of students connected on campus. The results also showed that 6.4% used dial-up service (school-operated and commercial dial-up service), and 2.6% adopted commercial wireless network.

Table 4.16
Internet Access

	Response (N=691)
Commercial dial-up	15 (2.2%)
School-operated dial-up	29 (4.2%)
Commercial broadband	192 (27.8%)
School-operated broadband	437 (63.2%)
Commercial wireless network	18 (2.6%)

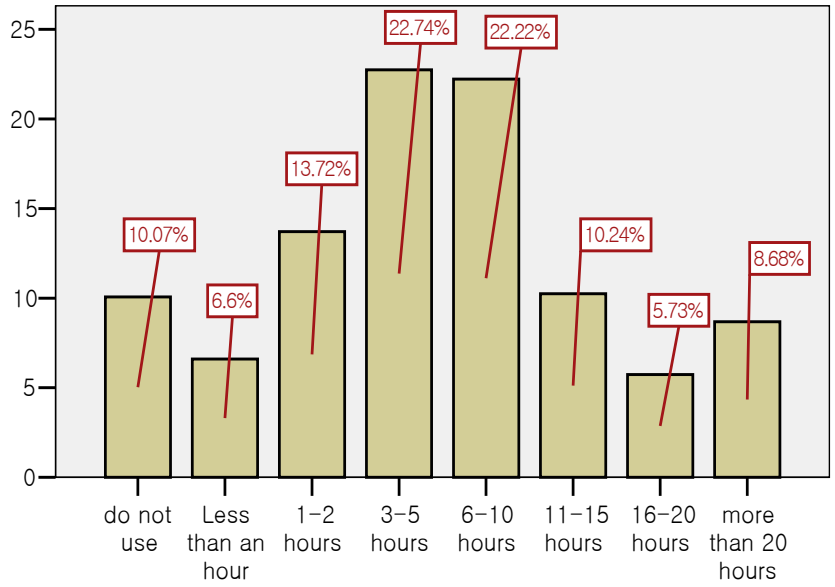
Weekly Hours Spent Using ICT

When asked about hours per week they spent using ICT for general purposes, excluding their use of cell phones, almost one half of the participants (44.9%) reported that they spent three to ten hours per week, as Table 4.17 and Figure 4.1 show. More specifically, 22.7 % of the respondents reported between three and five hours per week, and 22.2% indicated between six and ten hours per week. It was surprising to know, however, that 10.1% of them said that they did not use ICT at all.

Table 4.17
Weekly Hours Spent on General Use of ICT

	N= 576
① Do not use	58 (10.1%)
② Less than an hour	38 (6.6%)
③ 1-2 hours	79 (13.7%)
④ 3-5 hours	131 (22.7%)
⑤ 6-10 hours	128 (22.2%)
⑥ 11-15 hours	59 (10.2%)
⑦ 16-20 hours	33 (5.7%)
⑧ More than 20 hours	50 (8.7%)

Figure 4.1. Weekly Hours Spent on General Use of ICT



ICT Activities

According to Table 4.18, the most frequently engaged in activities were surfing the Internet (95.0%) and downloading or listening to music or videos (93.3%). The majority of the students used technology for communications such as emailing (83.4%) and instant-messaging (74.8%). Playing computer games was one of the activities in which many students were frequently engaged as well (60.1%). On the contrary, the students did not seem to be engaged frequently in using specialized applications such as creating spreadsheets (31.3%), presentation slides (31.7%), graphics (25.5%), audio/video files (18.9%) and webpages (22.6%). Moreover, the fewest students were engaged in online shopping (15.3%). Weekly hours the students spent doing the selected activities suggested that they used technology for three main purposes: (a) entertainment (e.g., downloading or listening to music or videos, surfing the Internet for pleasure, and playing games), (b) study, and (c) communication (e.g.,

emailing and instant messaging). The results also showed that they were least frequently engaged in blogging and online shopping.

Table 4.18
ICT Activities Engaged in by Students in the Descending Order

Activity	Engaged Rate	Mean of Hours (SD)
Surfing the Internet for pleasure (n=581)	95.0%	3.32 (1.320)
Downloading or listening to music or videos/DVDs (n=582)	93.3%	3.44 (1.354)
Creating, reading, sending e-mail (n=579)	83.4%	2.26 (.910)
Classroom activities and studying using an electronic device (n=577)	82.1%	3.02 (1.511)
Surfing the Internet for information to support your coursework (n=582)	76.5%	2.34 (1.138)
Creating, reading, sending instant messages (n=576)	74.8%	2.77 (1.553)
Using a library resource to complete a course assignment (n=581)	72.3%	2.31 (1.153)
Writing documents for your coursework (n=581)	69.4%	2.37 (1.241)
Completing a learning activity or accessing information for a course using course websites (n=579)	68.6%	2.24 (1.151)
Playing computer games (n=579)	60.1%	2.65 (1.810)
Writing documents for pleasure (e.g., blogging) (n=577)	31.9%	1.50 (.909)
Creating presentations (n=580)	31.7%	1.47 (.819)
Creating spreadsheets or charts (n=581)	31.3%	1.40 (.701)
Creating graphics (n=580)	25.5%	1.34 (.680)
Creating Web pages (n=580)	22.6%	1.40 (.919)
Creating and editing video/audio (n=581)	18.9%	1.27 (.679)
Online shopping (n=576)	15.3%	1.26 (.720)

The mean scores of weekly hours spent on each activity engaged by gender were compared using a series of independent t-tests. According to Table 4.19, statistically significant differences were found between gender and the four activities: (a) surfing the Internet for information ($t(580) = 3.423$, $p < .05$), (b) writing documents for coursework ($t(579) = 3.842$, $p < .05$), (c) instant messaging ($t(574) = 4.317$, $p < .05$), and (d) playing computer games ($t(577) = -6.664$, $p < .05$). Female students spent more

hours studying, surfing the Internet for information, writing documents for coursework, and instant messaging. On the other hand, male students spent more hours playing games than female students. The findings suggested interesting usage patterns between male and female students. Male students appeared to use ICT more for recreational purposes (e.g., playing games) while female students used ICT more for educational purposes and communications (e.g., writing for coursework, instant messaging).

Table 4. 19
Differences in Activities using ICT based on Gender

	Male	Female	t	df	p	Interpretation
Studying	2.95(1.481)	3.29 (1.597)	2.220	575	.027	
Using library resources	2.30 (1.159)	2.33 (1.138)	.296	579	.767	
Surfing for information	2.25 (1.106)	2.64 (1.203)	3.423	580	.001*	F > M
Writing for course work	2.26 (1.199)	2.74 (1.322)	3.842	579	.000*	F > M
Email	2.24 (.909)	2.33 (.911)	.974	577	.331	
Instant messaging	2.62 (1.491)	3.29 (1.663)	4.317	574	.000*	F > M
Writing for fun	1.49 (.915)	1.56 (.890)	.850	575	.396	
Playing games	2.91 (1.873)	1.74 (1.174)	-6.664	577	.000*	M > F
Music/videos	3.38 (1.357)	3.65 (1.329)	1.964	580	.050	
Surfing for fun	3.33 (1.365)	3.29 (1.146)	-.238	579	.812	
Online shopping	1.23 (.685)	1.37 (.826)	1.912	574	.087	
Spreadsheets	1.40 (.726)	1.37 (.601)	-.557	579	.578	
Presentation slides	1.42 (.804)	1.63 (.857)	2.524	578	.016	
Graphics	1.33 (.694)	1.36 (.626)	.391	578	.696	
Video/Audio files	1.31 (.732)	1.14 (.414)	-2.454	579	.001	
Webpages	1.40 (.950)	1.38 (.799)	-.239	578	.811	
Course websites	2.18 (1.153)	2.47 (1.122)	2.485	581	.013	

*p< .003 after Bonferroni correction based on p<.05

Weekly hours spent doing ICT-involved activities by major demonstrated that management majors were most frequently engaged in the selected activities, as shown in Table 4.20, followed by arts and humanities majors. Students from engineering and math and science major groups spent less hours using ICT for

pleasure and specialized applications than management and arts and humanities majors. In addition, engineering students did not frequently use ICT for communications (e.g., sending email and instant messages), while math and science students were not actively engaged in doing course-related activities (e.g., using course websites, studying or doing class activities, and writing for course work) and looking for information (e.g., using library resources and surfing the Internet for information).

Table 4.20
Activities Engaged by Majors

	Engineering	Math & Science	Management	Arts & Humanities
Studying	3.03 (1.478)	2.55 (1.563)	3.34 (1.368)	3.81 (1.600)
Using library resources	2.33 (1.059)	2.05 (1.212)	2.49 (1.417)	2.47 (1.077)
Surfing for information	2.31 (1.075)	1.82 (1.012)	2.78 (1.315)	3.19 (.738)
Writing for course work	2.31 (1.210)	1.76 (1.070)	3.07 (1.200)	3.03 (.999)
Email	2.21 (.869)	2.22 (1.065)	2.36 (.863)	2.58 (.923)
Instant messaging	2.65 (1.510)	2.68 (1.590)	3.19 (1.598)	2.97 (1.643)
Writing for fun	1.50 (.899)	1.42 (.921)	1.60 (.930)	1.45 (.888)
Playing games	2.59 (1.791)	2.58 (1.733)	3.10 (1.978)	2.32 (1.661)
Music/Videos	3.25 (1.287)	3.41 (1.266)	3.97 (1.410)	4.13 (1.607)
Surfing for fun	3.21 (1.204)	3.10 (1.297)	3.84 (1.463)	3.77 (1.707)
Online shopping	1.19 (.608)	1.23 (.839)	1.49 (.861)	1.42 (.886)
Spreadsheets	1.36 (.635)	1.38 (.920)	1.49 (.689)	1.52 (.508)
Presentation slides	1.42 (.766)	1.37 (.898)	1.74 (.941)	1.61 (.615)
Graphics	1.29 (.577)	1.35 (.884)	1.47 (.750)	1.45 (.723)
Video/Audio files	1.23 (.582)	1.36 (.907)	1.27 (.668)	1.45 (.768)
Webpages	1.25 (.718)	1.41 (1.031)	1.96 (1.255)	1.35 (.798)
Course websites	2.21 (1.038)	1.74 (1.049)	2.98 (1.366)	2.28 (.991)

One-way ANOVA tests were used to determine if there is a significant difference between major and weekly hours on eight technology activities. As Table 4.21 indicates, the results showed that major was significantly different in weekly hours on (a) studying and doing class activities ($F(3,568) = 7.782$, $p < .05$), (b) surfing

the Internet for information ($F = (3, 572) = 19.528$, $p<.05$), (c) writing documents for course work ($F(3,571) = 23.753$, $p <.05$), (d) downloading or listening to music or videos ($F(3,572) = 10.096$, $p <.05$), (e) surfing the Internet for fun ($F(3,571) = 8.005$, $p <.05$), (f) online shopping ($F(3,566) = 4.963$, $p <.05$), (g) creating webpages ($F(3,570) = 15.004$, $p <.05$), and (h) using course websites ($F(3,573) = 21.343$, $p <.05$).

Tukey's post-hoc test was used to determine which major groups significantly differed in those technology-involved activities. Math and science majors spent significantly less hours using technology for studying and/or doing class activities than any other major groups. Surprisingly, it was also revealed that arts and humanities students spent significantly more hours studying than engineering majors. Similar patterns were found in hours spent surfing the Internet for information and using technology in writing documents for courses. In other words, math and science students spent least hours on the two activities among four different major groups, which was statistically significant. Additionally, arts and humanities majors and management majors spent significantly more hours surfing the Internet for information and using technology in writing documents for courses than engineering students. As for downloading or listening to music/video, management and art and humanities students were significantly more engaged than engineering and math and science majors. In relation to surfing the Internet for fun, management students also spent significantly more hours than engineering and math and science students. Management students also spent significantly more hours shopping online than

engineering students. Again, management majors were significantly more engaged in creating webpages and using course websites than any other major groups.

Table 4.21
Summary of One-Way ANOVA for the Effects of Major on Activities

Activities		SS	df	F	Sig.	Tukey
Studying	Between Groups	51.419	3	7.782	.000*	1-2, 1-4, 2-3, 2-4
	Within Groups	1250.950	568			
	Total	1302.369	571			
Library resources	Between Groups	11.218	3	2.818	.038	
	Within Groups	757.680	571			
	Total	768.897	574			
Info Surfing	Between Groups	69.612	3	19.528	.000*	1-2, 1-3, 1-4, 3-2, 3-4
	Within Groups	679.693	572			
	Total	749.306	575			
Writing for class	Between Groups	98.090	3	23.753	.000*	1-2, 1-3, 1-4, 3-2, 3-4
	Within Groups	786.007	571			
	Total	884.097	574			
Email	Between Groups	5.333	3	2.148	.093	
	Within Groups	470.974	569			
	Total	476.307	572			
IM	Between Groups	22.396	3	3.123	.026	
	Within Groups	1353.155	566			
	Total	1375.551	569			
Writing for fun	Between Groups	1.680	3	.680	.565	
	Within Groups	467.070	567			
	Total	468.750	570			
Games	Between Groups	23.296	3	2.383	.068	
	Within Groups	1853.975	569			
	Total	1877.271	572			
Music/Video	Between Groups	52.896	3	10.096	.000*	1-3, 1-4, 2-3, 2-4
	Within Groups	998.977	572			
	Total	1051.873	575			
Surfing for fun	Between Groups	40.295	3	8.005	.000*	1-3, 2-3
	Within Groups	958.098	571			
	Total	998.393	574			
Online shopping	Between Groups	7.614	3	4.963	.002*	1-3
	Within Groups	289.475	566			
	Total	297.089	569			
Spreadsheets	Between Groups	1.873	3	1.277	.281	
	Within Groups	279.084	571			
	Total	280.957	574			
PPT	Between Groups	8.985	3	4.515	.004	
	Within Groups	378.069	570			
	Total	387.054	573			
Graphics	Between Groups	2.989	3	2.159	.092	
	Within Groups	263.117	570			
	Total	266.106	573			
Video/Audio files	Between Groups	2.475	3	1.804	.145	

	Within Groups	261.201	571			
	Total	263.677	574			
Webages	Between Groups	35.543	3	15.004	.000*	1-3, 2-3 3-4,
	Within Groups	450.096	570			
	Total	485.639	573			
Course websites	Between Groups	76.896	3	21.343	.000*	1-2, 1-3, 2-3, 3-4
	Within Groups	688.158	573			
	Total	765.054	576			

*p< .003 after Bonferroni correction based on p<.05

With regard to the relationship between weekly hours and class, freshmen spent least hours on the selected activities, which is seemingly associated with their low technology ownership rates. Juniors were most actively engaged in a variety of activities using ICT: (a) using library resources, (b) writing documents for coursework, (c) creating and editing audio/video files, (d) surfing the Internet for fun, (e) downloading music or videos, (f) playing games (g) creating presentation slides, (h) creating graphic images, and (i) using course websites. Seniors reported spending a great deal of hours on (a) surfing the Internet for information, (b) emailing, (c) writing for fun, (d) online shopping, (e) creating charts, and (f) creating audio/video files. It seems that their usage patterns were more purposeful than other class cohorts. Sophomores were more likely to use ICT in doing classroom activities and sending instant messages than other class cohorts (see Table 4.22).

Table 4.22
Activities Engaged by Class

	Freshman	Sophomore	Junior	Senior
Studying	2.85 (1.438)	3.97 (1.523)	3.61 (1.572)	3.00 (1.764)
Using library resources	2.22 (1.082)	2.50 (1.106)	2.67 (1.398)	2.26 (1.284)
Surfing for information	2.02 (.962)	3.27 (.691)	3.39 (1.148)	3.42 (1.017)
Writing for course work	2.08 (1.166)	3.17 (.874)	3.30 (1.096)	3.26 (.933)
Email	2.17 (.904)	2.62 (.942)	2.47 (.851)	2.74 (.872)
Instant messaging	2.73 (1.603)	3.03 (1.679)	2.84 (1.323)	2.84 (1.323)
Writing for fun	1.43 (.857)	1.45 (.910)	1.77 (.960)	2.05 (1.393)
Playing games	2.57 (1.801)	2.34 (1.717)	3.26 (1.864)	2.16 (1.302)
Music/Videos	3.21 (1.263)	4.17 (1.649)	4.20 (1.342)	4.05 (1.177)
Surfing for fun	3.06 (1.175)	3.83 (1.754)	4.24 (1.360)	4.11 (1.150)
Online shopping	1.16 (.596)	1.45 (.910)	1.57 (.999)	1.68 (.885)
Spreadsheets	1.29 (.654)	1.52 (.509)	1.74 (.758)	2.05 (.848)
Presentation slides	1.22 (.614)	1.66 (.614)	2.44 (.888)	2.32 (.885)
Graphics	1.21 (.576)	1.48 (.738)	1.86 (.801)	1.68 (.885)
Video/Audio files	1.22 (.634)	1.48 (.785)	1.41 (.763)	1.58 (.902)
Webpages	1.24 (.777)	1.38 (.820)	2.18 (1.176)	1.42 (.902)
Course websites	2.01 (1.023)	2.30 (1.022)	3.21 (1.311)	2.95 (.621)

The results of the one-way ANOVA analysis showed that students' class status was significantly related to weekly hours they spent using ICT in almost all the selected activities except using online library resources, instant messaging, playing games, and creating video/audio files. As Table 4.23 shows, the post hoc analyses using Tukey revealed that freshmen spent significantly less hours using technology for the selected activities than students in upper level classes, especially juniors and seniors. Additional findings included:

(1) Juniors were significantly more engaged in using graphics than sophomores, creating webpages than sophomores and seniors, and using course websites than sophomores.

(2) Seniors spent significantly more hours using spreadsheets and presentation

software than sophomores.

Table 4.23
Summary of One-Way ANOVA for the Effects of Class on Activities

Activities		SS	df	F	Sig.	Tukey
Studying	Between Groups	70.316	3	10.785	.000*	1-2, 1-3
	Within Groups	1245.344	573			
	Total	1315.660	576			
Using library resources	Between Groups	16.011	3	4.076	.007	
	Within Groups	755.456	577			
	Total	771.466	580			
Surfing for information	Between Groups	193.541	3	66.733	.000*	1-2, 1-3, 1-4
	Within Groups	558.777	578			
	Total	752.318	581			
Writing for course work	Between Groups	148.259	3	38.293	.000*	1-2, 1-3, 1-4
	Within Groups	744.654	577			
	Total	892.912	580			
Email	Between Groups	15.675	3	6.496	.000*	1-2, 1-3, 1-4
	Within Groups	462.495	575			
	Total	478.169	578			
IM	Between Groups	3.376	3	.465	.707	
	Within Groups	1383.983	572			
	Total	1387.359	575			
Writing for fun	Between Groups	14.537	3	6.013	.000*	1-3, 1-4
	Within Groups	461.710	573			
	Total	476.246	576			
Playing games	Between Groups	42.860	3	4.440	.004	
	Within Groups	1850.055	575			
	Total	1892.915	578			
Music/Video	Between Groups	97.355	3	19.374	.000*	1-2, 1-3, 1-4
	Within Groups	968.159	578			
	Total	1065.514	581			
Surfing for fun	Between Groups	125.313	3	27.241	.000*	1-2, 1-3, 1-4
	Within Groups	884.780	577			
	Total	1010.093	580			
Online shopping	Between Groups	17.402	3	11.826	.000*	1-3, 1-4
	Within Groups	280.570	572			
	Total	297.972	575			
Spreadsheets	Between Groups	24.623	3	18.192	.000*	1-3, 1-4, 2-4
	Within Groups	260.327	577			
	Total	284.950	580			
Presentation slides	Between Groups	127.291	3	93.585	.000*	1-2, 1-3, 1-4, 2-4
	Within Groups	261.151	576			
	Total	388.441	579			
Graphics	Between Groups	34.706	3	28.632	.000*	1-3, 1-4, 2-3
	Within Groups	232.734	576			
	Total	267.440	579			
Video/Audio	Between Groups	6.065	3	4.462	.004	

	Within Groups	261.423	577			
	Total	267.487	580			
Web pages	Between Groups	65.804	3	29.855	.000*	1-3, 2-3, 3-4
	Within Groups	423.194	576			
	Total	488.998	579			
Course websites	Between Groups	117.258	3	34.596	.000*	1-3, 1-4, 2-3
	Within Groups	654.155	579			
	Total	771.413	582			

*p< .003 after Bonferroni correction based on p<.05

Self-Perceived Level of ICT Skills

When the students were asked to rate their technology skills compared to other students' skills on their campus, almost half of the students (48.1%) rated themselves as having about the same skill level. Only 12% of them saw themselves as more skilled or much more skilled than their peers while about 40% reported their technology skills were lower or much lower compared to other students' skills. Overall, the students did not seem confident in their technology skills (see Table 4.24).

Table 4.24
Self-rating ICT Skill Levels

	Frequency	Percent	Valid Percent	Cumulative Percent
Much less skilled	64	10.8	10.9	10.9
Less skilled	170	28.8	29.0	39.9
About the same skill level	282	47.7	48.1	88.1
More skilled	63	10.7	10.8	98.8
Much more skilled	7	1.2	1.2	100.0
Total	586	99.2	100.0	
Missing	5	.8		
Total	591	100.0		

Students' self-assessed technology skills had a statistically significant relationship with gender (t (584) = -3.773, p<.05), major (F (3, 576) = 3.754, p<.05),

class (F (3, 582) = 9.625, p<.05) and desktop ownership (t (392. 879) = 11.686, p<.05). Male students rated their skills significantly higher than female students (see Table 4.25), and desktop owners rated their skills much higher than non-owners (see Table 4.26). Moreover, the Tukey follow-up tests showed that management majors self-rated their technology skills significantly higher than math and science majors (see Table 4.27 and 4.28), and that juniors rated their skill levels significantly higher than freshmen (see Table 4.29 and 4.30).

