To the Graduate Council:

I am submitting herewith a dissertation written by Satoshi Hashimoto entitled "Computer and Networking Technology Usage for World Language Education in Post-Secondary Education in Tennessee." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Education.

Dr. Patricia Davis-Wiley
Major Professor

We have read this dissertation
and recommend its acceptance:

Dr. Judith A. Boser

Dr. Edward L. Counts

Dr. John B. Romeiser

Accepted for the Council:

Dr. Anne Mayhew
Vice Provost and Dean of
Graduate Studies

(Original signatures are on file with official student records.)

COMPUTER AND NETWORKING TECHNOLOGY USAGE FOR WORLD LANGUAGE EDUCATION IN POST-SECONDARY EDUCATION IN TENNESSEE

A Dissertation
Presented for the
Doctor of Philosophy
Degree
The University of Tennessee, Knoxville

Satoshi Hashimoto
August 2002

ACKNOWLEDGEMENTS

I would like to thank everyone who helped make my dissertation possible. First of all, I would like to express my special gratitude to Dr. Patricia Davis-Wiley, my committee chairperson. I am grateful to Dr. Davis-Wiley for the enormous amount of time she devoted to my dissertation and for reading and closely editing every chapter more than four times. I thank her for her enthusiasm, her tireless support, guidance, and for feeding me many times for almost five years.

I also would like to express my sincere appreciation to Dr. Judy Boser for sharing her special knowledge of survey methods and data analysis. She also read and edited my manuscript many times and gave me essential advice and suggestions. I am also grateful to my two other committee members. Dr. Edward Counts helped me develop my technological knowledge and skills and challenged me to really think about my topic. Dr. John Romeiser willingly served as the outside of the College of Education member of my committee and inspired me to proceed with my research from the perspective of a world language educator.

I also wish to thank the survey participants and my friends who participated in the pilot study. Without the help of these fine people, I would not have been able to complete my research.

I am grateful to Mrs. Fumiko Kinjo, a visiting professor at UTK, Mrs. Kikue Yamada, a business manager at ETJS, and Mrs. Akiko Hayashi, an instructor of Japanese at Tokyo International University, for assisting me with many aspects of my life during my doctoral program. Lately, I owe a huge debt of gratitude to my wonderful parents, Masae and Osamu Hashimoto, for their tireless support and never-ending encouragement.

ABSTRACT

Technology has been rapidly and continually introduced into the world language classroom to teach both the target language and its culture. This study investigated what kind of computer/networking technology was available and actually used by the post-secondary world language teachers in Tennessee and how often this technology was used. The specific target language skills, which teachers using technology wanted to enhance, were also explored. The survey participants consisted of 102 post-secondary teachers of world languages (excluding English) who taught at 24 universities and colleges in Tennessee during the spring semester, 2002. According to the survey, 73% of the participants reported that they had at least one computer lab dedicated solely to teach languages, and 48% of the participants reported actually using the facility to teach world languages at their institutions. The research study revealed that 77% of the participants used at least one type of technology in their teaching. In terms of teachers' usage, word-processing was the most frequently used type of technology. Technology for on-line communication and information retrieval from the Internet was also used frequently. Almost all students could access technology for word-processing in the target language and for information retrieval from the Internet. The least available technology reported was audio-/video- conferencing, using telephone lines and other high-speed networking. According to the survey participants' perceptions, the most highly used technology by the students was the one for word-processing and information retrieval from the Internet. The survey participants who taught French used technology the most for their teaching. Spanish teachers followed next, and other less commonly taught language teachers used technology in their classes the least. The survey participants who had the least number of

years of teaching experience tended to use technology the most. The second group who frequently used technology consisted of those who taught languages more than 10 years. The survey participants who used technology for a specific purpose tended to require their students to use technology for the same purpose. Educational implications and recommendations for further research conclude the study.

TABLE OF CONTENTS

CHAPTER	PAGE
CHAPTER I: INTRODUCTION	1
Introduction	1
Statement of the Problem	2
Purpose of the Study	3
Significance of the Study	3
Assumptions	4
Limitations	4
Definition of Terms	5
Organization of the Study	9
Chapter Summary	9
CHAPTER II: REVIEW OF LITERATURE	11
Introduction	11
Concept of Technology	11
Technology in the Language Classroom	14
Instructional Technology	14
Conceptualization of Computer Usage in Education	15
Conceptualization of Computer Usage in Language Education	16
History of Technology Usage in the Classroom	17
CALL in the 1960s and 1970s – A Structural Perspective	17
CALL in the Late 1970s and 1980s – A Cognitive Perspective	19
CALL in the 1990s – A Sociocognitive Perspective	23
Autonomy in the Learning Process	26
Changing Roles for Teachers and Learners	26
Equality in Networking Learning Environment	27
Dynamics of the Learning Process	28
Authentic Materials and Experiential Learning	28
Disadvantages of the Use of Technology	29
Financial Barriers	29
Difficulty of Accessibility to Computer Hardware and Software	30
Lack of Technical and Theoretical Knowledge	30
Difficulty of Acceptance of the Technology	31
Current Practices	31
CALL Programs	32
The Internet	33
Word-Processing	36
Electronic Presentations	37
Desktop Publishing	37

Telecommunication 37
Surveys of Technology Usage in the Language Classroom 38
Chapter Summary 41

CHAPTER III: METHODS AND PROCEDURES 42
Introduction 42
Research Questions 42
Survey Participants 43
Instrumentation 45
Procedures 46
Data Analysis 48
Chapter Summary 49

CHAPTER IV: ANALYSIS OF THE DATA AND DISCUSSION OF THE FINDINGS 50
Introduction 50
Demographic Characteristics of the Respondents 51
Computer Labs 53
Technology Usage in Language Teaching 56
Teachers' Usage of Technology 57
Students' Usage of Technology 61
Students' Use of Technology 61
Availability and Use of Technology by Students 65
Teachers' Interest in Using Technology 69
Target Skills by Using Technology 74
Differences on Using Technology According to Target Languages 85
Differences of Usage of Technology by Survey Participants' Teaching Experience 88
Relationship between Teachers' Usage and Students' Usage 94
Discussion of the Findings 96
Chapter Summary 106

CHAPTER V: SUMMARIES, CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS 108
Introduction 108
Summary 108
Purpose of the Study 108
Review of Literature 110
Methods and Procedures 114
Findings 115
Conclusions 119
Educational Implications 123
Recommendations 126
Chapter Summary 128

REFERENCES 129

APPENDICES 136
Appendix A. Form A to the Department Review Committee 137
Appendix B. First Cover Letter to Survey Participants 140
Appendix C. Questionnaire 141
Appendix D. Reminder Post Card 145
Appendix E. Cover Letter of Reminder Package 146

VITA 147

LIST OF TABLES

TABLE		PAGE
1.	Institutions Participating in the Study	44
2.	Duration of Teaching Experience according to Target Languages	52
3.	Native Languages of Survey Participants	53
4.	The Number of Survey Participants Who Answered They Had Computer Labs for Teaching Languages	54
5.	The Numbers of Survey Participants Who Answered That They Used the Computer Lab	54
6.	The Number of Computers in Computer Labs Dedicated for Language Education and the Mean of the Number of Students per Class	55
7.	The Number of Survey Participants Who Were Not Using Technology in Teaching	56
8.	The Frequencies of Teachers' Usage of Computer and Networking Technology	59
9.	Students' Usage of Technology in World Language Learning Perceived by Their Teachers	63
10.	The Frequencies of Availability of Technology for Students to Learn World Languages	66
11.	Students' Actual Usage Based on Availability	67
12.	Teachers' Interest and Usage of Technology	71
13.	Teachers' Perspectives of Language Skills on Each Technology Item	76
14.	The Number of the Survey Participants Categorized with Their	89

Teaching Experience

15. Differences of Usage of Technology, Controlled by Survey Participants' Teaching Experience 90

16. The Number and Percentage of the Same Answers and Different Answers of the Use of Technology of Teachers and Students 95

LIST OF FIGURES

FIGURE		PAGE
1.	Target Languages Taught by the Survey Participants	51
2.	Teachers' Usage of Computer and Networking Technology	58
3.	Teachers' Perceptions of Students' Use of Technology in World Language Learning	62
4.	Percentages of Availability of Technology for Students' Usage to Learn World Languages	66
5.	Students' Actual Usage Based on Availability	67
6.	Teachers' Interest in Using Technology	72
7.	Teachers' Perspectives on CALL Drills/Practices/Tutorials	75
8.	Teachers' Perspectives on CALL Simulations/Gaming	75
9.	Teachers' Perspectives on Information Retrieval on the Internet	77
10.	Teachers' Perspectives on Drills/Practices/Tutorials on the Internet	78
11.	Teachers' Perspectives on Website Publication on the Internet	78
12.	Teachers' Perspectives on E-mail Exchanges on the Internet	79
13.	Teachers' Perspectives on Bulletin Boards	80
14.	Teachers' Perspectives on Chats on the Internet	81
15.	Teachers' Perspectives on Conferencing on the Internet	81
16.	Teachers' Perspectives on Word-processing	82
17.	Teachers' Perspectives on Electronic Presentations	83
18.	Teachers' Perspectives on Desktop Publishing	84