Table 4. 25
Differences in Self-rating ICT skills based on Gender

	Male	Female	t	df	p
Self-rated ICT skills	2.69 (.860)	2.37 (.818)	-3.773	584	.000

Table 4.26
Differences in Self-rating ICT skills based on Desktop Ownership

	Yes (N=182)	No (N=404)	t	df	p
Self-rated ICT skills	3.16 (.714)	2.38 (.811)	11.686	392.879	.000

Table 4.27
Means and Standard Deviations for Major and Self-rating ICT Skill Levels

	Engineering	Math & Science	Management	Arts & Humanities
Self-rated ICT skills	2.66 (.840)	2.39 (.910)	2.76 (.835)	2.72 (.924)

Table 4.28
Summary of One-Way ANOVA for the Effects of Major on Self-rating ICT skills

	SS	df	F	Sig.	Tukey
Between Groups	8.281	3	3.754	.011	3-2
Within Groups	423.531	576			
Total	431.812	579			

Table 4.29
Means and Standard Deviations for Class and Self-rating ICT skill Levels

	Freshman	Sophomore	Junior	Senior
Self-rated ICT skills	2.53 (.879)	2.70 (.952)	3.02 (.639)	2.94 (.539)

Table 4.30
Summary of One-Way ANOVA for the Effects of Class on Self-rating ICT skills

	SS	df	F	Sig.	Tukey
Between Groups	20.499	3	9.625	.000	3-1
Within Groups	413.155	582			
Total	433.654	585			

A series of stepwise multiple regression analyses were performed to identify which variable(s) discussed previously (e.g., gender, class, major and desktop ownership) contributed most to students' self-assessed technology skills. The stepwise regression procedure is known as useful particularly in looking for the most parsimonious set of independent variable(s) with the highest correlation to the dependent and building a model equation with possible predictors (Pedhazur, 1997). In stepwise regression, independent variables are entered based on their statistically significant contribution to the explanation of the variance in the dependent variable. Variables that do not make a significant contribution are eliminated from the final equation.

The regression Table 4.31 shows that model 1 that included only desktop ownership accounted for 17.4% of the variance (adjusted $R^2 = .173$). The inclusion of gender into model 2 added about 4% of the variance being explained (R^2 change =.039), and this model accounted for 21.3% of the variance (adjusted $R^2 = .210$). In addition, the stepwise regression indicated that class and major were not significant predictors of students' self-perceived technology skills.

Table 4.31
Model Summary for Stepwise Multiple Regressions of Self-rating ICT skills on Desktop Ownership, Gender, Class and Major

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.417(a)	.174	.173	.786	.174	121.743	1	578	.000
2	.462(b)	.213	.210	.767	.039	28.715	1	577	.000

a Predictors: (Constant), desktop
b Predictors: (Constant), desktop, gender

The students were also asked to evaluate their level of ICT skills in using 11 selected applications, as shown in Table 4.32. They were given five scales with detailed explanations: (1) do not use, (2) very unskilled=have not used the software, (3) unskilled=have used the software but not regularly, (4) skilled=full use of basic features but not advanced features, and (5) very skilled=ability to use advanced features, link the software with other software, troubleshoot problems, and upgrade/patch the software. Surprisingly, they rated themselves as unskilled or very unskilled in almost all activities except word processing (mean=3.66). The students reported lower skill levels for computer maintenance (mean=1.88), creating and maintaining blogs (mean=1.74), and creating and editing video/audio files (mean=1.83). Nearly or more than half of them answered ‘do not use’ for computer maintenance (49.6%), creating and maintaining blogs (53.9%), and creating and editing audio/video files (43.9%). The results suggested that the students’ skill levels were not high enough especially for advanced applications (e.g., creating web pages and hardware maintenance), and that the participants appeared well aware of this fact.

Table 4.32
Means and Standard Deviations for Perceived ICT skills for Selected Applications

Activity	Mean (SD)
Word processing (N=582)	3.66 (.827)
Computer operating systems (N=582)	3.26 (1.116)
Spreadsheets (N=582)	3.21 (.865)
Online library resources (N=581)	2.72 (1.100)
Presentation software (N=581)	2.70 (1.206)
Securing your electronic device (N=581)	2.58 (1.251)
Graphic software (N=581)	2.52 (.989)
Creating Web pages (N=581)	2.26 (1.073)
Computer maintenance (N=581)	1.88 (1.070)
Creating and editing video/audio (N=581)	1.83 (.897)
Creating and maintaining blogs (N=581)	1.74 (.991)

Scale: *1=do not use, 2=very unskilled, 3=unskilled, 4=skilled, 5=very skilled*

No significant gender difference was found in self-rating skill levels (see Table 4.33) for all selected applications.

Table 4.33
Differences in Perceived ICT Skills Based on Gender

	Male	Female	t	df	p
Word	3.63 (.860)	3.81 (.680)	2.189	580	.029
Spreadsheets	3.21 (.889)	3.23 (.774)	.301	580	.764
PPT	2.64 (1.216)	2.92 (1.147)	2.305	579	.022
Graphic software	2.52 (1.012)	2.54 (.903)	.207	579	.836
Video/Audio files	1.86 (.935)	1.74 (.739)	-1.253	579	.154
Webpages	2.21 (1.081)	2.44 (1.027)	2.125	579	.034
Blogs	1.73 (1.006)	1.79 (.936)	.639	579	.523
Online library	2.70 (1.126)	2.78 (.999)	.649	579	.517
OS	3.28 (1.135)	3.19 (1.045)	-.762	580	.446
Maintenance	1.94 (1.113)	1.66 (.870)	-2.533	579	.012
Security	2.60 (1.282)	2.54 (1.133)	-.479	579	.632

*p< .005 after Bonferroni correction based on p<.05.

Arts and humanities majors claimed to possess highest skill levels in the areas of word processing, spreadsheets, presentation software and creating or editing video/audio files while management majors reported to have highest skill levels in dealing with graphics, web pages, blogs, online library resources, operating system, computer maintenance and security. On the other hand, math and science majors reported to have lowest skill levels in most areas, except four areas in which engineering majors claimed to have lowest skill levels (e.g., creating graphics, video/audio files, web pages and blogs) (see Table 4.34). According to one-way ANOVA analyses, major was significantly related to students' perceived skills in (a) word processing ($F(3,572) = 13.742$, $p < .05$), (b) spreadsheets ($F(3,572) = 5.625$, $p < .05$) , (c) presentation software ($F(3,571) = 17.312$, $p < .05$), (d) graphic software ($F(3,571) = 6.091$, $p < .05$), (e) websites ($F(3,571) = 14.159$, $p < .05$), (f) operating system ($F(3,572) = 5.333$, $p < .05$), and (g) computer security ($F(3,571) = 8.032$, $p < .05$). The post hoc tests further indicated:

(1) Both management and arts and humanities majors perceived their skills in using word processing significantly higher than engineering and math and science majors.
(2) Arts and humanities majors rated themselves significantly higher in using spreadsheets than engineering and math and science majors.
(3) Management and arts and humanities self-rated significantly higher in using presentation software than engineering and math and science majors.
(4) Management students rated themselves in creating graphic images significantly higher than engineering and math and science students.

(5) Engineering students perceived their skills in creating websites significantly lower than management and arts and humanities students.

(6) Math and science students rated their skills in dealing with operating system significantly lower than management students.

(7) Management majors perceived themselves significantly higher than engineering and math and science majors in terms of maintaining computer security.

Table 4.34
Means and Standard Deviations for Major and Perceived ICT Skills for Selected Applications

	Engineering	Math & Science	Management	Arts & Humanities
Word	3.63 (.823)	3.39 (.900)	3.98 (.519)	4.19 (.780)
Spreadsheets	3.19 (.842)	3.03 (.910)	3.33 (.764)	3.69 (.998)
PPT	2.57 (1.180)	2.37 (1.120)	3.23 (1.171)	3.63 (1.008)
Graphic software	2.42 (.971)	2.45 (1.000)	2.86 (1.001)	2.84 (.847)
Video/audio files	1.77 (.848)	1.88 (.948)	1.91 (.990)	2.16 (.954)
Webpages	2.11 (1.012)	2.15 (1.142)	2.86 (.978)	2.63 (1.100)
Blogs	1.66 (.937)	1.74 (.981)	2.07 (1.140)	1.75 (.984)
Online library	2.70 (1.089)	2.62 (1.147)	2.92 (1.052)	2.78 (1.157)
OS	3.28 (1.106)	2.99 (1.134)	3.60 (1.026)	3.06 (1.190)
Maintenance	1.84 (1.059)	1.76 (.986)	2.11 (1.136)	2.00 (1.191)
Security	2.53 (1.255)	2.25 (1.116)	3.07 (1.197)	2.88 (1.408)

( ): Standard Deviation

Table 4.35 Summary of One-Way ANOVA for the Effects of Major on ICT Skills

		SS	df	F	Sig.	Tukey
Word	Between Groups	26.173	3	13.742	.000*	1-2, 1-3, 1-4
	Within Groups	363.153	572			2-3, 2-4
	Total	389.326	575			
Spreadsheets	Between Groups	12.269	3	5.625	.001*	1-4, 2-4
	Within Groups	415.891	572			
	Total	428.160	575			
PPT	Between Groups	69.778	3	17.312	.000*	1-3, 1-4, 2-3
	Within Groups	767.172	571			2-4
	Total	836.950	574			
Graphics	Between Groups	17.350	3	6.091	.000*	1-3, 2-3
	Within Groups	542.208	571			
	Total	559.558	574			
Audio/Video files	Between Groups	5.465	3	2.269	.080	
	Within Groups	458.507	571			
	Total	463.972	574			
Websites	Between Groups	45.619	3	14.159	.000*	1-3, 1-4, 2-3
	Within Groups	613.250	571			
	Total	658.870	574			
Blogs	Between Groups	12.112	3	4.189	.006	
	Within Groups	550.278	571			
	Total	562.390	574			
Online library	Between Groups	5.028	3	1.391	.245	
	Within Groups	688.005	571			
	Total	693.033	574			
OS	Between Groups	19.492	3	5.333	.001*	2-3
	Within Groups	696.868	572			
	Total	716.359	575			
Maintenance	Between Groups	7.308	3	2.143	.094	
	Within Groups	648.925	571			
	Total	656.233	574			
Security	Between Groups	36.512	3	8.031	.000*	1-3, 2-3
	Within Groups	865.314	571			
	Total	901.826	574			

*p< .005 after Bonferroni correction based on <.05.

The ANOVA results showed that class was significantly different in perceived skills for all 11 applications and activities presented, as Table 4.37 shows. In all cases, freshmen rated themselves as least skilled. While sophomores ranked themselves higher than other class groups in using basic applications such as word

and spreadsheets, juniors and seniors rated themselves as more skilled than other class groups in using advanced applications. The post hoc tests indicated:

(1) Freshmen assessed their skills significantly lower than sophomores for word processing, using spreadsheets and graphic software, creating video/audio files, developing webpages, and maintaining security.
(2) Freshmen rated themselves significantly lower than juniors in dealing with word processing, spreadsheets, presentation and graphic software, video/audio files, webpages, blogs, operating system, online library, computer maintenance, and security.
(3) Freshman rated their skill significantly lower than seniors for presentation software, blogs, computer maintenance and security.
(4) Juniors perceived their skills significantly higher than seniors for creating webpages, and than sophomores for creating and editing blogs.
(5) Seniors rated themselves significantly higher than sophomores in creating and editing blogs, and using operating system.

Table 4.36
Means and Standard Deviations for Class and Perceived ICT Skills for Selected Applications

	Freshman	Sophomore	Junior	Senior
Word	3.51 (.843)	4.30 (.535)	4.18 (.441)	3.79 (.787)
Spreadsheets	3.12 (.859)	3.77 (.898)	3.44 (.797)	3.42 (.769)
PPT	2.34 (1.092)	3.77 (.858)	3.91 (.685)	3.84 (.602)
Graphic software	2.40 (.998)	2.93 (.785)	3.00 (.866)	2.42 (.769)
Video/audio files	1.75 (.845)	2.23 (.935)	2.04 (1.054)	2.21 (.855)
Webpages	2.02 (1.018)	2.73 (1.048)	3.26 (.666)	2.47 (.964)
Blogs	1.58 (.866)	1.80 (.997)	2.35 (1.253)	2.53 (.905)
Online library	2.60 (1.090)	2.90 (1.094)	3.20 (1.079)	3.05 (.705)
OS	3.15 (1.135)	3.20 (1.095)	3.71 (.944)	3.79 (.787)
Maintenance	1.69 (.960)	2.07 (1.202)	2.53 (1.159)	2.95 (1.079)
Security	2.33 (1.165)	3.00 (1.365)	3.51 (1.078)	3.58 (1.121)

Table 4.37
Summary of One-Way ANOVA for the Effects of Class on Perceived ICT Skills for Selected Applications

		SS	df	F	Sig.	Tukey
Word	Between Groups	46.165	3	25.304	.000*	1-2, 1-3
	Within Groups	351.500	578			
	Total	397.665	581			
Spreadsheets	Between Groups	18.423	3	8.521	.000*	1-2, 1-3
	Within Groups	416.582	578			
	Total	435.005	581			
Presentations	Between Groups	247.831	3	79.969	.000*	1-2, 1-3, 1-4
	Within Groups	596.059	577			
	Total	843.890	580			
Graphics	Between Groups	32.244	3	11.597	.000*	1-2, 1-3
	Within Groups	534.778	577			
	Total	567.022	580			
Audio/Video files	Between Groups	14.777	3	6.287	.000*	1-2, 1-3
	Within Groups	452.029	577			
	Total	466.806	580			
Websites	Between Groups	122.240	3	43.099	.000*	1-2, 1-3, 3-4
	Within Groups	545.515	577			
	Total	667.756	580			
Blogs	Between Groups	55.792	3	20.898	.000*	1-3, 1-4, 2-3, 2-4
	Within Groups	513.482	577			
	Total	569.274	580			
Online library	Between Groups	30.591	3	8.773	.000*	1-3
	Within Groups	670.680	577			
	Total	701.270	580			
OS	Between Groups	28.571	3	7.918	.000*	1-3
	Within Groups	695.252	578			
	Total	723.823	581			
Maintenance	Between Groups	76.318	3	24.963	.000*	1-3, 1-4, 2-4
	Within Groups	588.005	577			
	Total	664.324	580			
Security	Between Groups	128.783	3	31.820	.000*	1-2, 1-3, 1-4
	Within Groups	778.418	577			
	Total	907.201	580			

*p< .005 after Bonferroni correction based on p<.05

According to Table 4.38, desktop ownership was significantly related to students' perceived ICT skills. For all applications, desktop owners self-assessed their skill levels much higher than non-owners. The differences were particularly noticeable in the areas of presentation software, computer maintenance and security.

Table 4.38
Differences in Perceived ICT Skills for Selected Applications by Desktop Ownership

	Desktop Owner	Desktop Non-Owner	t	df	p
Word	3.96 (.706)	3.53 (.845)	5.908	580	.000*
Spreadsheets	3.41 (.768)	3.12 (.894)	3.734	580	.000*
PPT	3.50 (.939)	2.33 (1.136)	12.189	579	.000*
Graphic software	2.86 (.867)	2.36 (1.003)	5.818	579	.000*
Video/audio files	2.16 (1.001)	1.68 (.802)	6.129	579	.000*
Webpages	2.74 (1.067)	2.04 (1.001)	7.746	579	.000*
Blogs	2.10 (1.175)	1.58 (.843)	6.093	579	.000*
Online library	3.06 (1.038)	2.56 (1.093)	5.208	579	.000*
OS	3.74 (.937)	3.04 (1.123)	7.421	580	.000*
Maintenance	2.58 (1.186)	1.55 (.827)	12.168	579	.000*
Security	3.46 (1.037)	2.17 (1.126)	13.135	579	.000*

*p< .005 after Bonferroni correction based on p<.05.

Stepwise multiple regression analyses were used again to determine the best set of potential predictor variables of students' perceived skill levels for each application, as Table 4.39 shows. The results indicated that:

(1) A model including class, major, and desktop accounted for 9.6% (adjusted $R^2 = .096$) of the variance in students' perceived skills for word processing (see Table 4. 40).

(2) Class was the single most significant predictor explaining students' perceived skill levels for using spreadsheets (adjusted $R^2 = .024$) (see

Table 4. 41).

(3) A model incorporating class, desktop and major explained 32% (adjusted R^2 = .319) of the variance in students' perceived skills for using presentation software (see Table 4.42).

(4) A model including desktop and major accounted for 6.6% (adjusted R^2 = .066) of the variance in students' perceived skills for using graphic software (see Table 4.43).

(5) Desktop ownership was the strongest predictor variable in explaining students' perceived skill levels for creating and managing video/audio files, accounting for 6% (adjusted R^2 = .060) of the variance (see Table 4.44).

(6) A combination of class, major and desktop ownership accounted for 17.6% (adjusted R^2 = .176) of the variance in the students' perceived skills for creating webpages (see Table 4.45).

(7) A combination of class and desktop made a significant contribution to students' perceived skills for managing blogs (adjusted R^2 = .105) (see Table 4.46).

(8) A model involving desktop ownership and class accounted for 5.2% (adjusted R^2 = .052) of the variation in students' perceived skills for using online library. (see Table 4.47).

(9) Desktop ownership was the only variable, which entered the predicting model for students' perceived skills for Operating System (OS) (adjusted R^2 = .087) (see Table 4.48).

(10) A combination of desktop ownership, gender, and class explained 25% (adjusted $R^2 = .250$) of the variation in students' perceived skills for computer maintenance (see Table 4.49).

(11) A model including desktop, class, and gender explained 25.6% (adjusted $R^2 = .256$) of the variance in students' perceived skills for maintaining computer security (see Table 4.50).

In stepwise multiple regression analyses, desktop ownership and class were always strong predictor variables. When considering the fact that class was significantly related to desktop ownership (see Table 4.5), ownership of desktops seems a powerful predictor that contributes most to students' perceived skill levels for the selected applications and activities.

Table 4.39
Factors Explaining Perceived ICT Skills for Selected Applications

	Model 1	Model 2	Model 3
Word	Class	Class, Major	Class, Major, Desktop
Spreadsheets	Class		
PPT	Class	Class, Desktop	Class, Desktop, Major
Graphic software	Desktop	Desktop, Major	
Video/audio files	Desktop		
Webpages	Class	Major	Class, Major, Desktop
Blogs	Class	Class, Desktop	
Online library	Desktop	Desktop, Class	
OS	Desktop		
Maintenance	Desktop	Desktop, Gender	Desktop, Gender, Class
Security	Desktop	Desktop, Class	Desktop, Class, Gender

Table 4.40
Model Summary for Stepwise Multiple Regression of Perceived ICT Skills for Word Processing

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.283(a)	.080	.078	.790	.080	49.917	1	574	.000
2	.302(b)	.091	.088	.786	.011	7.095	1	573	.008
3	.318(c)	.101	.096	.782	.010	6.322	1	572	.012

a Predictors: (Constant), class b Predictors: (Constant), class, major
c Predictors: (Constant), class, major, desktop d Dependent Variable: word

Table 4.41
Model Summary for Stepwise Multiple Regression of Perceived ICT Skills for Spreadsheets

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.160(a)	.025	.024	.853	.025	14.997	1	574	.000

a Predictors: (Constant), class b Dependent Variable: spreadsheets

Table 4.42
Model Summary for Stepwise Multiple Regression of Perceived ICT Skills for Presentation Software

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.518(a)	.269	.267	1.034	.269	210.546	1	573	.000
2	.559(b)	.312	.310	1.003	.043	36.060	1	572	.000
3	.568(c)	.323	.319	.996	.011	9.249	1	571	.002

a Predictors: (Constant), class b Predictors: (Constant), class, desktop
c Predictors: (Constant), class, desktop, major d Dependent Variable: presentation software

Table 4.43
Model Summary for Stepwise Multiple Regression of Perceived ICT Skills for Graphics

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.233(a)	.054	.053	.961	.054	32.881	1	573	.000
2	.264(b)	.070	.066	.954	.015	9.459	1	572	.002

a Predictors: (Constant), desktop b Predictors: (Constant), desktop, major
c Dependent Variable: graphics

Table 4.44
Model Summary for Stepwise Multiple Regression of Perceived ICT Skills for Video/Audio Files

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.248(a)	.061	.060	.872	.061	37.507	1	573	.000

a Predictors: (Constant), desktop b Dependent Variable: audio/video files

Table 4.45
Model Summary for Stepwise Multiple Regression of Perceived ICT Skills for Webpages

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.381(a)	.145	.144	.991	.145	97.222	1	573	.000
2	.406(b)	.165	.162	.981	.020	13.680	1	572	.000
3	.425(c)	.181	.176	.972	.016	10.885	1	571	.001

a Predictors: (Constant), class b Predictors: (Constant), class, major

Table 4.46
Model Summary for Stepwise Multiple Regression of Perceived ICT Skills for Blogs

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.313(a)	.098	.096	.941	.098	62.126	1	573	.000
2	.328(b)	.108	.105	.937	.010	6.441	1	572	.011

a Predictors: (Constant), class b Predictors: (Constant), class, desktop
c Dependent Variable: blogs

Table 4.47
Model Summary for Stepwise Multiple Regression of Perceived ICT Skills for Online Library Resources

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.214(a)	.046	.044	1.074	.046	27.376	1	573	.000
2	.236(b)	.056	.052	1.070	.010	6.160	1	572	.013

a Predictors: (Constant), desktop b Predictors: (Constant), desktop, class
c Dependent Variable: online library

Table 4.48
Model Summary for Stepwise Multiple Regression of Perceived ICT Skills for Operating System

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.298(a)	.089	.087	1.067	.089	55.765	1	574	.000

a Predictors: (Constant), desktop b Dependent Variable: OS

Table 4.49
Model Summary for Stepwise Multiple Regression of Perceived ICT Skills for Computer Maintenance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.460(a)	.211	.210	.950	.211	153.521	1	573	.000
2	.483(b)	.234	.231	.938	.022	16.715	1	572	.000
3	.503(c)	.253	.250	.926	.020	15.119	1	571	.000

a Predictors: (Constant), desktop b Predictors: (Constant), desktop, gender
c Predictors: (Constant), desktop, gender, class d Dependent Variable: maintenance

Table 4.50
Model Summary for Stepwise Multiple Regression of Perceived ICT Skills for Security

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.482(a)	.232	.231	1.099	.232	173.104	1	573	.000
2	.501(b)	.251	.248	1.087	.019	14.482	1	572	.000
3	.510(c)	.260	.256	1.081	.009	6.823	1	571	.009

a Predictors: (Constant), desktop b Predictors: (Constant), desktop, class
c Predictors: (Constant), desktop, class, gender d Dependent Variable: security

Concerns

The students were asked to report their concerns regarding their use of ICT by choosing one of four categories (1=not a concern, 2=small concern, 3=significant concern, and 4=major concern). As shown in Table 4.51, they were most concerned about troubleshooting, followed by slow or inadequate network access and computer viruses, worms or Trojan horses. Inadequate access to printing was not a big concern of the students. They were not much worried about spam and the age of computer hardware and software, either. More details about students' concerns are shown in Figures 4.2-4.8.

Table 4.51
Means and Standard Deviations for Students' Concerns

Concern	Mean (SD)
My technical skill level in troubleshooting my computer (n=552)	2.70 (.863)
Slow or inadequate network access (n=562)	2.60 (.879)
Computer viruses, worms, or Trojan horses (n=552)	2.41 (.893)
Inadequate technical assistance and help (n=520)	2.18 (.891)
The age of my computer hardware and software (n=547)	1.86 (.843)
Spam (n=546)	1.82 (.795)
Inadequate access to printing (n=549)	1.58 (.728)

Figure 4.2
Printing

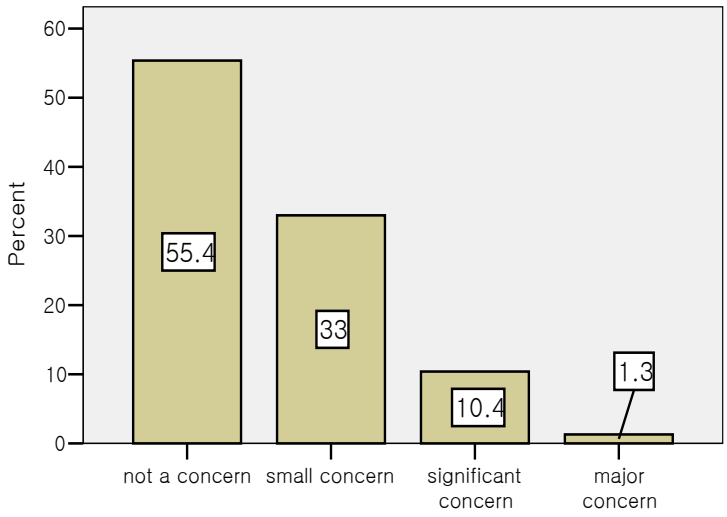


Figure 4.3
Computer Age

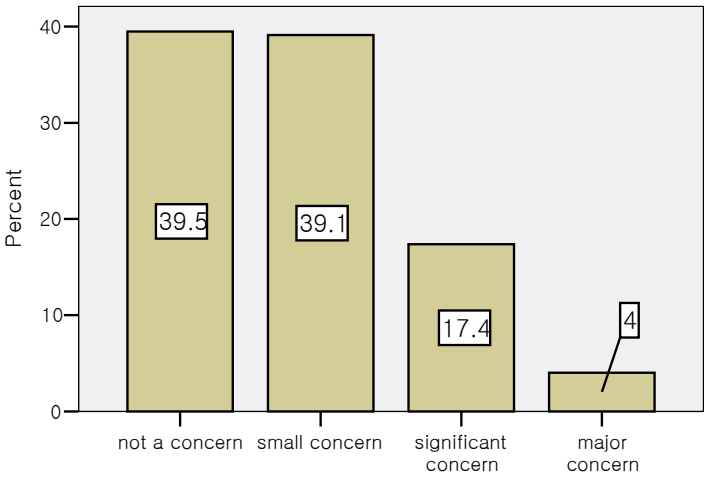


Figure 4. 4
Network Access

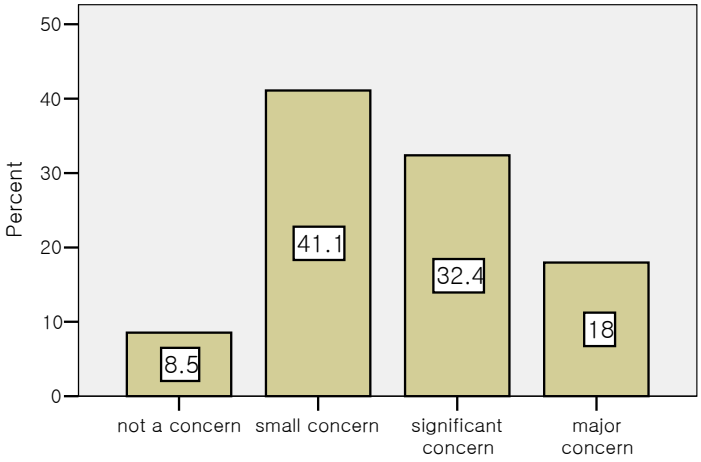


Figure 4.5
Troubleshooting

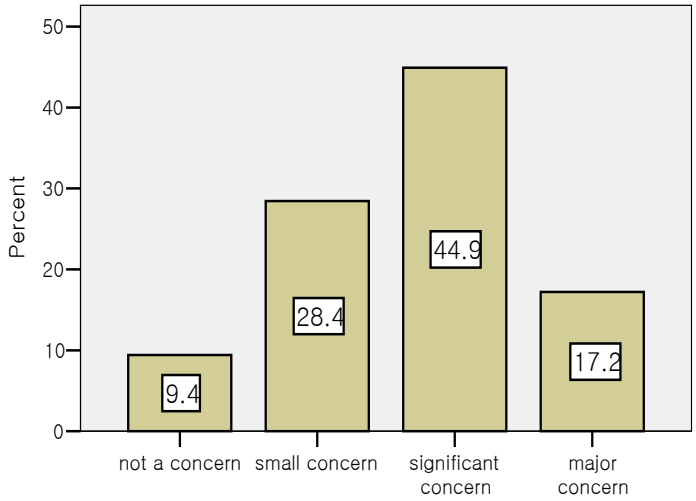


Figure 4.6
Viruses, worms, or Trojan horses

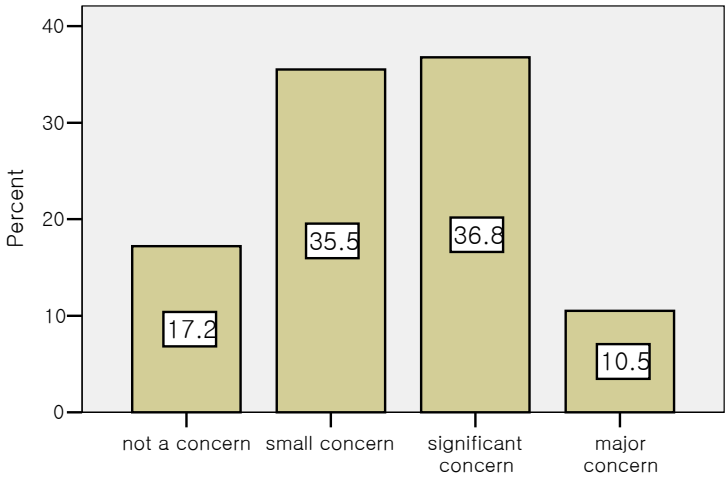


Figure 4.7
Spam

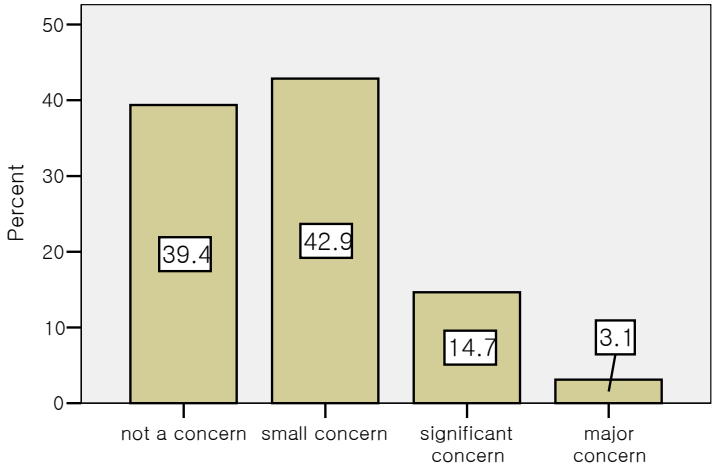
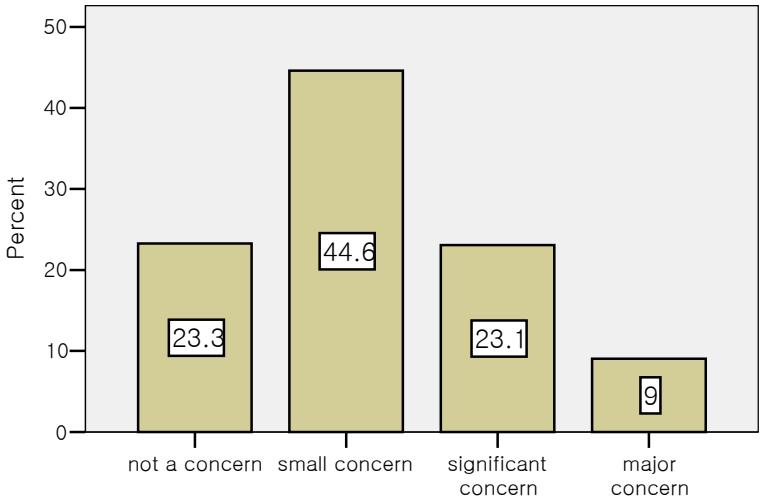


Figure 4.8
Technical Assistance and Help



Use of ICT in Learning English

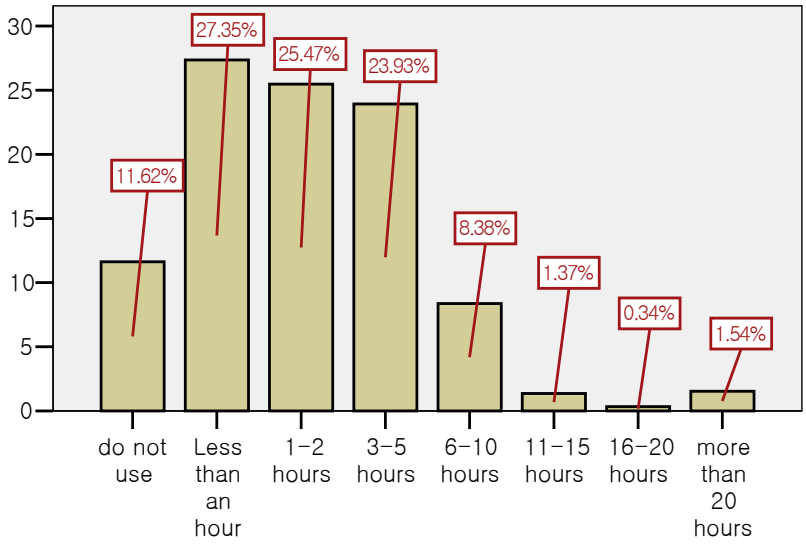
Weekly Hours Using ICT in Learning English

The participants reported that they spent fewer hours using ICT in learning English than using ICT for pleasure and other general activities. According to Table 4.52, the majority of them (88.4%) spent less than five hours per week ICT for studying English. Only 3.2% of the participants spent more than 10 hours per week using ICT for studying English (see Figure 4.9) while 24.6% of them spent more than 10 hours per week using ICT for general purposes (see Figure 4.1).

Table 4.52
Weekly Hours Spent on ICT Use for Studying English

	N= 585
① Do not use	68 (11.6%)
② Less than an hour	160 (27.4%)
③ 1-2 hours	149 (25.5%)
④ 3-5 hours	140 (23.9%)
⑤ 6-10 hours	49 (8.4%)
⑥ 11-15 hours	8 (1.4%)
⑦ 16-20 hours	2 (.3%)
⑧ More than 20 hours	9 (1.5%)

Figure 4.9
Weekly Hours Using ICT for Studying English



Perceived Usefulness of ICT in Learning English

The students perceived that the use of ICT would be beneficial to enhance their listening, speaking, and vocabulary. Specifically, 75.9% of them either agreed or strongly agreed that the use of ICT improved their ability in listening, as Table 4.53 and 4.54 show. Although almost half of the students remained neutral concerning the benefits of using ICT in reading, writing, and grammar, a large number of them either disagreed or strongly disagreed that the use of ICT would enhance their ability in reading (31.5%), writing (32.8%) and grammar (41.7%), as shown in Table 4.54. In addition, the majority of the students were skeptical about the use of ICT learning grammar. These findings deserve further investigation to see where the students' disagreements and agreements came from.

Table 4.53

Means and Standard Deviations for the Effects of ICT Use on Improving English Skills

	Reading	Writing	Speaking	Listening	Grammar	Vocabulary
Valid N	581	581	580	584	583	582
Missing	10	10	11	7	8	9
Mean (SD)	2.89	2.81	3.29	3.85	2.62	3.20
SD	.885	.811	1.001	.821	.769	.909

Note: ① *Strongly Disagree*, ② *Disagree,* ③ *Neutral,* ④ *Agree,* ⑤ *Strongly Agree*

Table 4.54
Percentages of the Effects of ICT Use on Improving English Skills

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Reading	6.0%	25.5%	43.4%	23.6%	1.5%
Writing	5.3%	27.5%	48.4%	18.2%	0.5%
Speaking	4.7%	16.7%	32.4%	37.2%	9.0%
Listening	1.5%	5.3%	17.3%	58.6%	17.3%
Grammar	6.9%	34.8%	48.9%	8.7%	0.7%
Vocabulary	3.8%	17.2%	39.3%	34.9%	4.8%

ICT Preferences in English Courses

With regard to ICT preferences in their English courses, the mean was 3.23 (SD= .845) on a scale of one to five, indicating that most of the students preferred a moderate level of technology in their English courses. Over 80% of the students said that they preferred either moderate or extensive use of technology in their English courses, as shown in Table 4.55. However, only 1.7% of the students reported they preferred taking courses using ICT exclusively, suggesting that a course delivered entirely via technology was not favored by the students.

Table 4.55
ICT Preferences in English Courses

Preferences	N (%)
① I prefer taking courses that use *no* information technology.	24 (4.1%)
② I prefer taking courses that use *limited* technology features	75 (12.8%)
③ I prefer taking courses that use a *moderate* level of technology	240 (41.0%)
④ I prefer taking courses that use technology *extensively*	236 (40.3%)
⑤ I prefer taking courses that use technology *exclusively*	10 (1.7%)

The results of a one-way ANOVA revealed that class was significantly related to students' preferences for ICT use in their English courses ($F(3,581)=3.447$, $p<.05$), with seniors having the highest preference for technology in their English courses and freshmen having the least preference, as shown in Table 4.56 and 4.57. However, the follow-up Tukey showed no significance between the groups. Therefore, other post-hoc tests were performed to find out all possible circumstances, and the Dunnett revealed senior students preferred having significantly more technology features in their English courses than freshmen did. The ANOVA showed that ICT preferences had no significant relationship with gender and major.

Table 4.56
Means and Standard Deviations for Class and ICT Preferences

Class	Mean (SD)
Freshman (n=446)	3.17 (.864)
Sophomore (n=30)	3.33 (.661)
Junior (n=90)	3.41 (.967)
Senior (n=19)	3.58 (.507)
Total (N=585)	3.23 (.845)

Table 4.57

Summary of One-Way ANOVA for the Effects of Class on ICT Preferences

	SS	df	F	Sig.	Dunnett
Between Groups	7.287	3	3.447	.016	1-4
Within Groups	409.475	581			
Total	416.762	584			

An independent t-test was computed to determine if there was a significant relationship between desktop ownership and ICT preferences. As Table 4.58 shows, the difference in ICT preferences between desktop owners and non-owners was statistically significant, indicating that desktop owners preferred more technology integration in English courses than non-owners ($t(583) = 2.745$, $p < 0.05$).

Table 4.58
Differences in ICT Preferences by Desktop Ownership

Mean and Standard Deviation of Desktop Owners (n=185)	Mean and Standard Deviation of Desktop Non-Owners (n=400)	t	df	p
3.37 (.748)	3.16 (.879)	2.745	583	.006

A significant relationship between students' self-assessed ICT skills on a scale of one to five, one being "much less skilled and five being "much more skilled," and their ICT preferences in English courses was found by one-way ANOVA ($F(2, 577) = 6.608$, $p < .01$), as shown in Table 4.59 and 4.60. The follow-up Tukey test revealed that:

(1) Those who rated themselves having about the same level skills liked significantly more technology-enhanced features in their English courses than those who reported much less/less skilled.

(2) Those who rated themselves as much more/more skilled liked significantly more technology integration in their English courses than those who rated themselves as having about the same levels.

Table 4.59
Means and Standard Deviations for Perceived Skills and ICT Preferences

	Mean of ICT Preferences (SD)
Much less skilled & Less Skilled (n=230)	3.09 (.862)
About the same skill level (n=281)	3.28 (.822)
Much more skilled & More skilled (n=69)	3.46 (.833)
Total (N=580)	3.23 (.848)

Table 4.60
Summary of One-Way ANOVA for the Effects of Perceived Skills on ICT Preferences

	SS	df	F	Sig.	Tukey
Between Groups	9.314	2	6.608	.001	1-2, 1-3
Within Groups	406.644	577			
Total	415.959	579			

Impact of ICT Use in English Courses

The students were given eight questions regarding the impact of ICT use in English courses. Based on a scale where 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree, the mean scores were about 3 or slightly above 3, which indicates that the students had a neutral feeling toward the use of ICT in their English courses. As Table 4.61 shows, the highest means were given to better understanding of complex or abstract concepts (mean = 3.38), prompt feedback from instructors (mean = 3.35), more engaged in courses (mean = 3.34), and increasing interests in the subject matter (mean = 3.33). On the other hand, improving communication and collaboration with classmates received the lowest scores (mean =

2.99). In other words, the students did not feel that the use of technology in English courses would enhance communications with their classmates. This might be influenced by their lack of experience in using ICT for collaboration or communication in their English courses.

Table 4.61
Means and Standard Deviations for the Impact of ICT in English Courses

	Mean (SD)
I am more engaged in courses that require me to use technology (n= 554).	3.34 (.818)
The instructors' use of technology in my courses has increased my interest in the subject matter (n=555).	3.33 (.911)
I primarily use information technology in courses to improve the presentation of my work (n=554)	3.25 (.896)
The use of information technology in courses has helped me better understand complex or abstract concepts (n=576).	3.38 (.881)
The use of information technology in courses has helped me better communicate with my instructors (n=568).	3.07 (.890)
The use of information technology in courses has helped me better communicate and collaborate with my classmates (n=567).	2.99 (.873)
The use of information technology in courses has resulted in prompt feedback from my instructors (n=568).	3.35 (.931)
Courses that use information technology allow me to take greater control of my course activities (n=530).	3.10 (.968)

Note: ①*Strongly Disagree,* ②*Disagree,* ③*Neutral,* ④*Agree,* ⑤*Strongly Agree*

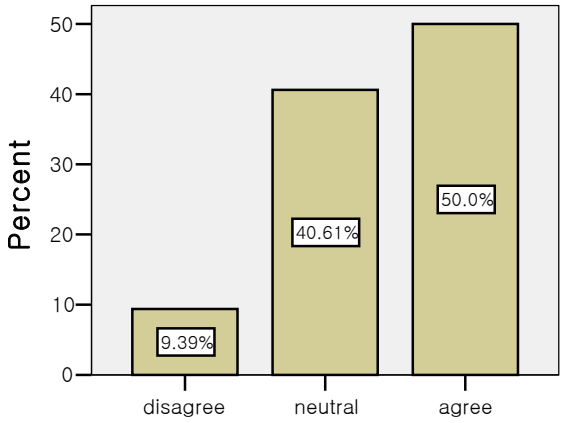
Overall, the students rated their instructors' ICT skills favorably (mean=3.42), as shown in Table 4.62. As Figure 4.10 clearly indicates, half of the students agreed to the statement, "My instructors use information technology well in my courses," while 9.39% of them did not think that their instructors used technology well. A slightly more than 40% of the students remained neutral.

Table 4.62
Means and Standard Deviations for Instructor's ICT Skills Perceived by Students

Overall, my instructors use information technology well in my courses (n=554).	3.42 (.767)

Note: ① Disagree, ② Neutral, ③ Agree

Figure 4.10
Instructor's ICT Skills



According to Table 4.63, the ANOVA results showed that students' perceptions of instructors' ICT skills had a significant effect on their perceptions of the impact of ICT on (a) engagement ($F(4, 544) = 7.601$, $p<.05$), (b) increasing interests ($F(4, 546) = 10.008$, $p<.05$), (c) improving communication with instructors ($F(4, 545)= 7.992$, $p<.05$), (d) prompt feedback from instructors ($F(4, 546) = 4.978$, $p<.05$), and (e) control of course activities ($F(4, 503) = 5.491$, $p<.05$).