19. Teachers' Perspectives on Conferencing 84

20. Overall Percentages of Use of Technology Comparing Languages 86

21. Language Differences of Six of Most Frequently Used Technology Items by Teachers 87

22. Differences of Usage of Technology Controlled by Survey Participants' Teaching Experience 89

23. Difference of Usage of Technology Controlled by Survey Participants' Years of Teaching Experience 91

24. Differences for Teachers' Perspectives for their Students' Usage Controlled by Years of Teaching Experience of Survey Participants 93

CHAPTER I

INTRODUCTION

Introduction

Technology has dramatically changed people's lives in many ways; its influence is ubiquitous. It is true that "digital technology is affecting virtually every aspect of our lives… [and] some sectors of our society have experienced phenomenal growth in the implementation of digital technologies" (Bush, 1996, p. 11). The tidal wave of technology has also come to the educational field. According to the RAND Corporation study for the White House Office of Science and Technology Policy, and the Office of Technology of the U.S. Department of Education (Glennan & Melmed, 1996), there was one computer for each nine students in 1995, contrasted with one computer for each 125 students in the public schools in the U.S. in 1983. By the fall of 2000, "the ratio of students to instructional computers in public schools had decreased to 5 to 1" (Cattagni & Farris, 2001, p. 3).

Schools in the U.S. spent about $3 billion on computer- and network-based technology in 1994; however, "as of February 28, 2001, $5.8 billion has been committed to E-rate [the Educational rate program] applications throughout the nation" (Cattagni & Farris, 2001, p. 1). Not only the federal government, but also states and local schools, allocate a great amount of money for the installation of technology in schools. For example, Kentucky's technology initiative master plan called for spending $560 million in five years on educational technology for more than 50% of the state's classroom to

facilitate Internet access by the year 1996 (E-Republic, 1996). Using technology is now an integral part of classroom activities nationwide.

The development of the Internet is one of the reasons that schools use technology. According to statistics (2001) provided by the U.S. Department of Education, 98% of schools in the U.S. had access to the Internet, compared with 35% of public schools which were connected to the Internet in 1994.

As technology has been rapidly and continually introduced into the educational arena, it has also been used in the world language classroom to teach both the target language and its culture. Although computers have been used for language teaching and learning since the 1960s, "recent years have shown an explosion of interest in using computers for language teaching and learning" (Warschauer & Healey, 1998, p. 57) due to the development of multimedia computing and the Internet. Therefore, "the role of computers in language instruction has now become an important issue confronting large numbers of language teachers throughout the world" (Warschauer & Healey, 1998, p. 57).

Statement of the Problem

Empirical research in the literature has demonstrated how various types of technology are used for world language education at the K-12 and college levels. These studies have presented the concepts, examples, and results of technology usage in the classroom. Despite the number of papers published about the use of technology in world language education, few studies have documented the actual usages of technology in the world language classroom. In addition, because the speed of the development of

technology is very rapid, studies of technology usage just a few years ago are not up-to-date.

Although much research has investigated how and why specific technology devices can be used and which learning concepts can be addressed with the usage of technology, few studies have discussed how many teachers, especially those on the first and second year levels at post-secondary institutions, actually use it. In addition, no studies to date have addressed whether or not second language teachers are interested in or have presented how they are actually using technology in their classrooms.

Purpose of the Study

This study investigated the actual usage of computer technology in the world language classroom and the percentage of post-secondary language teachers (on the first and second year levels), who were using it in their classrooms. Technology usage by students and teachers was examined separately. The target skills which teachers using technology wanted to enhance, were also explored. Specifically, this study investigated which types of computer technology devices were available for teaching and learning languages inside and outside of the classroom.

Significance of the Study

This research appears to be the first study in the literature exploring how much and how often computer and networking technology is used in world language education by both students and teachers in the U.S. Although many studies which have dealt with the usage of technology have focused on the specific devices and their respective

effectiveness, this study investigated the actual practices of computer and networking technology in world language classes.

In addition, because all of the survey participants of this study were instructors teaching world languages at universities and colleges on the first and second year levels, in the state of Tennessee, this research was able to describe the actual use of technology on a state level.

Assumptions

The first assumption of this study was that respondents gave honest responses concerning the use of computer and networking technology for teaching and learning world languages.