Table 4.63
Summary of One-Way ANOVA for the Effects of Instructor's ICT Skills on ICT Use

		SS	df	F	Sig.	Tukey
Engaged	Between Groups	13.404	2	10.468	.000*	1-2, 1-3, 2-3
	Within Groups	349.580	546			
	Total	362.984	548			
Interest	Between Groups	24.224	2	15.413	.000*	1-3, 2-3
	Within Groups	430.626	548			
	Total	454.849	550			
Presentation	Between Groups	2.015	2	1.252	.287	
	Within Groups	439.279	546			
	Total	441.293	548			
Abstracts	Between Groups	6.771	2	4.384	.013	
	Within Groups	424.744	550			
	Total	431.515	552			
Communications with Instructor	Between Groups	19.908	2	13.035	.000*	1-3, 2-3
	Within Groups	417.735	547			
	Total	437.644	549			
Collaboration	Between Groups	3.050	2	2.002	.136	
	Within Groups	416.833	547			
	Total	419.884	549			
Feedback	Between Groups	16.196	2	9.606	.000*	1-3, 2-3
	Within Groups	461.975	548			
	Total	478.171	550			
Control	Between Groups	11.311	2	6.311	.002*	2-3
	Within Groups	452.524	505			
	Total	463.835	507			

*p< .006 after Bonferroni correction based on p<.05.

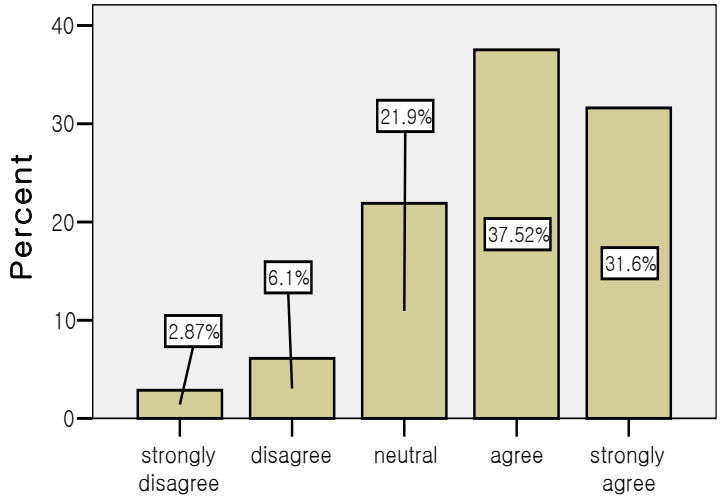
The most important finding was that there was a critical need for adequate ICT training programs in relation to English courses. According to Table 4.64 and Figure 4.11, almost 70% of the students agreed (37.52%) or strongly agreed (31.6%) to the statement, "my school needs to give me more training on the information technology that I am required to use in my courses."

Table 4.64
Means and Standard Deviations for the Need of ICT Training

My school needs to give me more training on the information technology that I am required to use in my courses (n=557).	3.89 (1.013)

Note: *① Strongly Disagree, ② Disagree, ③ Neutral, ④ Agree, ⑤ Strongly Agree*

Figure 4.11
Need of ICT Training



The ANOVA results showed a significant relationship between class and the need of ICT training ($F(3, 553) = 6.893$, $p<.01$), as shown in Table 4.65 and 4.66. Moreover, according to the follow-up Tukey test, freshmen wanted to receive ICT training significantly more than juniors did.

Table 4.65
Means and Standard Deviations for Class and the Need of ICT Training

Class	Mean (SD)
Freshman (n=424)	3.98 (1.009)
Sophomore (n=29)	3.93 (.998)
Junior (n=86)	3.51 (.967)
Senior (n=18)	3.39 (.850)
Total (N=557)	3.89 (1.013)

Table 4.66
Summary of One-Way ANOVA for the Effects of Class on the Need of ICT Training

	SS	df	F	Sig.	Tukey
Between Groups	20.586	3	6.893	.000	1-3
Within Groups	550.513	553			
Total	571.099	556			

Furthermore, according to Table 4.67 and 4.68, the ANOVA found that there was a significant relationship between students' self-rated ICT skills and their need for training ($F(4, 547) = 4.428$, $p<.01$). The Tukey post hoc test also suggested that those who rated themselves as less skilled/much less skilled wanted to receive technology training significantly more than moderately skilled students and much more skilled/ more skilled students.

Table 4.67
Means and Standard Deviations for Self-rating Technology Skills and the Need of ICT Training

	Mean (SD)
Much less skilled & Less skilled (n=219)	4.08 (.983)
About the same skill level (n=267)	3.81 (.980)
Much more skilled & More skilled (n=66)	3.59 (1.123)
Total (N=552)	3.89 (1.011)

Table 4.68
Summary of One-Way ANOVA for the Effects of Self-rating Technology Skills on the Need of ICT Training

	SS	Df	F	Sig.	Tukey
Between Groups	15.745	2	7.891	.000	1-2, 1-3
Within Groups	547.734	549			
Total	563.478	551			

Technology Components in English Courses

As for the question about technology components they would like their instructors to use in English courses, a total of 2057 responses were collected from 573 students (missing = 18). The fact that this particular question attracted a large number of responses suggests that the students wanted to have a variety of technology components integrated in their English courses. Multimedia components including digital images were most wanted by the students (18.0%), followed by PowerPoint presentations (17.5%), course materials available online (12.4%), computer simulations and games (12.1%), and online discussion boards (12.0%) (see Table 4.69).

Table 4.69

Technology Components Wanted by Students for English Courses

	Frequency	Percent	Valid Percent	Cumulative Percent
Course web site	213	10.4	10.4	10.4
PowerPoint presentations	360	17.5	17.5	27.9
Digital images, multimedia components	371	18.0	18.0	45.9
Online course materials	256	12.4	12.4	58.3
Online discussion board	247	12.0	12.0	70.3
Technology-mediated projects	134	6.5	6.5	76.9
Computer simulations and games	248	12.1	12.1	88.9
Webcasting	228	11.1	11.1	100.0
Total	2057	100.0	100.0	

⁎ Multiple answers were allowed.

Summary of Key Findings and Conclusion

This chapter reported the quantitative results from close-ended questions. The results of statistical analyses were as follows:

(1) Ownership levels of ICTs were quite low.

(2) Over 80% of the participants had access to broadband.

(3) The majority of the participants spent three to ten hours weekly using ICT for general purposes.

(4) The activities most engaged in by the participants included surfing the Internet for fun, downloading or listening to music or video, sending e-mail, and doing classroom activities.

(5) Only 12% of the participants rated themselves as highly skilled compared to colleagues.

(6) Class and desktop ownership were the factors contributing most to the

participants' perceived ICT skill levels.

(7) The participants were concerned about troubleshooting, inadequate network access, and computer viruses, and lack of technical help.

(8) The majority of the participants believed that they needed additional training to use ICT in English courses.

(9) Almost 40% of the participants reported that they spent less than one hour per week using ICT for studying English.

(10) The participants preferred having a moderate to extensive amount of ICT features in English courses.

(11) The participants believed that the use of ICT would improve their skills in speaking, listening, and vocabulary. However, they were somewhat skeptical about the effects of ICT use for improving skills in reading, writing, and grammar.

Further discussion and implications are presented in Chapter 6.

Chapter 5
Results of Qualitative Questions

This chapter serves to answer Research Questions 5, 6, 7, and 8, presenting findings from qualitative questions:

Question 5: What are the participants' reason(s) to learn English?

Question 6: How do they perceive English, computers, the Internet, and learning English?

Question 7: What are their perceived benefits of using ICT in learning English?

Question 8: What are their perceived barriers to using ICT in learning English?

In the first part of this chapter, participants' motivational orientations toward learning English are discussed, followed by the results of analyzing metaphors for English and learning English. The second part presents (a) metaphors for computers and the Internet, (b) the participants' perceived benefits of using ICT, and (c) the participants' perceived barriers to integrating ICT into learning English.

Perceptions about English

This section consists of two major parts: (a) motivational orientations and (b) metaphors for English and learning English. Emerging patterns and categories show what motivated the participants to learn English and how they perceived the English language and the process of learning English.

Motivational Orientations

For the open-ended question that asked to report reason(s) for learning English, 549 students out of 591 wrote their answers (missing=39, don't know =3), and many of them gave more than one reason. In total, 764 accounts were elicited, and seven major categories were emerged while analyzing the data, as shown in Table 5.1.

Table 5.1
Student's Motivational Orientations to Learning English

Category	# Accounts	Percentage
1. To prepare for the future	359	47%
2. To communicate with the world	181	24%
3. To acquire skills, information and knowledge, and to learn other subjects	85	11%
4. For personal growth	49	6%
5. Personal interest in foreign culture	43	6%
6. To master a foreign language	37	5%
7. For entertainment	7	0.9%
Total	764	99.9%*

* Multiple answers were accepted. * Don't know (3 accounts)

The results showed that the dominant reason (359 accounts, 47%) for studying English was to prepare the future. This category contained the following reasons: (a) to pass exams and get certificates, (b) to be prepared for life, work and study in the near future, (c) to meet the society's needs, (d) to meet the university requirements for graduation, (e) to get a good job, and (f) to go abroad for traveling and study. The results indicated that the students were aware of the significant role English could play in their future career, as they considered learning English as a way to increase the quality of life. Putting it differently, the social contexts in which the

students were situated demanded them to achieve a certain level of English (e.g. passing Band 4 and taking required English courses for graduation), and they were actively engaged in the process of securing a space of their own in the social world by acquiring English. For example, a student clearly stated, "It is a necessary quality possessed by people in the modern society, and it is a tool that should be learned to become a part of the society." Similarly, another student noted, "(I learn English) to adapt myself to the globalizing world and changing economy." It is undoubtedly related to Gardner's (1985) instrumental motivation in that practical and utilitarian values attached to the English language seemed to be a driving force for the students to acquire it. The fact that the students frequently mentioned the word "future" suggested that they were an active agent in planning and designing their future through English. Thus, it would be more appropriate to understand that they were making a great deal of effort to expand possibilities and arenas for the future, as referred by Norton (1995, 1997) to an investment in the future.

The second most frequent reason for learning English (181 accounts, 24%) was to be able to communicate with the world. This is a powerful finding for several reasons. First, it indicates that the students perceived EIL used in communicating and cooperating with the world instead of a foreign language that belongs merely to countries with it as their native language. Second, it expresses their desire to participate in the world and keep pace with the times. This also reflects the significant historical situation in which the students reside - China's opening to the world. Third, it calls for the reconceptualization of language learning orientations in EFL settings based on the changing status of the English language in an age of globalization, as

already addressed by many scholars (Chen, Warden, & Chang, 2005; Dörnyei & Csizér, 2002; Lamb, 2004; Rahman, 2005).

Numerous students (85 accounts, 11%) also said that they studied English to acquire skills, information and knowledge, and to help them learn other subjects. Some of examples include: (I learn English) "to better learn advanced technology and knowledge from foreign countries", "to master technology skills" and "to read English materials to obtain up-to-date information for my major." Again, it is speculated that the students were well aware of one of these major benefits of using EIL in the 21st century, as well as its impact on the construction of knowledge (Warschauer, 2001), which also suggests the impact of the globalization process on motivational orientations of university students in an Asian EFL setting.

In the fourth category (49 accounts, 6%), learning English for personal growth, comments like "to perfect myself," "to enrich myself," "to broaden my horizons," and "to cultivate my ability" reflect Chinese students' cultural beliefs about learning. As Li (2001, 2003) documented in her research, Chinese students, influenced by the Confucian learning model, tend to regard seeking knowledge as a need to perfect oneself and as a lifelong commitment. For this reason, Chinese students' orientation to learning is quite different from that of the western world, as Li (20002) argued,

> Learning appears more fundamental in Chinese lives than does achievement per se…Chinese people's orientation to lifelong learning, instead of achievement itself, may well be responsible for their higher levels of achievement. (p. 263-264)

Some students (43 accounts, 6%) reported that they learned English because of their personal interest in foreign cultures. The most frequent statement in this category was to learn about western culture although only one student mentioned British and American culture. In fact, several statements revealed that the students were more likely to study English for "a better understanding of different cultures (or different countries)", not just wanting to psychologically and emotionally integrate into any particular culture of native speakers of English, as Gardner (2001) claimed. Moreover, one student noted that English ability helped to learn western culture and, at the same time, promote Chinese culture, which seems an indication of developing "a bi-cultural identity, in which part of their identity is rooted in their local culture while another part stems from an awareness of their relation to the global culture" (Arnett, 2002, p. 777), as a consequence of globalization.

A relatively small number of students (37 accounts, 5%) mentioned that they studied English to master a foreign language besides their mother tongue. One student even expressed a desire to speak English as fluently as Chinese. However, it is hard to see this category as a completely separate reason without further elaboration (i.e., the reason to master an additional language).

The last category (7 accounts, 0.9%) was learning English for entertainment including comments like, "learning English for fun," "to play games," and "because it is my hobby." Seven respondents stated such reasons.

Metaphors 1

Participants were asked to present metaphors for (a) English and (b) learning English. Most of the responses were very short, straightforward, and explicit, without a great deal of elaboration. The metaphors were sorted into coherent categories and grouped together (Ellis, 2002), instead of using predetermined categories. Then, the groupings were presented according to frequency, using the frame "English as X", "Computers as X", "the Internet as X", and "Learning English as X".

Metaphors about English

A total of 465 metaphors were collected for the English language. Table 5.2 summarizes 10 major categories that contained more than 10 coherent themes.

Table 5.2
Metaphors Representing English

Metaphor	# Accounts	Percentage
1. English as Tool	150	32%
2. English as Connector	74	16%
3. English as Key	54	12%
4a. English as ID	21	5%
4b. English as Road	21	5%
6. English as Window	17	4%
7. English as Evil	15	3%
8. English as Common Language	13	3%
9. English as Vehicle	12	3%
10. English as Assistant	11	2%

* Total # 465

The *English as Tool* (150 accounts, 32%) metaphor was a single dominant category that almost one-third of the participants reported. Specifically, 110 students

explicitly mentioned the word, "tool," for the English language. They perceived English as a useful, indispensable tool used to communicate, get a good job, and obtain information and knowledge. Some students came up with a more specific, interesting metaphor that had similar connotation, such as weapon, medium, shoes (to help go), walking stick, telescope, and traveling bag.

The *English as Connector* (74 accounts, 16%) was the metaphor, which arose second most frequently from the responses, including (a) bridge, (b) link, (c) channel, (d) canal, and (e) line. In particular, the metaphor of bridge appeared in 53 out of 74 accounts. Examples are English as: (a) the bridge of communication, (b) the bridge to success (c) the bridge of friendship, (d) the bridge connecting the world, and (e) the bridge in joint ventures.

The third category was *English as Key* (54 accounts, 12%). The participants clearly specified English as a key to: (a) the world, (b) other people's minds, (c) the door of a postgraduate school, and (d) foreign countries. Two interesting comments in this category were "English is an omnipotent key" and "English is a golden key to unlock the door of the world."

The metaphors of *English as ID* and *English as Road* were also frequent, as appeared in 21 accounts each. The *English as ID* metaphor (21 accounts, 5%) included: (a) passport, (b) ID card, (c) qualification ticket, and (d) passenger ticket. The respondents seemed to equate acquiring English with having a passport that lets them go everywhere in the world or an ID card, which is a must for living as a citizen in a society. As for the *English as Road* metaphor (21 accounts, 5%), the participants univocally related mastering English to getting on a road to success. This also

happened for the sixth category, *English as Window* (17 accounts, 4%), as some of them stated that English is a window through which they could envision success.

The seventh category, *English as Evil* (15 accounts, 3%), exhibited the animosity that some of the participants had against the English language. Such animosity was presented in the form of (a) devil, (b) enemy, (c) opium (a symbol of cultural invasion from the West), (d) a scary animal (e.g., tiger getting in the way and a saber-rattling wolf), and (e) a sharp knife.

The *English as Common Language* metaphor (13 accounts, 3%) showed that the participants perceived English as a lingua franca. They stated that English is (a) our common language, (b) a world language, (c) an international language, and (d) a language that brings convenience to our life.

As for the *English as Vehicle* metaphor (12 accounts, 3%), the participants came up with several types of transportation such as boat, ship, car, and train. Although almost none of them gave further clarification as to vehicles that they mentioned, two statements provided useful elaboration: “English is a boat sailing into the wonderful future” and “English is a famous car running on the road.”

Finally, the *English as Assistant* metaphor (11 accounts, 3%) included (a) assistant, (b) carrier, (c) guide, (d) ambassador and (e) simultaneous interpreter. It appeared that such metaphors are similar to the English as Tool metaphor, as it helped to do a better job.

Metaphors about Learning English

Because of the previous question about English, most responses for learning English were very much similar to the ones already presented. The only difference was that the participants perceived learning English as a process in some accounts. Thus, instead of repeating the same metaphors, I present four new categories of metaphors for learning English that did not appear earlier: (a) *Learning English as Hardship* (83 accounts), (b) *Learning English as Acquiring Skills* (45 accounts), (c) *Learning English as Preparation* (42 accounts), and (d) *Learning English as Joy* (34 accounts).

In relation to the *Learning English as Hardship* metaphor, the participants frequently used adjectives indicating difficulty such as hard, suffering, harsh, arduous, long, and bitter. They perceived learning English as torture (e.g., drilling for the war, committing suicide, blood and tears, battle, and forcing a hen to lay an egg), as obstacles getting in their way (e.g., burden on my shoulders, rocks on the road to success, and getting disease,), as a long, tedious process (e.g., climbing the world's highest mountain, an arduous 25 thousand-mile march and a marathon) and as a harsh challenge (e.g., sailing against the current).

With regard to the metaphor, *Learning English as Acquiring Skills*, considering that the majority of the participants saw English as a tool, it seemed quite natural to see the response, "Learning English is learning how to use the tool to acquire skills," many times as a follow-up answer. The participants also perceived *Learning English as Preparation* for their future. Some interesting metaphors shown in this category were Learning English as: (a) building a bridge, (b) paving the way

for the future, (c) preparing a journey, (d) applying for a passport, and (e) forging a sword.

The *Learning English as Joy* metaphor included some appealing metaphors such as (a) having bread when hungry, (b) taking an exciting journey, (c) savoring wine, (d) singing songs, and (e) appreciating an essay.

Summary of Perceptions about English

The results showed that the participants held utilitarian views toward English. By acquiring English, they strongly wanted to (a) improve their future, (b) communicate with the world, and (c) get access to up-to-date information. Keeping this in mind, I now turn to their perceptions about technology.

Perceptions about Technology

In this section, the findings are organized into three areas: (a) metaphors for computers and the Internet, (b) perceived benefits of using ICT, and (c) perceived barriers of adopting ICT into English courses.

Metaphors 2

Participants were also asked to present metaphors for (a) computers and (b) the Internet. Again, the data were classified into coherent groups, and then presented them according to frequency.

Metaphors about Computers

As for metaphors for computers, there were 460 accounts collected. Table 5.3 illustrates nine major categories that had more than ten relevant themes.

Table 5.3
Metaphors Representing Computers

Metaphor	# Accounts	Percentage
1. Computers as Tool	122	27%
2. Computers as Helper	59	13%
3. Computers as Window	42	9%
4. Computers as Key	36	8%
5. Computers as Human Body	32	7%
6. Computers as Friend	25	5%
7. Computers as Connector	23	5%
8. Computers as Container	22	5%
9. Computers as Vehicle	20	4%

* Total #460

The *Computer as Tool* metaphor (122 accounts, 27%) was most frequent, as it was for the English language. The vast majority of the participants noted that computers are a powerful tool for learning, work, communication and entertainment. Other metaphors frequently reported in this category described computers as: (a) machine, (b) reference (e.g., dictionary and encyclopedia), (c) weapon, (d) shoes, and (e) eye-related tools (e.g., kaleidoscope, telescope, and a pair of glasses). In addition, there were several interesting metaphors such as a remote controller, a supernatural pen, a hunter's gun, and an ax used to explore a mine.

The second category, the *Computer as Helper* metaphor (59 accounts 13%), suggested that the participants perceived computers as helping hands that would enhance their work performance. Most of the accounts in this category involved

computers as assistant, and some adjectives appeared, from time to time, like "capable," "efficient", "erudite", and "accurate". Other frequent metaphors in this category included: (a) secretary, (b) servant, (c) carrier, and (d) teacher.

The *Computer as Window* metaphor (42 accounts, 9%) was also popular with the participants, which could be partially attributed to the fact that the *Microsoft Windows* is the most widely-used operating system in the world today. The participants rarely gave further explanation but the term, "window."

The *Computer as Key* metaphor (36 accounts, 8%) ranked fourth. A couple of responses in this category indicated that some of the participants might see computers as a panacea, saying "computers as an omnipotent key" and "computers as a multi-functional key."

The fifth category, *Computer as Human Body* (32 accounts, 7%), was very intriguing in that computers were seen as vital organs in the human body. The most frequent metaphors within this category described the computers as a brain, as hands, and as eyes. Other metaphors were arms, nerve, and gland. The human metaphor continued to appear in the sixth category, *Computer as Friend* (25 accounts, 5%). This category included various metaphors like friend, companion, co-partner, lover, and wife.

The *Computer as Connector* metaphor (e.g., bridge, link, channel, and transfer station) (23 accounts, 5%) indicated the fact that computers and the Internet are inseparable these days. The eighth category was *Computer as Container* (22 accounts, 5%). In this category, the participants perceived computers as (a) a box, (b) a storehouse, and (c) database in which they could store information, knowledge,

memory, and other personal files.

The *Computer as Vehicle* metaphor (20 accounts, 4%) involved two types of vehicles: (a) transportation in the real world (e.g., boat, ship, bus, and car), and (b) vehicles from the participant's imagination. Those non-existent vehicles were a flying carpet and a time machine.

There were some other interesting metaphors, which were not included in any of the nine categories, showing the participants' ambivalent attitudes toward computers. Examples are "roses full of thorns", "the source of good and bad", "a combination of convenience and complex," and "the necessary road to corruption."

Metaphors about the Internet

A total of 458 metaphors were gathered for the Internet. Six categories including more than 10 coherent metaphors were generated, as Table 5.4 indicates.

Table 5.4
Metaphors Representing the Internet

Metaphors	# Accounts	Percentage
1. the Internet as Connector	147	32%
2. the Internet as Window/Door	80	17%
3. the Internet as Place	75	16%
4. the Internet as Road	36	8%
5. the Internet as Sea	35	8%
6. the Internet as Person	15	3%

* Total # 458

The most dominant metaphor was the *Internet as Connector* (147 accounts, 32%). This category involved a vast array of metaphors. The Internet as a bridge appeared most frequently, followed by the Internet as a link, the Internet as a net, and

the Internet as a channel. All of them indicated the symbolic role of the Internet in (a) linking and connecting the world, and (b) reducing physical and psychological distance between people. Other metaphors included traffic system, nerves, conveyer belts, blood vessels, arteries, threads, and rope.

The *Internet as Window/Door* metaphor (80 accounts, 17%) was also popular. For the participants, the Internet was a window through which they could reach the world and display themselves to the world. In addition, the Internet was seen as a door that could lead them to the world of opportunity.

The third category, the *Internet as Place* (75 accounts, 16%), involved various places not only in the physical world but also in the virtual or imaginary world. This is in part because the participants perceived the Internet as another world existing online. In fact, the term, "world" appeared numerous times. Other metaphors related to places were platform, storehouse, library, and museum, where knowledge, information, and resources can be found, shared, stored and even generated. In addition, metaphors like paradise, magic square, and amusement park suggested that the participants perceived the Internet as an exciting place. On the contrary, there were also some comments showing either negative or ambivalent attitudes toward the Internet such as "Mine with impurity," "Cemetery shared by people," "Complex labyrinth," and "Place where all kinds of fallacies occur."

The fourth category presented the *Internet as Road* (36 accounts, 8%) to a remote place, the outside world, the world of information, and even to the mysterious world. The fifth category suggested the *Internet as Sea* (35 accounts, 8%) of information. In the fourth category, the participants perceived the *Internet as Person*

(15 accounts, 3%), who could either benefit or hurt them. Such metaphors included information provider, assistant, friend, co-worker, a neighbor, lover, passerby in the information age, and killer.

One last thing that should be noted is, several metaphors clearly showed the participants' negative feelings about the Internet, suggesting they were concerned about the potentially harmful effects of the Internet. The metaphors included the Internet as a combination of distillation and dregs, a trap full of seduction, something that nourishes the root of evil, and even a monster.

Benefits of Technology Integration in Learning English

The majority of the participants in this study clearly understood that they could benefit from adopting technology in learning English. As Table 5.6 summarizes, their responses to benefits of using technology were classified into four major categories: (a) learning, (b) convenience and efficiency, (c) motivation and (d) being up-to-date.

Table 5.5
Students' Perceived Benefits of Using Technology in Learning English

	# Accounts	Percentage
1. Improving learning	237	51%
2. Convenience and efficiency	173	37%
3. Increasing motivation	59	13%
4. Being up-to-date	20	4%

* Total # 466

The students saw the most valuable benefit of using technology as way to improve learning (237 accounts, 51%). They liked using authentic materials through

technology, which enhanced their ability in listening (77 accounts), speaking (29 accounts), and vocabulary (13 accounts), as well as helping to better understand foreign culture. This is consistent with the statistical results for students' perceived benefits of using ICT in increasing English skills, as discussed earlier. In relation to language and culture, a student noted, "Digital images and multimedia let me learn culture of English-speaking countries directly." Another student said, "(Technology) vividly exhibit the charm of the English language." Furthermore, they appreciated the fact that they could improve both English and technology skills at the same time while being in a technology-integrated learning environment. It is partly because they were well aware that gaining both skills would make them competitive in the information society. In fact, numerous students stated that learning English through technology helped them expand knowledge and broaden their horizons.

The students also spoke highly of convenience and efficiency (173 accounts, 37%). Their comments include, "I don't have to take notes", "It saves time", "It is convenient, fast, and real-time," "I can learn at any time after class," and "I can get feedback in time." The participants especially felt that they could obtain learning materials and information more conveniently and quickly when using technology.

Another aspect the students greatly valued was that using technology could increase motivation to learn as well as create a genuine interest in English (59 accounts, 13%). They stated that it made studying English more "fresh and enjoyable" than a more traditional way of learning English. Some examples of remarks that were made include: "It makes dull lessons interesting," and "I can feast my eyes (with technology)."

Being up-to-date was seen as one of the primary benefits of using technology in learning English, as well (20 accounts, 4%). They liked to get the most recent learning materials and current English usage through technology, as shown in the remark, "I can feel the pulse of current English while enjoying good TV programs and films." Similarly, they understood that getting in touch with the latest international news and information was a good way to keep pace with the very rapidly changing world. A student echoed that ICT itself is connected with the English language, and learning English through technology helps to obtain up-to-date information and access to rich resources.

However, surprisingly, only three students reported that using technology improved communication. From research findings indicating that one of the primary benefits of using technology is to improve communication (Kvavik & Caruso, 2005), it can be inferred that the students' use of ICT in communicating with their teachers and collaborating with classmates were very limited.

Barriers to Using ICT in Learning English

Students' answers regarding their perceived barriers to the effective use of ICT in learning English consisted of both technological and non-technological issues. Those responses were classified into seven categories based on relevancy.

Table 5.6
Students' Perceived Barriers to Using Technology in Learning English

	# Accounts	Percentage
1. Non-affordability of technology, inadequate access and insufficient resources	97	21%
2. Lack of technology skills	87	19%
3. Lack of English proficiency	79	17%
4. Cultural beliefs about learning	50	11%
5. Lack of guidance	45	10%
6. Insufficient human (face-to-face) interaction and communication	37	8%
7. Lack of interest	21	5%

* Total #453

The biggest concern reported by the students was the exorbitant costs of technology, inadequate access to the Internet and insufficient resources (97 accounts, 21%). They pointed out that the cost of new technologies and high-speed internet service was too high for them to afford, and that there were not many good websites or software for studying English. This reflects major problems China has faced related to the digital divide within the nation described as an "imbalance of diffusion of ICTs infrastructure, high-online charges, insufficient qualified staff, imperfect network legation, and information resources shortage in the Chinese language" (Wang, 2002, p. 538).

The second biggest concern was unfamiliarity with new, emerging technologies and low technology skills (87 accounts, 19%). Many students stated that they were not knowledgeable enough to take advantage of new technologies, and even felt pressured by the fact that they had to master how to use the technology. The third problem was limited English proficiency (79 accounts, 17%). Specifically, the students perceived that their poor vocabulary and listening skills hindered their ability

to make the most of a technology-integrated, authentic language learning environment.

They also came up with problems associated with their cultural beliefs about learning and school practice (50 accounts, 11%). Examples of this included, “I cannot understand the essence of knowledge,” “I cannot take complete notes,” “I cannot learn all the things by heart,” “The distinction between learning and playing is too vague,” “Some questions are not answered,” “It is hard for me to be attentive,” and “It makes me lazier, less active and less persistent.”

The fifth barrier was a lack of proper guidance (45 accounts, 10%). The students stated that they were not able to locate, evaluate or use the information and learning materials needed on the Web, feeling overwhelmed by the abundance of information. Several students mentioned that they had no one who could guide them to use information effectively and efficiently. Another barrier noted by the students was that technology integration reduces face-to-face interaction and real communication in English courses (37 accounts, 8%). Particularly, they believed that using technology would minimize their interaction and communication with teachers.

Other opinions included little interest in technology, getting tired eyes, and inconvenience (21 accounts, 5%). In addition, there were some answers stimulating curiosity about the nature of technology-integrated learning environment in which they participated. Those statements were: “I don’t have many opportunities to practice speaking and writing,” “Place and time in which learning happens are not determined,” and “Information is not updated in a timely manner.”

Summary of Perceptions about Technology

According to the results, the participants' perceptions about technology, specifically computers, were strongly associated with their perceptions about English. The participants also perceived that ICT plays a critical role in improving their learning. In addition, they had various concerns about the use of ICT in learning English, such as lack of access, ICT skills, and guidance.

Summary of Key Findings and Conclusion

The qualitative results from open-ended questions supported the fact that essential skills in the 21st century include acquiring proficiency in English and ICT. Key findings are:

(1) Seven major categories of the participants' motivational orientations demonstrated that the participants were highly motivated by practical needs and concerns.
(2) The majority of the participants perceived both *English and Computers as Tool*
(3) The participants reported learning (esp. communicative skills in English) as the major benefit of using ICT in learning English.
(4) The participants reported that the primary benefit of ICT use is improved learning, followed by convenience and efficiency.
(5) Lack of ICT access was perceived as the primary barrier to ICT use in learning English, followed by (a) lack of fluency in English and ICT, (b) cultural beliefs about learning, and (c) lack of guidance.

Based on the results, I provide detailed discussion and pedagogical implications in Chapter 6.

Chapter 6
Discussion and Implications

This is a time of challenge and a time for experiment. (Kellner, 2004, p.30)

Based on the findings discussed in previous chapters, this chapter presents remaining challenges that need to be solved by researchers and educators, and then provides practical and pedagogical implications. This chapter also offers my speculations based on the study's results.

Redefining Basic Concepts and Terminology

The ESL/EFL dichotomy, the instrumental vs. integrative motivation, and the bipolar concept of the digital divide might be outmoded according to this study. Here I address three areas in which new ideas and themes might be warranted.

Does the ESL/EFL Dichotomy Still Make Sense?

The 40th anniversary issue of *TESOL Quarterly* published in March, 2006 includes an article by Jennifer Jenkins that documented a paradigm shift from English as a native English (ENL), English as a second language (ESL) and English as a foreign language (EFL) to World Englishes (WEs), English as a Lingua Franca (ELF) and English as an International Language (EIL). As Jenkins commented herself in the article, it is truly a breakthrough when considering how long we have been with the ESL/EFL dichotomy. Jarvis (2005) similarly claimed that the ESL/EFL classification is no longer appropriate because "the language does not actually belong to the users; it is foreign (alien), or it is second (not first)-this despite the fact that today these

users are now a majority (p. 219)."

The presence of Jenkins' article in the 40th anniversary issue turns our attention to the question, "Who really owns the English language in the age of globalization?" This question has been addressed by many researchers (Brutt-Griffler, 2002; Graddol, 1997; Jarvis, 2005; Kachru & Nelson, 2001; Kramsch, 1998; McKay, 2003; Phan Le Ha, 2005; Rajadurai, 2005; Seidlhofer, 2001; Sifakis, 2004; Widdowson, 1994, 2000; Yano, 2001).

The participants in the current study were non-native speakers learning English as a lingua franca, having a desire to promote "social mobility, economic ambition, and individual identity" (Rajadurai, 2005, p.125) and to gain "access to scientific and technological information, international organizations, global economic trade, and higher education" (McKay, 2003, p. 4). Although they did not show a clear sense of ownership of English, they explicated that their purposes for studying English were mainly for a better future for themselves, but for internalizing native-speakers' cultural norms (McKay, 2003, 2004). In other word, the students specified what they wanted to do or achieve (e.g., communicating with the world or acquiring other skills) by becoming owners of English. As Hui (2001) confirmed, Chinese students want to learn English mainly because it is "the language they could share" (p. 131) with a wider world, not because it is the native language of the United States or any other English speaking countries. Such motivational orientations support McKay's (2003) assertion as to speakers of EIL.

> [M]any language learners today are studying English not because they are being coerced to do so by speakers of Inner Circle countries, but rather because of the benefits knowledge of English brings. (p. 5)

Thus, it is evident that they would be better served if they could recognize, at a fully conscious level, the fact that the English language belongs to them just as it belongs to native speakers, and that they are responsible for creating a culture of EIL in Asia (Matsuda, 2003; Phan Le Ha, 2005; Tomlinson, 2005). Moreover, by recognizing their ownership of the English language, they will be "the main agents in the ways English is used, is maintained, and changes, and who will shape the ideologies and beliefs associated with EIL" (Seidlhofer, 2003, p. 7).

Does the Instrumental vs. Integrative Motivation Still Make Sense?

Considering the complex, dynamic nature of orientations and motivation in second language learning (Dörneyi, 2003, 2005; Dörnyei & Csizér, 2002; Dörnyei & Skehan, 2003; Gardner, Masgoret, Tennant, & Mihic 2004; Gardner, Tremblay, & Masgoret, 1997; Noels, Pelletier, Clement, & Vallerand, 2000; Oxford & Shearin, 1994), the results of this study are never comprehensive nor conclusive, partly because of the use of short-answer open-ended questions. Nonetheless, the findings provide meaningful implications and raise critical questions regarding the significant influence of historical changes, social contexts, and cultural beliefs on foreign language motivational orientations among Asian students at the university level.

First, consistent with recent studies conducted in Asia (Chen, Warden, & Chang, 2005; Lamb, 2004; Mori, 2002; Rahman, 2005), the results in this study showed the weak presence of integrative motivational orientations and a strong

tendency for utilitarian and job-oriented orientations among Chinese university students learning EIL. These findings were also compatible with the fact that the participants perceived *English as Key*, *as Bridge*, and *as Road* to success.

According to Gardner (2001), the integrative motivation involves complete identification with L2 community and speakers of the target language. However, this concept gets blurred in EFL contexts due to "the absence of salient L2 group in the learners' environment" (Dörnyei, 2003, p. 6). Even further, whether Gardner's integrative motivation exists in Asian EFL contexts in the early 21st century is somewhat questionable. Lamb (2004) argued that "[Being identified with the force of globalization] English may not be associated with particular geographical or cultural communities but with a spreading international culture (p. 5)." Rahman (2005) also stated that integrative motivation for Bangladeshi students might be integration into English-educated society of Bangladesh and that way of life instead of becoming a native speaker of English. In this regard, what Dörnyei and Csizér (2003) claimed is noteworthy:

> World English is turning into an increasingly international language and it is therefore rapidly losing its national cultural base while becoming associated with a global culture. This undermines the traditional definition of integrativeness as it is not clear any more who the 'L2 speakers' or the members of the 'L2 community' are. (p. 453)

Second, the findings raise an important question concerning whether the L2 motivation constructs (e.g., the integrative-instrumental distinction) originally developed in the West are relevant to Asian EFL contexts. As appeared in second language motivation studies recently conducted in Bangladesh (Rahman, 2005),

Indonesia (Lamb, 2004), Japan (Mori, 2002), and Taiwan (Chen, Warden, & Chang, 2005), integrative and instrumental motivation were not really distinguishable in this study. Rather, almost all statements were a reflection of the students' social, historical and cultural situations, and their strong desire to interact with the world as a "world citizen" (Lamb, 2004, p.16). In fact, just as Mori (2002) mentioned in her research on Japanese students' motivation to read a foreign language, the statements in the current study, intermingled with some other variables, were hard to be classified into either integrative or instrumental orientation. In this regard, more attention should be paid to how the social contexts affect language acquisition process (e.g., L2 motivation as a situated construct) (Dörnyei, 2001) to challenge "any assumption that the components of motivation are universal" (Chen, Warden, & Chang, 2005, p. 624).

Third, it seems apparent that more comprehensive and well-designed qualitative research such as ethnography, in-depth interviews or multiple case studies is needed to reconceptualize and reinterpret the existing the motivation theories, as Dörnyei (2001) claimed, "I consider it a significant step in motivation research that traditional quantitative research methodologies have been increasingly complemented by qualitative approaches" (p. 49). Furthermore, looking at different age groups in different sociocultural contexts over time would be greatly helpful in understanding "the internal dynamic of the intricate and multilevel construct of student motivation" (Dörnyei, 2001, p. 49).

Does the Binary Concept of the Digital Divide Still Make Sense?

Since the term "digital divide," referring to the gap between those who have access to information technologies and those who do not (Dickard & Schneider,

2005), was first introduced in the late 1990s, it has been often seen as a useful framework. However, as the information society brings about new conditions of living in the 21st century, numerous scholars have pointed out the shortcomings of the bipolar concept, calling for reconceptualizing the digital divide concept in order to efficiently respond to emerging socioeconomic, cultural, political, linguistic, institutional, and technological issues (Cisler 2000, De Haan, 2004; Dickard & Schneider, 2005; Gorski, 2005; Jarboe, 2001; Reddy, 2004; Warschauer, 2002, 2003).

According to Warschauer (2003), the binary divide concept "draws attention away from more complex long-term processes that underlie social development and inclusion" (p. 303) and neglects the possibility of widening the great literacy gap for the sake of technological determinism. Stating that meaningful access to ICT entails a full consideration of content and language, literacy and education, community, and institutional structures, he claimed, "an overemphasis on the mere presence of computers or Internet connections, without a corresponding emphasis on social mobilization and transformation, can squander resources while leaving inequity intact" (p. 303). De Haan (2004) also criticized the binary concept of the digital divide as it appears in existing research for failing to capture multidimensional nature of ICT access and the causes and consequences of unequal access to ICT. Similarly, Reddy (2004) discussed many types of digital divides to replace the simplistic concept: (a) the connectivity divide related to access to the Internet, (b) the computer access divide, which refers to accessibility and affordability, (c) the digital literacy divide, including language divide and literacy divide, and (d) the content divide (i.e., divides in relation to access to information and knowledge, access to health care,

access to education and learning, access to jobs, access to entertainment, and access to improved quality of life).

The data presented in the current study revealed a very complex picture in relation to the digital divide. Despite the low rate of computer ownership, the participants were still connected using public access computers on campus or in Internet cafés. According to the binary concept of the digital divide that primarily concerns access to computers and the Internet, they could be both "haves" (at school) and "have-nots" (at home). Inadequate access and the unaffordable nature of new technologies were some of the major concerns most frequently reported by the participants in this study. The real problem, however, resided in their incompetence in ICT skills, spending little time using ICTs in learning English because of the limited access. Moreover, the fact that they had difficulty in obtaining adequate technical assistance, instructional guidance, and appropriate educational resources and materials might further deteriorate the students' enthusiasm for adopting technology in learning and their acquisition of digital literacies.

Thus, we should stay alert not only for connectivity or physical accessibility to technology but also for the possible 'second-level divide' (Dickard & Schneider, 2005; Jarboe, 2001). The second-level divide, caused by the limited physical access, includes differences in mental accessibility (i.e., the degree to which people are willing to adopt new technology), and digital skills and competence, and the use of ICT (e.g., the amount of time spent using technologies and different kinds of applications used) (De Haan, 2004).

Therefore, as Jarboe (2001) asserted, the issue is transformation, not

technology, because the ultimate goal is "not to narrow some gap, but to ensure that everyone has access to the expanded opportunities" (p. 31). To this end, it is about time to revisit the traditional concept of the digital divide and come up with a new definition that reflects "shifting the digital divide paradigm" (Gorski, 2005, p. 5).

Summary of Redefining Concepts

Key ideas discussed in this section included: (a) the paradigm shift toward EIL/WEs, (b) the need to reconceptualize the existing motivation framework, and (c) the need to update the concept of the digital divide. The next section discusses the importance of human factors in relation to the adoption and use and expansion of ICT in education.

Rethinking Human Factor in ICT Integration into the Curriculum

The human factor is of vital importance when considering the adoption of ICT. This section portrays the ways in which we can develop human and social resources to achieve effective ICT integration into education.

The Need for Sustained Training

Undoubtedly, effective implementation of ICT in foreign language education is a daunting task that should take various factors into consideration. In fact, the adoption of new technologies in the field of education is surprisingly slow, and profound endeavors to integrate ICT into the curriculum often turn out to be disappointing. As the participants in the current study commented, there are many barriers to making a difference through technology, such as lack of infrastructure and resources, non-affordability of hardware and software, and unfamiliarity with

technology.

Of those barriers, one notorious reason behind the unsuccessful outcomes is neglecting the role of human factor that influences the use of technology while paying too much for equipment (Lam, 2000; Tiene, 2002; Warschauer, 2002, 2003). For example, ICT implementation often begins by purchasing new technologies without considering the fact that "technology can play a role in realizing that system if the physical and digital resources are complemented by the development of appropriate human and social resources" (Warschauer, 2003, p. 302). It also holds true for researchers, who, more often than not, focus too much on external factors (e.g., lack of equipment, unreliability of technology, lack of resources) than institutional, cultural and human-related factors (e.g., teachers, students, and staff members) when discussing barriers to the use of ICT in education.

In addition, the ICT training offered often fails to be sustainable support because the activities focus on basic skill training and software applications without thoroughly examining what staff and learners can do with and/or through technology, how they perceive the use of technology and how they understand the effect of technology on the teaching/learning process (Law & Plomp, 2003). It is partly due to the small amount of funding allocated to training programs compared to purchasing hardware and software, which makes it hard to provide staff and students with sustained support, maintaining equipment, and ongoing evaluation (Warschauer & Meskill, 2000). This unbalanced expenditure frequently observed impedes developing plans, training, and support systems based on teachers' and students' needs, as one determining factor for the failure of the use of new technologies in education.