The second assumption was that the situations described in this research represent only limited situations in the world language classroom which could be explored with the survey instrument used in this study.

Limitations

The focus of this study was on what types of computer and networking technology are used and how often they are used in the world language classroom in the post-secondary arena. The study did not investigate why and how some specific technology devices may be used in the classroom. Therefore, the results will not reveal why and how language teachers use technology devices in the classroom.

Secondly, because the survey participants in this study were drawn from colleges and universities in the state of Tennessee, including only those teachers on the first and second year levels, the results cannot be generalized to other states in the U.S.

Thirdly, the survey used to collect data for this study did not ask teachers whether or not they had training experience such as technology classes for faculty. This means that there may be some teachers who want to use technology and have access to technology devices but who do not know how to use them. These kinds of experiences may be related to teachers' usage of technology, and this research did not investigate this particular issue.

Finally, this study examined two facets about technology usage: the language teachers' perceptions of their students' technology use inside and outside of the classroom and the teachers' actual usage of technology in their teaching. Thus, this research did not ask students learning languages whether or not they were using technology inside and outside of the world language classroom. Consequently, the results drawn from the data collected for this research only disclosed the teachers' opinions and not the students'.

Definition of Terms

Audiolingual Method

Based on the behaviorist theory, *habit-formation*, teachers use dialogues and structure drills to enhance students' *behavior* in appropriate situations (Kern & Warschauer, 2000).

BASIC

Beginner's All Purpose Symbolic Instruction Code. A computer language system developed at Dartmouth College in 1964.

CAI Computer-Assisted Instruction

CAL Computer-Assisted Learning

CALL Computer-Assisted Language Learning. A language learning method using computers, software, and networking systems in the classroom.

CBE Computer-Based Education

CBI Computer-Based Instruction

CD-ROM

Compact disc-read-only memory. "A CD-ROM drive reads the data (graphics, sound, and text) on the CD and transfers it to the computer" (Shuman, 1998, p. 35).

CELL Computer-Enhanced Language Learning

CLT Communicative language teaching. A method which aims to make communicative competence the goal of language teaching and to develop procedures of language skills in communication (Larsen-Freeman, 1986).

CML Computer-Managed Learning

CMI Computer-Managed Instruction

Cognitive perspective

Based on Noam Chomsky's theory. Language learning is not habitual acquisition but an active process of generating learners' mental construction and knowledge (Kern & Warschauer, 2000).

Communicative Competence

Language competence which "entails not solely grammatical accuracy but also a knowledge of sociocultural rules of appropriateness, discourse norms, and strategies for ensuring that a communication is understood" (Riggenbach & Lazaraton, 1991, p. 125).

Desktop publishing

A system for creating printed materials, using a computer and a printer.

HTML

Hypertext Markup Language. A format to display a document and to create links that allow the viewers to navigate throughout the document on the Internet (Shuman, 1998).

ICALI

Intelligent Computer-Assisted Language Instruction

ICALL

Intelligent Computer-Assisted Language Learning

Internet

"[A] vast communications system linking computers around the world… a network [linked computers] of networks" (Shuman, 1998, p. 220).

ITS Intelligent Tutoring Systems

LAN Local Area Network. A group of computers and associated devices that share a common communication line and the resources of a single processor or server within a small geographic area.

Language skills

Four language skills: listening, speaking, reading and writing.

NBLT Networked-Based Language Learning

OS Operating System. Master control program in a computer

Sociocognitive perspective

A perspective that claims "learning is viewed not just in terms of changes in individuals' cognitive structures but also in terms of the social structure of learners' discourse and activity" (Kern & Warschauer, 2000, p. 5).

Sociolinguistics

The study that concerns itself with the relationship between language and the context or society in which it is used (Holmes, 1992).

Structural perspective

A perspective that language learning is the acquisition of the system of structures that constitute a given language.

Target language

The language that learners are studying to acquire.

Technology

In this study, the term technology is defined as the computer itself, its related devices, and application software. In addition, it contains networking devices such as the Internet and telephone and satellite networking.

TELL Technology-Enhanced Language Learning

Teleconferencing

The conference system using telephone lines, satellite, cable transmission, and associated devices.

WWW The World Wide Web. Web pages are documents that are written in HTML.

Organization of the Study

This dissertation is organized into five chapters. Chapter One introduces the background of current research and states the purpose and significance of the study. Assumptions, limitations, and definitions of terms are also included in this chapter.

Chapter Two reviews the related literature, which includes the history of technology usage in the classroom and explanations of current actual practices of technology.