It is no doubt that the role of teachers is of paramount importance in the process of integrating ICT into their class. Moreover, offering constant training to teachers is very crucial in that they should adapt themselves to the changing society, emerging technologies, and new learning and teaching environment. Lam (2000) maintained that teacher's reluctance to use technology results from their beliefs about the benefits of the technology for their students' learning, neither from their resistance nor from their fear. So, she claimed, if technology is not used as planned, it is not because of teacher's fault, but because of the top-down approach from "technophilic" administrators of schools and school districts in purchasing the brand new technologies without having enough discussion with teachers, who are misperceived as "technophobes". To prevent this serious "mismatch between what is advocated and what is practiced" (Zhong & Shen, 2002, p. 48), various forms of training (e.g., training courses, seminars, workshops, and discussion groups) opportunities should be provided so that teachers can develop their teaching pedagogy, as well as their technical confidence and competence in ICT and their knowledge about the way to incorporate ICT into their subject areas (UNESCO, 2002).

The students in this study also wanted ICT training and proper guidance to efficiently use technology and resources in their learning. Obviously, what they needed was not just one-time training focusing on basic skills and software applications, but continued support to help them use technology as a tool in their learning process. To help them "engage in meaningful social practices, specifically to communicate with people, to access information, and to publish information"

(Warschauer, in press, n.p), they should be provided continual support in terms of how to use new technologies in learning English in an interactive and supportive learning environment.

Nurturing Supportive Communities of Practice

Lave and Wenger (1991) define a community of practice as "a set of relations among persons, activity, and world, over time and in relation with other tangential and overlapping communities of practice" (p. 98). In fact, in the post-modern era, the participation in certain communities allows us to create multiple, dynamic, and conflicting identities, which change in different circumstances over time (Warschauer & De Florio-Hansen, 2003). Such participation also enables us to increase our ability to experience daily life and the world, share resources with community members, recognize participation as competence, and create personal histories (Wenger, 1998). Echoing Wenger's argument, Yang (2005) gives an example of the community of practice of language learners that includes teachers, students, native speakers, classes, as well as the values, perspectives, beliefs, the interaction among the members, and resources. She continues, "the interrelationships among these components and the interactions between the members establish the community of practice of the target language" (p. 158). In short, any process of learning is an issue of engaging in the practices of communities for individuals, of refining practice and ensuring new generations of members for communities, and of sustaining the interconnected communities of practice for organizations (Wenger, 1998).

As the concept of community of practice is now seen as a central theme of teacher professional development research and practice (Schlager, Fusco, & Shank,

2002), it has been strongly urged that teachers using technology in their classrooms need to create communities of practice so that they can share ideas, generate dialogues on their experience, cultivate professional competencies, and disseminate effective pedagogy (Law & Plomp, 2002). Tapped In (http://tappedin.org/tappedin/), the online international community for teacher professional development, is the best example in that it links numerous educators, teachers, administrators, and professional development staff, and lets them learn, collaborate, share, and support each other, participating in various online subgroups within the Tapped In system. In Tapped In, they are able to (a) plan and conduct learning projects, (b) lead discussion groups, (c) manage and attend online courses, (d) mentor other educators, and (e) try out new ideas in a supportive environment (Bull, Bull, & Kajder, 2004).

Interestingly enough, Guo and Wang (2004) found that hundreds and thousands of Internet cafés in small cities in China functioned like a community of practice, where users learned from each other and asked the café owner for help. Guo and Wang (2004) quoted remarks by a participant from a small city, "The population of computer ownership is limited, but the number of Internet users here is unlimited" (p. 38) because those who don't have a computer at home can still be connected at Internet cafés. According to Guo and Wang (2004)'s study, 47% of Internet users in small cities had access to the Internet at Internet cafés while only 24% of users in metropolitan cities used it. In short, Internet cafés provided a space in which those who didn't have computers at home learned to use the Internet and other applications and taught each other. This type of community of practice might serve as an example of how ICT skill and attitude development can occur.

Summary of Developing Human Resources

This section stressed the urgent need of promoting human and social resources in order to achieve successful ICT adoption. What teachers should know about teaching EIL through technology is provided in the next section.

Reflecting on Pedagogy: Implications Leading Toward Full Participation in the Information Society

The significance of sound pedagogy cannot be overemphasized. In this section, I detail the ways in which we can increase the quality of teaching EIL through technology.

New Literacies in the 21st Century

The information age requires students to hone a different set of literacies in order to take advantage of information overload, to efficiently use technology to "access, adapt and create knowledge" (Warschauer, 2003, p. 301), and to benefit from the networked society. Putting it differently, not acquiring new literacies means not being able to participate in the information society, just as "being disconnected means being disconnected from the economy and democratic debate" (Dickard & Schneider, 2005, n.p). Such literacies include the ability to (a) think critically and analytically; (b) access information quickly; evaluate it appropriately, and use it effectively; and (c) understand and appreciate international cultures, not to mention traditional basic literacy (Leu & Kinzer, 2000).

For those who consider learning and teaching English as a lingua franca, the concept of literacy also extends to encompass acquisition of the English language and

ICT skills as "a vital stepping stone to being literate" (Godwin-Jones, 2000, p. 11). Both English and ICT are now considered as the means of communication and knowledge production, which allows individuals to fully participate in society (Warschauer, 2002). It is particularly because a command of English enables them to make the most of "the extensive resources available in English – resources which have developed as a consequence of globalization" (McKay, 2003, p. 5), and ICT skills maximize their opportunities in the labor market and increase their meaningful social participation (De Haan, 2004). Consistent with these arguments, the results of the current study demonstrated the participants' strong enthusiasm for cultivating their skills and knowledge for English and ICT despite a series of challenges they have faced (e.g., lack of infrastructure, resources and guidance). In addition, the fact that the participants reported *English as Tool* and *Computer as Tool* most frequently suggests that they perceived both English and computers as a tool used, not an end in itself (Warschauer, 2004).

The increasing importance of developing multiple literacies, in turn, demands teachers to rethink their teaching practice and try new approaches to meet the challenges posed by technological, economic and sociopolitical changes taking place in this era of change (Kellner, 2004). Especially, English language teachers should be able to teach "new forms of discourse, new forms of authorship, new forms of identity construction, and new ways to create and participate in learning communities" (Kern, 2006, p. 183). Developing English language literacy in the 21st century involves acquiring new forms of reading, writing, and interpersonal communication via online technologies (Warschauer, 2001). In other words, they

must be prepared to teach English with a goal of preparing students to effectively and critically use technology in local contexts where learning occurs, and to expand their cross-cultural awareness and understanding (Cheng & Ren, 2003; Kern, 2006; Warschauer, 2004). The role of qualified English teachers therefore cannot be exaggerated in fostering multiple literacies, as Hu (2002) claimed, "Without qualified teachers, no matter how good the curriculums, syllabuses, textbooks and tests are, the development of ELT [English Language Teaching] will be handicapped and the quality compromised"(p. 45).

Technology-Based Language Pedagogy

In the technological revolution and the information age, using technology in teaching English becomes "a fact of life" (Chapelle, 2001, p. 1) and becomes "a part of the broader ecology of life at the turn of the century" (Warschauer & Meskill, 2000, p. 10). It is widely assumed that technology has enormous potential to improve learners' achievement by expanding students' learning experience, increasing motivation, facilitating collaboration, fostering learner autonomy, and promoting global understanding, not to mention developing language skills if it is used effectively in the context where learning takes place (Jurich, 2001; Lee, 2000).

However, it seems that the integration of ICT into foreign language classrooms anywhere in the world is not as pervasive as in other sectors for various reasons, and has not caused any profound pedagogical innovations in technology-enhanced foreign language classrooms yet. Rather, as Zhong and Shen (2002) claimed, a "technologized traditional classroom" (p. 46) that exhibits some changes only in the physical appearance of the classroom, with actual teaching practices

unchanged, has come into existence.

The success of use of ICT in foreign language classrooms is truly a matter of whether and how technology is effectively used, not of technology itself (Egbert, Paulus, & Nakamichi, 2002; Kern 2006, Thao, 2003; Zhao, 2003; Zhong & Shen, 2002). In this regard, Thao (2003) stated,

> The success or failure of language learning/teaching using multimedia tools can hardly be decidedly by the media themselves, but by other determinants like teachers' creativity and adaptability, students' language ability, the curriculum and the teaching goals as well. (p. 7)

Kern (2006) also echoed,

> The central importance of pedagogy and the teacher: Success largely depends on teachers' efforts in coordinating learners' activities, structuring language and content learning and helping learners to reflect critically on language, culture, and context. (p. 203)

It is thus assumed that teachers can make the most of technology in teaching foreign languages only when they use creativity in the classroom, guided by sound pedagogy. In other words, without an emergent pedagogy that reflects the impact of rapid changes on the learning process in the information society, any deliberate goals to infuse ICT into the curriculum cannot be attained (Law & Plomp, 2003).

As an effective approach to teach foreign languages by using technology, adoption of task-based language teaching has been advocated by numerous researchers (Chapelle, 1999; Doughty & Long, 2003; Ellis, 2003, 2006; Jarvis, 2005;

Lee, 2000; Leaver & Willis, 2004; Norris, 2005; Nunan, 2005; Oxford, in press; Zhong & Shen, 2002). They claim that task-based language teaching can provide learners with optimal language learning space to foster communication, interaction, negotiation, and collaboration by offering meaningful activities (Lee, 2004). It is also compatible with learner-centered approach, even in a large class, that facilitates more interaction and boost learner autonomy, by devising activities suited to class size (e.g., using small group work) and students' proficiency levels (Ellis, 2003; Zhong & Shen, 2002). Chapelle (2005) particularly pointed out that the range of tasks that teachers can develop has been enormously expanded by the emergence of technology, breaking boundaries of registers in written and spoken language, time and space that language learning occurs. At the same time, teaching foreign languages through technology would allow teachers to focus on authentic activities, not on software, keeping them away from using technology for technology's sake (Szendeffy, 2005). Furthermore, it is understood that task-based, technology-enhanced approaches are the most effective way to accommodate the EIL perspective (Jarvis, 2005; Sifakis, 2004). For example, teachers can experiment various long-distance collaboration tasks such as intercultural learning projects that invite learners to communicate with other learners from different countries via email or teleconferencing (Kern, Ware, & Warschauer, 2004; Sifakis, 2004). In short, task-based language teaching can be very promising, ensuring that teachers make a "connection among technology, culture and ideology" (Chapelle, 2003, p. 9) while enhancing learners' language skills.

EIL Pedagogy

As the English language becomes a lingua franca for cross-cultural communication, there has been consensus that a new pedagogy based on a pluralistic view of World Englishes is needed for the increasing number of non-native speakers of English in periphery regions, whose motivational orientations and expectations are quite different from other foreign language learners (Jenkins, 2002, 2006; Llurda, 2004; Matsuda, 2003; McKay, 2003; Sifakis, 2004). In other word, as the results of this study revealed, they are eager to acquire English to pave their own road for a better future (*English as Road*), communicate with the world (*English as Connector*), and obtain up-to-date information (*English as Tool*), not assimilating into North American or British culture.

The crucial need for new pedagogy also comes from a growing awareness that "it will be those who speak English as a second or foreign language who will determine its world future" (Graddol, 1997, p. 5). In relation to this, McKay (2003) asserted, "Given this shift in the nature of English, it is time to recognize the multilingual context of English use and to put aside a native speaker model of research and pedagogy" (p. 19) because the majority of English users are now non-native speakers of English everywhere in the world.

As for effective pedagogy for EIL, it should go without saying that raising learners' ownership of English and awareness of English varieties should be the first step (Matsuda, 2003; McKay, 2003; Nakamura, 2002; Petzold, 2002; Sifakis & Sougari, 2003, Widdowson, 1994). This would be best achieved when teachers become vigilant in watching over the changing role of English for international

communication within political, sociocultural, economic, and linguistic contexts in which they are located, taking full responsibility for "global thinking, local teaching" (McKay, 2003, p. 17, quoting Kramsch & Sullivan, 1996). Teachers should be able to help learners cultivate intercultural understanding based on a variety of linguistic features, taking ownership of English (Sifakis, 2004). In this regard, Sifakis and Sougari (2003) convincingly argued, "The ultimate aim of ESOL practitioners should be not only to make their learners competent users of English, but also to 'culturally authenticate' the foreign language" (p. 67).

Another important point regarding EIL is that many learners of English these days have more opportunities to interact with non-native speakers of English like themselves rather than with native speakers. For this reason, achieving native-like competence as a goal of teaching and learning English is debatable. Instead, considerable attention should be paid to the ways in which we could enhance learner's international intelligibility, and intercultural abilities while securing regional appropriateness and local identity and culture (Jenkins, 2000, 2002; McKay, 2003; Sifakis, 2004). For example, Sifakis and Sougari (2003) strongly suggested culturally informed approaches for "upholding English language as an instrument for communication among people in the entire world, while at the same time shielding non-native speakers from the negative effects on the norm-based rationale" (p. 64). It can be achieved by (a) encouraging learners to communicate with other students in different countries, (b) encouraging them to participate in the various international exchange programs and non-profit organizations, (c) stimulating classroom discussions on cultural and political issues in the world, and (d) sensitizing them to

the status of EIL and their role as global communicators (Sifakis, 2004; Sifakis & Sougari, 2003). Similarly, Nakamura (2002) urged teachers to integrate global human issues into EIL speech communication class as an effort to build up learners' global literacy, including "inter/cross-cultural competence with transcultural and transnational perspectives" (p. 64). To make this happen, teachers should not force learners to take up native speakers' identity and/or culture keeping in mind the fact that EIL learners and their real-life situations are always the best instructional resources (Sifakis, 2004). Furthermore, it is also necessary to revisit the notion of traditional communicative competence for international communication in the 21st century (Alptekin, 2002, Jenkins, 2000) to define EIL competence based on what we have achieved. In this regard, Nunn's (2005) recent call for embracing multiple competences that includes not only intelligibility but also linguistic competence sets spurs to this newly-fledged area.

Summary of Pedagogical Implications

This section suggested the ways in which we can develop an appropriate pedagogy for EIL through technology: (a) employing task-based language teaching, (b) increasing learners' ownership of English, and (c) encouraging intercultural collaboration. Now I'd like to make my last remarks.

Concluding Remarks

There still remain many controversial issues and problems with reference to teaching EIL (e.g., issues surrounding standards and linguistic competence and norms) and integrating ICT into English language teaching, which requires

substantial collaboration between researchers and educators in order to benefit learners. It is truly a time of challenge but at the same time it is an era of opportunity for all of us to revitalize foreign language education worldwide through technology since "language classrooms will be one important place where these new educational opportunities are found, or missed" (Warschauer, 2001, p. 58). We truly live in interesting times for making a meaningful difference (Jarvis, 2005). As Hawkins (2002) noted,

> It is time to collectively change our approach to the learning process, and particularly, take advantage of the power of technology to improve learning outcomes, enhance economic opportunities, foster greater creativity, and realize the dreams of disadvantaged youth in developing countries. (p. 43)

Appendix A:
Information and Communication Technology Use and Skills (ICTUS) for Learning English

This survey focuses on your experiences with and opinions about information technology and its use in learning English. The goal of the study is to better understand student experiences with information technology in learning English.

The original version of this questionnaire, *Student Information Technology Use and Skills in Higher Education: 2005 Survey Questionnaire*, was developed by EDUCAUSE Center for Advanced Research (ECAR). The current questionnaire is a modification of the ECAR 2005 survey to make it more relevant to the language learning experience and to higher education in China and Korea.

SECTION I. Background Information

1.1 Gender (check one) : Female ____ Male ____ 1.2 Age: _____

1.3 Major: _____

1.4 Class status (check one): Freshman ___ Sophomore ___ Junior ____ Senior ___

1.5 Nationality: _____ City you live in _____

1.6 Reason(s) you learn English

_____

1.7 How would you rate your level of English?

	Basic	Intermediate	Advanced
Listening			
Speaking			
Reading			
Writing			
Grammar			
Vocabulary			

1.9_1.11 Please describe the following words using a metaphor. (e.g., The Internet is *a door to the World*)

1.9 Computers are _____

1.10 The Internet is _____

1. 11 English is _____

1. 12 Learning English is _____

SECTION II. Your General Use of Technology

2.1_2.8 Which of the following electronic devices do you own? Check all that apply.

2.1 Desktop computer		2.2 Laptop computer	
2.3 Personal digital assistant (PDA),		2.4 Smart phone (combination cell phone and PDA device)	
2.5 Cell phone		2.6 Electronic music device, (e.g., mp3 player, iPod, etc)	
2.7 Digital camera		2.8 Camcorder	

2.9 Excluding your use of cell phones, how many hours each week do you normally spend using an electronic device (computer, Palm device, etc.) for pleasure?

Do not use _____ Less than an hour _____ 1–2 hours _____

3–5 hours _____ 6-10 hours _____ 11-15 hours _____

16-20 hours _____ More than 20 hours _____

2.10_2.19 How many hours each week do you normally spend on each of the following activities using an electronic device (computer, Palm device, etc.)? Choose one of these: 1 *Do not use,* 2 *Less than an hour,* 3 *1–2 hours,* 4 *3–5 hours,* 5 *6–10 hours,* 6 *11–15 hours,* 7 *16–20 hours,* 8 *More than 20 hours*

2.10 Classroom activities and studying using an electronic device	
2.11 Using a library resource to complete a course assignment (e.g., a library resource on your official school library Web sit e)	
2.12 Surfing the Internet for information to support your coursewor k	
2.13 Writing documents for your coursework	
2.14 Creating, reading, sending e-mail	
2.15 Creating, reading, sending instant messages	
2.16 Writing documents for pleasure (e.g., blogging)	
2.17 Playing computer games	
2.18 Downloading or listening to music or videos/DVDs	
2.19 Surfing the Internet for pleasure	
2.20 Online shopping	

2.21_2.26 How many hours each week do you normally spend on each of the following activities using an electronic device (computer, Palm device, etc.)? Choose one of these: 1 *Do not use,* 2 *Less than an hour,* 3 *1–2 hours,* 4 *3–5 hours,* 5 *6–10 hours,* 6 *11–15 hours,* 7 *16–20 hours,* 8 *More than 20 hours*

2.21 Creating spreadsheets or charts (Excel, etc.)	
2.22 Creating presentations (PowerPoint, etc.)	
2.23 Creating graphics (Photoshop, Flash, etc.)	
2.24 Creating and editing video/audio (Premiere, Windows Movie Maker, etc.)	
2.25 Creating Web pages (Dreamweaver, FrontPage, etc.)	
2.26 Completing a learning activity or accessing information for a c ourse using course websites	

2.27_2.37 What is your skill level using the following computer technologies and applications? Choose one of these**:** 1 ***Do not use***, 2 ***Very unskilled****=have not used the software,* 3 ***Unskilled****=have used the software but not regularly,* 4 ***Skilled****=full use of basic features but not advanced features,* 5 ***Very skilled****=ability to use advanced features, link the software with other software, troubleshoot problems, and*

upgrade/patch the software)

2.27 Word processing (Word, etc.)	
2.28 Spreadsheets (Excel, etc.)	
2.29 Presentation software (PowerPoint, etc.)	
2.30 Graphics (Photoshop, Flash, etc.)	
2.31 Creating and editing video/audio (Premiere, Widows Movie Ma kers etc)	
2.32 Creating Web pages (Dreamweaver, FrontPage, etc.)	
2.33 Creating and maintaining blogs	
2.34 Online library resources	
2.35 Computer operating systems (Windows, OSX, etc.)	
2.36 Computer maintenance	
2.37 Securing your electronic device (firewalls, antivirus software, e tc)	

2.38 How would you rate your information technology skills compared to other students' skills on your campus?

Much less skilled _____Less skilled _____ About the same skill level _____
More skilled _____ Much more skilled _____

2.39_2.43 Why did you learn the following computer technologies and applications? Choose <u>all that apply</u>: 1 *Do not use,* 2 *To improve my course performance,* 3 *Class or major requirement,* 4 *Campus requirement,* 5 *Personal interest* 6 *Employment,* 7 *Other (please specify)*

2.39 Spreadsheets (Excel, etc.)	
2.40 Presentation software (PowerPoint, etc.)	
2.41 Graphics (Photoshop, Flash, etc.)	
2.42 Creating and editing video/audio (Premiere, Windows Movie Makers, etc)	
2.43 Creating Web pages (Dreamweaver, FrontPage, etc)	

2.44 What is your most frequently used method for access to the Internet?

Commercial dial-up modem service	
School-operated dial-up modem service	
Commercial broadband service (e.g., DSL modem, cable modem, et c.)	
School-operated wired broadband service	
Commercial wireless network	

2.45_2.51 Which of the following concern you regarding information technology? Choose one of these: ๑ *Not a concern,* ๒ *Small concern,* ๓ *Significant concern,* ๔ *Major concern*

2.45 Inadequate access to printing	
2.46 The age of my computer hardware and software	
2.47 Slow or inadequate network access	
2.48 My technical skill level in troubleshooting my computer	
2.49 Computer viruses, worms, or Trojan horses	
2.50 Spam	
2.51 Inadequate technical assistance and help available to me on my campus	

SECTION III: Your Use of Technology in Learning English

3.1 Excluding your use of cell phones, how many hours each week do you normally spend using an electronic device (computer, Palm device, etc.) for studying English?

Do not use _____ Less than an hour _____ 1–2 hours _____

3–5 hours _____ 6-10 hours _____ 11-15 hours _____

16-20 hours _____ More than 20 hours _____

3.2 Which of the following best describes your preference with regard to the use of technology in your English courses?

I prefer taking courses that use *no* information technology.	
I prefer taking courses that use *limited* technology features (e.g., e-mail to instructors and limited use of PowerPoint in class).	
I prefer taking courses that use a *moderate* level of technology (e.g., e-mail, several PowerPoint presentations, some online activities or content).	
I prefer taking courses that use technology *extensively* (e.g., class lecture notes online, computer simulations, PowerPoint presentations, streaming video or audio, etc.).	
I prefer taking courses that use technology *exclusively* (i.e., are entirely online with no required face-to-face interactions).	

3.3_3.7 To what extent does each of the following describe your experiences in your English courses? Choose one of these: ๑ *Strongly Disagree*, ๒ *Disagree,* ๓ *Neutral,* ๔ *Agree,* ๕ *Strongly Agree*

3.3 I am more engaged in courses that require me to use technology.	
3.4 Overall, my instructors use information technology well in my courses.	
3.5 The instructors' use of technology in my courses has increased my interest in the subject matter.	
3.6 I primarily use information technology in courses to improve the presentation of my work.	
3.7 My school needs to give me more training on the information technology that I am required to use in my courses.	

3.8_3.12 To what extent has the use of information technology in English courses helped you? Choose one of these: 1 *Strongly Disagree*, 2 *Disagree,* 3 *Neutral*, 4 *Agree,* 5 *Strongly Agree*

3.8 The use of information technology in courses has helped me better understand complex or abstract concepts.	
3.9 The use of information technology in courses has helped me better communicate with my instructors.	
3.10 The use of information technology in courses has helped me better communicate and collaborate with my classmates.	
3.11 The use of information technology in courses has resulted in prompt feedback from my instructors.	
3.12 Courses that use information technology allow me to take greater control of my course activities (e.g., planning, apportioning time, noting success and failure).	

3.13 Have you taken an English class that used course websites? <If no, go to **3.26**. If yes, go to **3.14**>

Yes _____ No _____

3.14 If yes, how would you describe your own overall experience using a course website?

Very negative ___ Negative ___ Neutral ____ Positive ____ Very positive ___

3.15_3.23 How valuable did you find the following course website features? Choose one of these: ⓵ *Did not use,* ⓶ *Not valuable*, ⓷ *Valuable*, ⓸ *Very valuable*

3.15 Syllabus available on-line	
3.16 Online readings and links to other text-based course materials	
3.17 Online discussion board (postings comments, questions, and responses)	
3.18 Access to sample exams and quizzes for learning purposes	
3.19 Taking exams and quizzes online for grading purposes	
3.20 Turning in assignments online	
3.21 Getting assignments back from with comments and grades	
3.22 Sharing materials among students	
3.23 Keeping track of grades on assignments and tests	

3.24 Which of the following benefits from using information technology in your English courses was the most valuable to you?

No benefits _____ Improved my learning _____ . Convenience _____

Helped me manage my course activities (e.g., planning, monitoring my progress) _____

Helped me communicate with my classmates and instructors _____

Other _____

3.25 The use of information technology in my English courses improves my language skills.

Strongly disagree ____ Disagree ____ Neutral _____
Agree ____ Strongly agree ____

3.26 The use of information technology has improved my ability in …

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Reading					
Writing					
Speaking					
Listening					
Grammar					
Vocabulary					

3. 27 Three websites you frequently visit for learning English

_____

_____

_____

3.28 Two or three software programs you use for learning English

_____

3.29 Which of the following would you like your instructors to use in English classes? Check all that apply.

Course web site		PowerPoint presentations	
Digital images, multimedia components		Course materials available on-line	
On-line discussion board for the class		Technology-mediated projects	
Computer simulations and games		Web-casting	
Other (Please specify):			

3.30 Most valuable benefits from using technology in learning English

_____
_

_____
_

3.31 Barriers to using technology in learning English

_____
_
_____
_

Thank you very much for your time and participation.

Appendix B
A Map of China

Source from http://www.travelchinaguide.com/map/

Appendix C: Consent Form

Project Title	Information and Communication Technology Use among Chinese Learners of English as an International Language	
Why is this research being done?	This is a research project being conducted by Dr. Rebecca Oxford and Sei-Hwa Jung at the University of Maryland, College Park. We are inviting you to participate in this research because you are at least 18 years of age, currently enrolled in a university in China, and taking English courses now. The purpose of this research is to explore university students' ICT use in learning English.	
What will I be asked to do?	The procedures involve taking the questionnaire *Information and Communication Technology Use and Skills* in learning English, which takes 15-20 minutes. The questionnaire consists of three sections: (a) background information, (b) your general use of technology, and (c) your use of technology in learning English.	
What about confidentiality?	We will do our best to keep your personal information confidential. To help protect your confidentiality, your name will not be included on the survey, and a code will be placed on the surveys. If we write a report or article about this research project, your identity will be protected to the maximum extent possible.	
What are the risks of this research?	You will have to spend approximately 15 – 20 minutes taking the questionnaire.	
What are the benefits of this research?	As a result of taking the questionnaire, you will understand more about your ICT use and skills in language learning. You can obtain a summary of the whole-group results if you are interested.	
Do I have to be in this research? **Can I stop participating at any time?**	Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any time. If you decide not to participate in this study or if you stop participating at any time, you will not be penalized or lose any benefits to which you otherwise qualify.	
What if I have questions?	Dr. Rebecca Oxford Professor, Second Language Education and Culture Program, College of Education, 2311 Benjamin Building, University of Maryland, College Park, MD 20742 roxford@umd.edu (301)405-8157	Sei-Hwa Jung Ph.D. Candidate, Second Language Education and Culture Program, College of Education , University of Maryland , College Park, MD 20742 seihwajung@hotmail.com
	If you have questions about your rights as a research subject or wish to report a research-related injury, please contact: Institutional Review Board Office, University of Maryland, College Park, Maryland, 20742; (e-mail) irb@deans.umd.edu; (telephone) 301-405-0678 This research has been reviewed according to the University of Maryland, College Park IRB procedures for research involving human subjects.	
Statement of Age of Subject and Consent	Your signature indicates that: you are at least 18 years of age; the research has been explained to you; your questions have been answered; and you freely and voluntarily choose to participate in this research project.	
Signature and Date	**Signature:**	

Bibliography

Adamson, B. (2002). Barbarian as a foreign language: English in China's Schools. *World Englishes, 21*(2), 231-243.

Adamson, B. (2004). *China's English: A History of English in Chinese Education*. Hong Kong: Hong Kong University Press.

Adamson, B. (2005). Developing information technology for English in Chinese secondary schools. In Chris Davison (Ed.). *Information Technology and Innovation in Language Education*. Hong Kong: Hong Kong University Press

Adamson, B., & Morris, P. (1997). The English Curriculum in the People's Republic of China. *Comparative Education Review*, *41*(1), 3-26.

Alptekin, C. (2002). Towards intercultural communicative competence in ELT. *ELT Journal, 56*(1), 57-64.

Anker, W. P. (2002). The Challenge and opportunity of technology: An interview with Mark Warschauer, *English Teaching Forum, 40*(4), 1-8.

Arnett, J. J. (2002). The psychology of globalization. *American Psychologist, 57*, 774-783.

Becker, G. (2000). Creating comparability coefficient: The case of Cronbach alpha and Cohen kappa. *Psychological Reports, 87*, 1171-1182

Beijing launches BETS exams (2006, March 29). *People's Daily Online*. Retrieved March 14, 2006, from http://english.people.com.cn/200603/29/eng20060329_254254.html

Bureau of Commerce of Municipal Government (2006). Xi'an Online Investment Fair. Retrieved July 29, 2006, from http://www.xianonlineinvest.org

Block, D., & Cameron, D. (Eds.).(2002). *Globalization and language teaching.* London and New York: Routledge.

Bogdan, R. C., & Biklen, S. K. (2003). Qualitative research for education: An introduction to theories and methods. (4th Ed.). Boston: Pearson Education, Inc.

Bolton, K., & Tong, Q. S. (2002). Introduction: interdisciplinary perspectives on English in China. *World Englishes, 21*(2), p. 177-180.

Boyle, J. (2000). Education for teachers of English in China. *Journal of Education for Teaching, 26*(2), p. 147-155.

Brutt-Griffler, J. (2002). *World English: A study of its development.* Clevedon: Multilingual Matters.

Burns, A. (2003). Opportunities or threats? The case of English as a global language *Publishing Research Quarterly, 18(*4), 18-25.

Burns, A., & Coffin, C. (Eds.). (2001). *Analyzing English in a global Context: A reader*. London and New York: Routledge.

Bull, G., Bull, G.., & Kajder, S. (2004). Tapped In: The new incarnation of this resource is now available*. Learning & Leading with Technology, 31*, 34-37.

Cameron, D. (2002). Globalization and the teaching of 'communication skills'. In D. Block and D. Cameron. (Eds.). *Globalization and language teaching.* (pp. 67-82). London and New York: Routledge.

Canagarajah, A. S. (1999). *Resisting linguistic imperialism in English teaching.* Oxford: OUP.

Caruso, J. B., Kvavik, R. B., & Morgan, G. (2004, July). *ECAR study of students and information technology, 2004: Convenience, Connection and Control*. Paper

presented at the Third Annual ECAR/HP Summer Symposium for Higher Education IT Executives. Sedona, AZ.

Castells, M. (2000). *The rise of the network society*. (2nd ed.). Malden, MA: Blackwell.

Castells, M. (2004). *Informationalism, Networks, and the Network Society: a Theoretical Blueprinting, The network society: a Cross-Cultural Perspective*. Northampton, MA: Edward Elgar.

Chapelle, C. A.(1999). Theory and research: Investigating of authentic language learning tasks. In J. Egbert & E. Hanson-Smith (Eds.). *CALL environments: Resources, practice and critical issues* (pp.101-115). VA: TESOL Inc.

Chapelle C. A.(2001). *Computer applications in second language acquisition: foundations for teaching, testing and research*. Cambridge: Cambridge University Press.

Chapelle, C.A. (2003). *English language learning and technology: Lectures on applied linguistics in the age of information and communication technology.* Amsterdam: John Benjamins Publishing.

Chapelle, C. A. (2005). Computer assisted language learning. In E. Hinkle (Ed.) *Handbook of research in second language learning and teaching,* (pp. 743-756). Laurence Erlbaum Associates.

Chism, R. L. (2003). Electronic message boards: Conversations and communication beyond the classroom. In L. Lomicka & J. Cooke-Plagwitz (Eds.). *Teaching with Technology* (pp. 149-154). Boston: Thomson Heinle.

Chen, J. E., Warden, C. A., & Chang, H-T. (2005). Motivators that do not motivate: The case of Chinese EFL learners and the influence of culture on motivation. *TESOL Quarterly, 39*(4), 609-633.

Cheng, L., & Ren, S. (2003). Pre-service and in-service teacher education of secondary English language teachers in China. *TEFL Web Journal, 2*(1), 1-14.

China Internet Network Information Center (2006). The 17th Statistical Survey Report on the Internet Development in China. Retrieved March, 16, 2006, from http://www.cnnic.net.cn/en/index/0O/02/index.htm

Cisler, S. (2000). Subtract the digital divide. *San Jose Mercury News*. Retrieved October 17, 2005, from http://www.athenaalliance.org/rpapers/cisler.html

Commission on Behavioral and Social Sciences and Education (2000). *How people learn: Brain, mind, experience and school.* Washington, D.C.: National Academy of Sciences.

Cope, B. & Kalantzis, M. (1997). *Putting 'Multiliteracies' to the Test*. Retrieved October 17, 2005, from http://www.alea.edu.au/multilit.htm

Cope, B. & Kalantzis, M. (Eds.). (2000). *Multiliteracies: Literacy learning and the design of social futures.* London and New York: Routledge.

Cresswell, J. W. (2003). *Research Design: Qualitative, quantitative, and mixed methods approaches.* Thousand Oaks, CA: Sage.

Cresswell, J. W., Clark, V. L., Gutmann, M. L., & Hanson, W. E. (2003). Advanced mixed methods research designs. In A. Tashakkori & C. Teddlie (Eds.), *Handbook of mixed methods in social and behavioral research* (pp. 209-239). Thousand Oaks, CA: Sage.

Crystal, D. (2001). *Language and the Internet.* Cambridge: Cambridge University Press.

Crystal, D. (2003). *English as a global language. (*2nd Ed.). Cambridge: Cambridge University Press.

Crystal, D. (2004). *The language revolution*. Cambridge: Polity Press.

Daley, E. (2003). Expanding the concept of literacy. *EDUCAUSE Review, 38*(2), 33-40.

Davies, G. (2002). ICT and modern foreign languages: Learning opportunities and training needs. *International Journal of English Studies. 2*(1), 1-18.

Dede, C. (2005). Planning for neomillennial learning styles. *EDUCAUSE Quarterly, 28(*1), 7-12.

De Haan, J. (2004). A multifaceted dynamic model of the digital divide. *IT & Society, 1*(7), 66-88.

Dickard, N., & Schneider, D., (2005). The digital divide: Where we are today. *Edutopedia*. Retrieved June, 12, 2006, from http://www.glef.org

Dörnyei, Z. (2001) New themes and approaches in second language motivation research. *Annual Review of Applied Linguistics, 21*, 43-59.

Dörnyei, Z. (2003). Attitudes, orientations, and motivations in language learning: Advances in theory, research, and applications. *Language Learning, 53*(1), 3-32.

Dörnyei, Z. (2003). *Questionnaires in second language research: construction, administration, and processing.* Mahwah, N.J: Lawrence Erlbaum

Dörnyei, Z. (2005). *The psychology of the language learner: Individual differences in second language acquisition*. Mahwah, NJ: LEA

Dornyei, Z., & Csizer, K. (2002). Some dynamics of language attitudes and motivation: Results of a longitudinal nationwide survey. *Applied Linguistics, 23*(4), 421-462.

Dörnyei, Z., & Skehan, P. (2003). Individual differences in second language learning. In C. J. Doughty & M.H. Long (Eds.). *The handbook of second language acquisition* (pp. 589-630). Oxford: Blackwell.

Doughty, C., & Long, M. H. (2003). Optimal psycholinguistic environments for distance foreign language learning. *Language Learning & Technology, 7*, 50-80.

Economist (1996, December 21). Language and electronics: The coming global tongue. *The Economist,* 45-48. Retrieved September 11, 2005, from http://www.uta.fi/FAST/US8/REF/globtong.html

Egbert, J. L. (2005). Conducting research on CALL. In J. Egbert and G. M. Petrie (Eds.) *CALL research perspectives* (pp. 3-8). Mahwah, NJ: Lawrence Earlbaum.

Egbert, J., Paulus, T. M., & Nakamichi, Y. (2002). The impact of CALL instruction on classroom computer use: A foundation for rethinking technology in teacher education. *Language Learning and Technology, 6*(3), 108-126.

Ellis, R. (2001). The metaphorical constructions of second language learners. In M. Breen (Ed.), *Learner contributions to language learning: New directions in research* (pp. 65-85). London: Longman.

Ellis, R. (2003). *Task-based language learning and teaching*. Oxford: Oxford University Press.

Emrich, A. (2004). *The gamer generation: And why baby boomers shouldn't worry so much about them*. Retrieved October 17, 2005, from http://www.alanemrich.com/SGI/Week_10/SGI%2010%20GAMER%20GENERATION.PDF

English can enhance development of successful, progressive economy. (2001, July 29). *New Straits Times*. p. 6.

Fang, X., & Warschauer, M. (2004). Technology and curricular reform in China: A case study. *TESOL Quarterly 38*(2), 301-323.

Ferguson, C. (1959) Diglossia. *Word, 15,* 325-340.

Foreman, J. (2003). Next-generation: Educational technology versus the lecture. *EDUCAUSE Review, 38*(4), *12-22.*

Frand, J. L. (2003). The information age mindset. *EDUCAUSE Review, 35*(5), 15-24.

Freire, P., & Macedo, D. (1987). *Literacy: Reading the word and the world.* Hadley, MA: Bergin and Garvey.

Gardner, R. C. (1985). *Social psychology and second language learning: The role of attitudes and motivation.* London: Arnold.

Gardner, R. C. (2001). Integrative motivation and second language acquisition. In Z. Dornyei & R. Schmidt (Eds.). *Motivation and second language learning* (pp.1-20). Honolulu, HI: University of Hawaii Press.

Gardner, R.C., Masgoret, A.M., Tennant, J., & Mihic, L. (2004). Integrative motivation: Changes during a year-long intermediate-level language course. *Language Learning, 54*(1), 1-34.

Gardner, R. C., Tremblay, P.F., & Masgoret, A.M. (1997). Towards a full model of second language learning: An empirical investigation. *Modern Language Journal, 81,* 344-362

Gee, J. P. (2003). *What video games have to teach us about learning and literacy.* New York: Palgrave/Macmillan.

George, D., & Mallery, P. (2003). *SPSS for Windows step by step: A simple guide and reference. 11.0 update* (4th ed.). Boston: Allyn & Bacon.

Giddens, A. (2000). *Runaway world: How globalization in reshaping our lives.* New York: Routledge.

Greenfield (2003). Collaborative E-mail exchange for teaching secondary ESL: A case study in Hong Kong. *Language Learning & Technology, 7(*1). 46-70.

Godwin-Jones, B. (2000). Literacies and technology tools/trends. *Language Learning & Teaching, 4(2),* 11-18.

Godwin-Jones, B. (2005). Skype and podcasting: Disruptive technologies for language learning. *Language Learning & Technology,* 9(3), 9-12.

Gorski, P. (2005). Education equity and the digital divide. *AACE Journal, 13*(1), 3-45.

Goulding, C. (1999). *Grounded theory: Some reflections on paradigm, procedures and misconceptions.* Working paper series, WP006/99, Wolverhampton: University of Wolverhampton. Retrieved June 25, 2006 from http://www.wlv.ac.uk/PDF/uwbs_WP006-99%20Goulding.pdf

Graddol, D. (1997). *The future of English?* London: The British Council.

Greene, J. C., & Caracelli, V. J. (Eds.).(1997). *Advances in mixed-method evaluations: The challenges and benefits of integrating diverse paradigms* (New Directions for Evaluations, No. 74). San Francisco: Jossey-Bass.

Guo, L., & Wang, N. (2004). Internet adoption in China's smaller cities. *IT & Society, 1*(6), 36-43.

Harrington, J. (2001).The Digital Divide: Lessons from the People's Republic of China. Paper Presented at the Midwest International Studies Association Meeting, St. Louis, MO, November 2nd, 2001.

Hawkins, R. J. (2002). The lessons for ICT and education in the developing world.

Hinkle, D. E., Wiersma, W. & Jurs, S. G. (1998). *Applied Statistics for the Behavioral Sciences.* (4th Ed.)Boston, Houghton Mifflin Company.

Hertel, T. J. (2003). Using an E-mail exchange to promote cultural learning. *Foreign Language Annals, 36(*3), 386-396.

Hu, G.. (2002). Recent important development in secondary English-language teaching in the People's Republic of China. *Language, Culture, and Curriculum, 15*(1), 30-49.

Hu, G.. (2003). English language teaching in China: Regional differences and contributing factors. *Journal of Multilingual and Multicultural Development, 24*(4), 290-318.

Hu, G.. (2005). Contextual influences on instructional practices: A Chinese case for an ecological approach to ELT, *TESOL Quarterly, 39*(4), 635-660.

Hui, D. (2001). The globalization of the English language: Reflections on the teaching of English in China. *International Education Journal, 2*(4), 126-133.

Hui, P. K. (2005, September). *Implications of ubiquitous computing for education*. Paper presented at the International Workshop on Workforce Development for Knowledge Economy. Seoul, Korea.

Jarboe, K. P. (2001). *Inclusion in the information age: Reframing the debate*. Athena | Alliance: Washington, D.C. Retrieved March 14, 2006, from

http://www.athenaalliance.org/apapers/inclusionreport.html

Jarvis, H. (2005). Technology and change in English Language Teaching. *Asia TEFL Journal, 7*(4), 213-227.

Jenkins, J. (2000). *The phonology of English as an international language: New models, new norms, new goals.* Oxford: Oxford University Press:

Jenkins, J. (2002) A socially based, empirically researched pronunciation syllabus for English as an international language. *Applied Linguistics, 23*(1), 83-103.

Jenkins, J. (2006). Current perspectives on teaching World Englishes and English as a Lingua Franca. *TESOL Quarterly, 40*(1), 157-181.

Jin, L. & Cortazzi, M. (1998) The Culture the Learner Brings: a Bridge or a Barrier?, in M. Byram & M. Fleming (eds.) *Language Learning in Intercultural Perspective*, *approaches through drama and ethnography* (pp. 98-118). Cambridge: Cambridge University Press.

Jin, L., & Cortazzi, M. (2004). English language teaching in China: A bridge to the future. In H. W. Kam & R. T. Wong, (2nd Eds.). *English Language Teaching in East Asia Today: Changing Policies and Practices.* Singapore: Marshall Cavendish International.

Johnson, B., & Turner, L. A. (2003). Data collection strategies in mixed methods research. In A. Tashakkori & C. Teddlie (Eds.). *Handbook of mixed methods in social and behavioral research* (pp. 167-187). Thousand Oaks, CA: Sage.

Johnson, B., & Christensen, L. (2004). *Educational Research: Quantitative, Qualitative, and Mixed Approaches.* (2nd Ed.). Boston, MA: Allyn and Bacon.

Johnson, R.B., & Onwuegbuzie, A. J. (2004). Mixed methods research: A research paradigm whose time has come. *Educational Researcher, 33*(7), 14-26.

Johnson, T. P., & Van de Vijver, F. J. R. (2003). Social Desirability in Cross-Cultural Research. In J. Harkness, F. J. R. Van de Vijver, & P. P. Mohler (eds.), *Cross-Cultural Survey Methods* (pp. 295-304). Hoboken, NJ: John Wiley & Sons.

Jordan, M. K., Heredia, A. H., & Aguilera, G., M. (2001). Cross-cultural E-mail: Providing cultural input for the advanced foreign language student. *Foreign Language Annals, 34(*4), 341-346.

Jones, S. (2002). *The internet goes to college: How students are living in the future with today's technology*. Washington, D.C: Pew Internet & American Life Project.

Jung, S. (2006). *Information and Communication Technology Use and Skills (ICTUS) for learning English.*

Jurich, S. (2001). ICT and the teaching of foreign languages. Retrieved June 12, 2006, from http://www.techknowlogia.org/TKL_active_pages2/CurrentArticles/main.asp?IssueNumber=14&FileType=HTML&ArticleID=335

Kachru, B., & Nelson, C.L. (2001). World Englishes. In A. Burns & C. Coffin (Eds.). *Analyzing English in a global context* (pp.9-25). New York: Routledge.

Kaminski, K., Seel, P., & Cullen, K. (2003). Technology literate students? Results from a survey. *EDUCAUSE Quarterly, 26* (3), *34-39.*

Kasper, L. F. (2000). New technologies, new literacies: Focus discipline research and ESL learning communities. *Language Learning & Teaching, 4(*2), 105-128.

Katsuno, M. (2005). *Status and Overview of Official ICT Indicators for China*. Paris, France: OECD Publications. Retrieved March 14, 2006, from http://www.oecd.org/sti/working-papers

Katz, S. L. (2001). Videoconferencing with the French-speaking world: A user's guide. *Foreign Language Annals, 34(*2), 152-157.

Kern, R. (2006). Perspectives on technology in learning and teaching languages. *TESOL Quarterly, 40*(1), 183-210.

Kellner, D. (2000). New technologies/new literacies: Reconstructing education for the new millennium. *Teaching Education, 11(*3), 245-265.

Kellner, D. (2004). Technological transformation, multiple literacies, and the re-visioning of education. *E-Learning, 1*(1), 9-37.

Kern, R. (2006). Perspectives on technology in learning and teaching languages. *TESOL Quarterly, 40*(1), 183-211.

Kern, R., Ware, P., & Warschauer, M. (2004). Crossing frontiers: New directions in online pedagogy and research. *Annual Review of Applied Linguistics, 24*, 243-260.

Kramsch, C. (1998). The privilege of the intercultural speaker. In M. Byram & M. Fleming (Eds.). *Language learning in intercultural perspective: approaches through drama and ethnography.* (pp. 16-31). Cambridge: Cambridge University Press.

Kramsch, C., & Thorne, S. L. (2002). Foreign language learning as global communicative practice. In D. Block and D. Cameron. (Eds.). *Globalization and language teaching.* (pp. 83-100). London and New York: Routledge.

Kramsch, C., A'Ness, F., & Lam, W. (2000). Authenticity and authorship in the computer-mediated acquisition of L2 literacy. *Language Learning & Technology, 4(*2), 78-104.

Kubota, R. (2002). The impact of globalization on language teaching in Japan. In D. Block and D. Cameron. (Eds.). *Globalization and language teaching.* (pp. 13-28). London and New York: Routledge.

Kvakik, R. (2005). Convenience, communications, and control: How students use technology. In D.G. Oblinger & J.L. Oblinger (Eds.), *Educating the Net Generation*. (pp. 7.1-7.20). Washington, DC:Educause.

Kvaivk, R. B., & Caruso, J. B. (2005). *ECAR study of students and information technology, 2005: Convenience, connection, control, and learning*. Boulder, CO: EDUCAUSE Center for Applied Research. Retrieved October 17, 2005, from www.educause.edu/ir/library/pdf/ers0506/rs/ERS0506w.pdf

Lam, A. (2002) English in education in China: Policy changes and learners' experiences. *World Englishes, 21*(2), 245-256.

Lam, A., & Chow, K. (2004). English language education in China: An Update. In K-K. Tam & T. Weiss. (Eds.). *English and globalization: Perspectives from Hong Kong and China*. (pp. 233-252). Hong Kong: Chinese University Press.

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.

Lam, W. S. E., & Kramsch, C. (2003). The ecology of an SLA community in a computer-mediated environment. In J. Leather, & J. van Dam (Eds.), *Ecology of Language Acquisition* (pp. 141-158). Boston: Kluwer Academic Publishers.

Lamb, M. (2004) Integrative motivation in a globalizing world. *System, 32*, 2-19.

Lave, J., & Wenger, E. (Eds.). (1991). *Situated learning: Legitimate peripheral participation.* Cambridge: Cambridge University Press.

Law, N., & Plomp, T. (2003). Curriculum and Staff Development for ICT in education. In T. Plomp, R., Anderson, N. Law & A. Quale (Eds.) *Cross-national Policies and Practices on Information and Communication Technology in Education.* Information Age Publishing Inc.

Leaver, B. L., & Willis, J. R. (eds.) (2004). *Task-based instruction in foreign language education: Practices and programs.* Washington, D.C.: Georgetown University Press.

Lee, J. (2000). *Tasks and communicating in language classrooms*. Boston: McGraw Hill.

Lee, K. (2000). English teachers' barriers to the use of computer-assisted language learning. *The Internet TESL Journal, 6*(12), Retrieved March 14, 2006, from http://iteslj.org/Articles/Lee-CALLbarriers.html

Lee, N. (November, 2004). *Online task-based learning: Design, process and assessment.* Paper presented at the American Council of Teaching of Foreign Languages, Chicago, IL.

Leu, D. J., Jr., & Kinzer, C. K. (2000). The convergence of literacy instruction with networked technologies for information and communication. *Reading Research Quarterly, 35,* 112-118

Leu, D. J., Kinzer, K. K., Coire, J. L., & Commack, D. W. (2004). Toward a theory of new literacies emerging from the internet and other information and communication technologies. In R. B. Ruddell & N. Unrau (Eds.), *Theoretical models and processes of reading* (5th ed., pp. 1570-1613). Newark, DE: International Reading Association

Levy, M. (1997). *Computer-assisted language learning: Context and conceptualization.* Oxford, UK: Clarendon.

Llurda, E. (2004). Non-native speaker teachers and English as an international language. *International Journal of Applied Linguistics, 14*(3), 314-323.

Li, C. (2003). China, ICT use in Education: Policy goals and implementations. In G. | Farrell, & C. Wachholz.(Eds.). *Meta-survey on the Use of Technologies in Education in Asia and the Pacific 2003-2004*. Bankkok, Thailand: UNESCO Asia and Pacific Regional Bureau for Education.

Li, J. (2002). A cultural model of learning: Chinese "heart and mind for wanting to learn." *Journal of Cross-cultural Psychology, 33*(3), 248-269.

Li, J. (2003). U.S. and Chinese cultural beliefs about learning. *Journal of Educational Psychology, 95*(2), 258-267.

Liu, M., Moore, Z., Graham, L., & Lee, S. (2003). A look at the research on computer-based technology use in second language learning: A review of the literature from 1990-2000. *Journal of Research on Technology in Education, 34*(3), 250-273.

Ma, F., & Hu, C. (July, 2002): *Information Literacy, Education Reform and the Economy: China as a Case Study.* Retrieved March 14, 2006, from http://www.nclis.gov/libinter/infolitconf&meet/papers/ma-fullpaper.pdf

Matsuda, A. (2003). The ownership of English in Japanese schools. *World Englishes, 22*(4), 483-496.

Maxwell, J. A., & Loomis, D. M. (2003). Mixed methods design: An alternative approach. In A. Tashakkori & C. Teddlie (Eds.), *Handbook of mixed methods in social and behavioral research* (pp. 209-240). Thousand Oaks, CA: Sage.

McEuen, S. F. (2001). How fluent with information technology are our students? *EDUCAUSE Quarterly, 24(*4), 8-17.

McKay, S. L. (2002), *Teaching English as an International Language*. Oxford: Oxford University Press.

McKay, S. L. (2003). Toward an appropriate EIL pedagogy: Re-examining common ELT assumptions. *International Journal of Applied Linguistics, 13*(1), 1-22.

McNeely, B. (2005). Using technology as a learning tool, not just the cool new thing. In D.G. Oblinger & J.L. Oblinger (Eds.), *Educating the Net Generation*. (pp. 4.14-4.10).Washington, DC: Educause.

McLuhan, M. (1962). *The Gutenberg galaxy*. Toronto: University of Toronto Press.

McLuhan Associates (1986). *If it works, it's obsolete: Marshall McLuhanisms*. Retrieved October 17, 2005, from http://www.marshallmcluhan.com/poster.html

Meskill, C. (2005). Metaphors that shape and guide CALL research. In J. Egbert and G. M. Petrie (Eds.) *CALL Research Perspectives* (pp. 25-40). Mahwah, NJ: Lawrence Earlbaum.

Mok, K.-H., & Welch, A. R. (2003). Globalization, structural adjustment and educational reform. In K.-H. Mok & A. R. Welch (Eds.), *Globalization and Educational Re-Structuring in the Asia Pacific Region* (pp. 1-31). London: Palgrave.

Mori, S. (2002). Redefining Motivation to Read in a Foreign Language. *Reading in a Foreign Language, 14*(2), 92-110. Retrieved March 16, 2006, from http://nflrc.hawaii.edu/rfl/October2002/mori/mori.html

Morse, J. M. (2003). Principles of mixed methods and multimethod research design. In A. Tashakkori & C. Teddlie (Eds.), *Handbook of mixed methods in social and behavioral research* (pp. 189-207). Thousand Oaks, CA: Sage.

Murray, D. E. (2001). Changing technologies, changing literacy communities? *Language Learning & Technology, 4(*2), 43-58.

Nakamura, K. (2002). Cultivating global literacy through English as an international language education in Japan: A new paradigm for global education. *International Education, 3*(5), 64- 74.

New London Group (1996). A pedagogy of multiliteracies: Designing social futures. *Harvard Educational Review, 66*, 60-92.

New Media Consortium (2005a). *A global imperative: The report of the 21st century literacy summit*. Retrieved October 17, 2005, from http://www.nmc.org/summit/

New Media Consortium (2000b). *The 2005 Horizon Report.* Stanford, CA: NMC-National Learning Infrastructure Initiative. Retrieved October 17, 2005, from http://www.nmc.org/horizon/index.shtml

Newman, I., Ridenour, C. S., Newman, C., & Demarco, Jr. G. M. (2003). A typology of research purposes and its relationship to mixed methods. In A. Tashakkori & C. Teddlie (Eds.), *Handbook of mixed methods in social and behavioral research* (pp. 167-187). Thousand Oaks, CA: Sage.

Noels, K. A., Pelletier, L.G., Clement, R., & Vallerand, R. J. (2000). Why are you learning a second language? Motivational orientations and self-determination theory. *Language Learning, 50,* 57-85.

North Central Regional Education Laboratory. (2003). *EnGauge 21st century skills: Literacy in the digital age.* Npaerville IL: Author. Retrieved October 17, 2005, from http://www.ncrel.org/engauge/skills/skills.htm

Norris, J. M. (2005, September). *The essential roles of assessment, measurement, and evaluation in task-based language teaching*. Plenary address presented at the First International Conference on Task-Based Language Teaching, University of Leuven, Belgium.

Norton Peirce, B. (1995). Social identity, investment, and language learning. *TESOL Quarterly*, *29*(1), 9-31.

Nunan, D. (2003). The impact of English as a global language on educational policies and practices in the Asia-Pacific region. *TESOL Quarterly, 37*(4), p. 589-613.

Nunan, D. (2005). *Task-based language teaching*. Cambridge: Cambridge University Press.

Nunn, R. (2005). Competence and teaching English as an International Language. *Asian EFL Journal, 7*(3), 61-74.

Oblinger, D. (2005a). Asking the right question. *EDUCAUSE Review*, *40*(2), 76.

Oblinger, D. (2005b). Learners, learning, & technology. *EDUCAUSE Review, 40*(5), 67-75.

O'Callaghan, J. (1996) Grounded Theory: a potential methodology" *Counselling Psychology Review* 11(1) pp.23-28.

Oxford, R.L. (2001). "The bleached bones of a story" Learners' constructions of language teachers. In M. Breen (Ed.), *Learner contributions to language learning: New directions in research* (pp. 86-111). London: Longman.

Oxford, R. L (2001). Language learning styles and strategies. In M. Celce-Murcia (Ed.), *Teaching English as a second or foreign language* (3rd Ed., pp. 359-366). Boston, MA: Heinle & Heinle.

Oxford, R. L. (2002). Sources of variation in language learning. In R. Kaplan (Ed.), *Ox ford handbook of applied linguistics* (pp. 245-252). Oxford, UK: Oxford University Press.

Oxford, R. (in press). Task-based language teaching and learning: An overview. *Asian EFL Journal.*

Oxford, R. & Shearin, J. (1994). Language learning motivation: Expanding the theoretical framework. *Modern Language Journal, 78,* 12-28.

Oxford, R.L., Massey, R., & Anand, S. (2005). Transforming teacher-student style relationships. In. J. Frodesen & C. Holten (Eds.), *The power of context in language teaching and learning* (pp. 249-266). Boston: Thomson Heinle.

Oxford, R. L., Tomlinson, S., Barcelos, A. Harrington, C., Lavine, R., Saleh, A., et al. (1998) Clashing metaphors about classroom teachers: Toward a systematic typology for the language teaching field. *System, 26*, 3–50.

Petzold, R. (2002). Toward a pedagogical model for ELT. *World Englishes, 21*(3), 422- 426.

Pang, J., Zhou, X., & Fu, Z. (2002). English for international trade: China enters the WTO. *World Englishes*, *21*(2), p. 201-216.

Phan Le Ha (2005). Toward a critical notion of appropriation of English as an international language. *Asian EFL Journal, 7*(3), 30-42.

Phillipson, R. (1992). *Linguistic imperialism*. Oxford: Oxford University Press.

Phillipson, R., & Skutnabb-Kangas, T. (1996). English only worldwide or language ecology?, *TESOL Quarterly, 30*(3), 429-52.

Pururshotma, R. (2005). You're not studying, you're just…*Language Learning & Technology, 9(*1), 80-96.

Rajadurai, J. (2005). Revisiting the concentric circles: Conceptual and sociolinguistic considerations. *Asia EFL Journal, 7*(4), 111-130.

Rahman, S. (2005). Orientations and motivation in English language learning: A study of Bangladeshi students at undergraduate level. *Asian EFL Journal, 7*(1), 1-25.

Reddy, R. (2004). *ICT for emerging economies. Mythology and Reality of the Digital Divide Problem*. Retrieved March, 16, 2006, from http://www.rr.cs.cmu.edu/ITSD.ppt

Richards, C. (2000). Hypermedia, internet communication, and the challenge of redefining literacy in the electronic age. *Language Learning & Technology, 4*(2), 59-77.

Rickman, J., & Grudzinski, M. (2000). Student expectations of information technology use in the classroom. *Educause Quarterly, 23(*1), 24-30.

Rohter, L. (2004, December 29). Learn English, says Chile, thinking upwardly global. *New York Times*, pp. A3.

Ross & Morrison, (2001). *Getting started in instructional technology research.* Bloomington, IN: The Association for Educational Communications and Technology. Retrieved September 11, 2005, from http://www.aect.org/intranet/publications/Research/index.html#1-4

Seidlhofer, B. (2001). Closing a conceptual gap: The case for a description of English as a lingua franca. *International Journal of Applied Linguistics, 11*(2), 133-58.

Seidlhofer, B. (2003). *A concept of international English and related issues: From 'real English' to 'realistic English'?* Strasbourg: Council of Europe.

Sifakis, N.C. (2004). Teaching EIL-Teaching international or intercultural English? What teachers should know. *System, 32*, 237-250.

Sifakis, N. S., & Sougari, A-M. (2003). Facing the globalisation challenge in the realm of English language teaching. *Language and Education, 17(*1), 59-71.

Shenkar, O. (2005). *The Chinese Century: the rising Chinese Economy and its Impact on the Global Economy, the Balance of Power, and Your Job*. Philadelphia, PA: Wharton School Publishing.

Smith, C. S. (2001). Olympics; Joyous Vindication and a Sleepless Night. (2001, July 14). *The New York Times.* A.3; p. 1

Strauss, A. & Corbin, J. (1998). *Basics of qualitative research: Techniques and procedures for developing grounded theory* (2nd ed.). Thousand Oaks, CA: Sage.

Szendeffy, J (2005). *Effective CALL pedagogy: Ten suggestions for teachers with limited CALL experience*. Retrieved from

www.bu.edu/celop/mll/tutorials/ pdf_public/CALL_Pedagogy.pdf

Tiene, D. (2002). Addressing the global digital divide and its impact on educational opportunity. *Education Media International,* 211-221.

Tinio, V. L. (2003). *ICT in education*. E-ASEAN task force. Manila, Philippines: UNDP-APDIP.

Thao, V.T. (2003). The contribution of multimedia tools to EFL setting unfamiliar with technology. *Asian EFL Journal, 5*(3), 1-14.

Tomlinson, B. (2005). The future for ELT materials in Asia. *Electronic Journal of Foreign Language Teaching, 2*(2), 5-13.

Toporkoff, S. (2005, May). *The ubiquitous network society within reach?: A European perspective*. Paper presented at the Tokyo Ubiquitous Network Conference. Tokyo, Japan.

Quxin, H. (2001). English language education in China. In Steven Baker (ed.), *Language policy: Lessons from global models*. Monterey Institute of International Studies, Monterey: CA.

United Nations Educational, Scientific, and Cultural Organization (2002). *Information and Communication Technology in Education: A curriculum for Schools and Program of Teacher Development*. Paris, France.

Warschauer, M. (1996). Computer-assisted language learning: An introduction. In S. Fotos (Ed.) *Multimedia language teaching* (pp. 3-20). Tokyo, Japan: Logos International.

Warschauer, M. (1998). *New media, new literacies: Challenges for the next century.* Plenary address at the annual conference of the English Teachers Association of Israel, Jerusalem.

Warschauer, M. (1999). *Electronic literacies: Language, culture, and power in online education.* Mahwah, NJ: Erlbaum.

Warschauer, M. (2000a). The changing global economy and the future of English teaching, *TESOL Quarterly, 34 (*3), 511-535.

Warschauer, M. (2000b). The death of cyberspace and the rebirth of CALL, *English Teachers' Journal, 53,* 61-67.

Warschauer, M. (2001) Millennialism and media: Language, literacy, and technology in the 21st century. *AILA Review, 14*, 49-59.

Warschauer, M. (2002). Reconceptualizing the digital divide. *First Monday 7*(7), 197-304.

Warschauer, M. (2003). Dissecting the "digital divide": A case study in Egypt. *Information Society, 19*, 197-304.

Warschauer, M. (2004). Technological change and the future of CALL. In S. Fotos & C. Brown (Eds.), *New perspectives on CALL for second and foreign language classrooms (*pp. 15-25). Mahwah, NJ: Lawrence Erlbaum Associates.

Warschauer, M. (2005). Sociocultural perspectives on CALL. In J. Egbert and G. M. Petrie (Eds.) *CALL research perspectives* (pp. 41-51). Mahwah, NJ: Lawrence Earlbaum.

Warschauer, M. (in press). A literacy approach to the digital divide. In M. A. Pereyra (Ed.), *Las mulialfabetizaciones en el espacio digital* . Malaga, Spain: Ediciones Aljibe.

Warschauer, M., & De Florio-Hansen, I. (2003). Multilingualism, identity, and the Internet. In A. Hu & I. De Florio-Hansen (Eds), *Multiple identity and multilingualism* (pp. 155-179). Tübingen: Stauffenburg.

Warschauer, M., & Meskill, C. (2000). Technology and Second Language Teaching and Learning. In J. Rosenthal (ed) *Handbook of Undergraduate Second Language Education.* (pp. 303-318). Mahwah, NJ: Lawrence Erlbaum.

What the Games will do (2001, July 30). *Business Week*, p.60W.

Wang, L. (2004). When English becomes big business. In K-K. Tam & T. Weiss. (Eds.). *English and globalization: Perspectives from Hong Kong and China*. (pp. 149167). Hong Kong: Chinese University Press.

Wang, W. (2002). *Bridging the digital divide inside China*. Paper presented at the Third Asian Conference in Information Technology in Agriculture, October 26-28, 2002, Beijing, China

Weiser, M. (1991, September). The computer for the twenty-first century. *Scientific American*, 94-104.

Wenger, E. (1998). *Communities of Practice: Learning, meaning, and identity.* Cambridge: Cambridge University Press.

Widdowson, H.G. (1994) The ownership of English. *TESOL Quarterly* 28 (2), 377–88.

Widdowson, H. G. (1997). EIL, ESL, EFL: global Issues and local Interests. *World Englishes, 16*(1), 146-53.

Widdowson, H. G. (2000). On the limitations of linguistics applied. Applied *Linguistics, 21*(1), 3–25.

Wu, Y. (2001). English Language Teaching in China: Trends and Challenges. *TESOL Quarterly, 35*(1), 191-194.

Yang, Y-F. (2005). Situated learning as a framework for CALL research. In J. Egbert and G. M. Petrie (Eds.) *CALL research perspectives* (pp. 155-168). Mahwah, NJ: Lawrence Earlbaum.

Yano, Y. (2001). World Englishes in 2000 and beyond. *World Englishes, 20*, 119-131.

Zhao, Y. (2003). Recent developments in technology and language learning: A literature review and meta-analysis. *CALICO Journal, 21*(1), 7-27.

Zhao, Y. (2005). *Research in technology and second language learning: Developments and directions.* Greenwich, CT: Information Age Publishing.

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.