Chapter Three describes the methods and procedures for conducting this research, which includes the research questions, selection of the population, design of the instrument, administration of the survey, and methods used for data analysis.

Chapter Four presents a detailed data analysis and the results of this study.

Chapter Five discusses the findings, summary of the results, and implications of this study, and offers suggestions for further research.

Chapter Summary

This chapter introduced the research topic, purpose of the study, significance, assumptions, limitations, definitions of terms, and organization of the study, which aimed to examine actual usage of computer and networking technology at the post-secondary

level for world language education. The following chapter will provide a review of the literature related to the present study.

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

In this chapter, the framework of how technology has been used in world language education will be discussed. First, the history of the development of technology usage, along with selected second language acquisition theories, will be discussed. Then, specific examples of the use of technology in the language classroom will be presented.

Concept of Technology

Technology is a very broad term, and it has many synonyms. The word *technology* includes many electronic devices, such as the VCR, the TV, the cassette player, and the computer. According to the *Longman dictionary of American English* (1983), the definition of technology is, "the branch of knowledge dealing with scientific and industrial methods and their practical use in industry" (p. 696). The dictionary implies that technology is just for knowledge and practices of industry and science. However, at present, technology is used everywhere, including the educational field, where teachers are using industrial devices such as the computer and computer networking in the classroom.

In the published literature dealing with education and technology, a clear definition of technology is not found; however, there is some research investigating this definition which yields an image of technology. For example, the Salem-Keizer School District Technology Survey conducted in 1991, asked the participants what types of

technology were used in the classroom. The following are the items that were categorized as having technology potential: artificial intelligence; audio tapes; authoring/programming; authoring systems; copy machines; calculators; color printers; CD-ROMs; CDs; computers; overheads; data bases; data research; desktop publishing; digitized speech; educational TV-ITV; electronic mail; electronic file transfers; FAX machines; film strip projectors; graphics; instructional mail; interactive videos; large screen projectors; laser printers; laser video discs; light pens; modems; mice; movie projectors; network/file servers; overhead projectors; personal computers; plotters; robotics; satellite dish/microwave; scanners; site TV networks; spell checkers; spreadsheets; synthesized speech; tape recorders; teleconferencing; telephones; touch screens; transactions; video camcorders; video tapes/VCR; voice activation; voice mail; word processing; and others (Salem-Keizer School District Technology Survey, 1991). This survey includes almost everything electrical that could be used in the classroom, from the telephone and FAX to computers.

Results of another research study show a different aspect of technology. The following items are taken from Teacher Technology Survey in *An educator's guide to evaluating the use of technology in schools and classrooms* (1998). The survey asked teachers what types of technology they used with their students. They replied with the following list: computers in general; word processing packages; spreadsheets; databases; graphical applications; presentation software (e.g., Power Point); desktop publishing; any Internet activity; search engines for the Internet (e.g., Yahoo); hypermedia/multimedia (e.g., Hypercard); integrated learning systems (e.g., Jostens); simulation programs; and drill/practice programs/tutorials. In this particular study, technology refers to computers

and software/programs related to computer use such as the Internet. It does not include electronic devices such as the VCR or the fax machine.

Another study published by EDmin Open Systems (1998) found a different aspect of technology. The research survey consisted of four sections: "Your technology background," "Staff centered technology," "Student-centered technology," and "Staff development activities." In the technology background and technology potential section, there were the same items listed in the first survey mentioned above, such as the computer, the VCR, and the fax machine. The significance of the results of this particular study is that the word *Computer-Aided Instruction* (*CAI)* is used in the question in the "Student-centered technology" section. It says, "In your classes, do students use the following Computer-Aided Instruction (CAI)?" The teachers indicated the following: CAI: drill and practice/tutorial; CAL (simulation/educational games); word processing; information retrieval; problem solving; databases/spreadsheets; student portfolio building; authoring/multimedia development; desktop publishing; electronic presentation; video development; open lab access; and web page development. This survey asked teachers what types of electronic devices in the classroom were used, but did not focus on the students' usage of them.

The first research study mentioned above was published in 1991, and the last one was published in 1998. The difference between the two surveys is the focus on computers. Because the computer and its associated devices have rapidly improved, and technology has become much more widespread during the 1990s, the implication of the word *technology* has shifted from general *electronic machines* to *computers*. In fact, the book, *Technology-enhanced language learning*, published by the American Council on

the Teaching of Foreign Language (ACTFL), uses *technology* in the title; however, the book focuses specifically on computer usage in the classroom. For example, the title of Chapter Five is "Computer-Mediated Communication (CMC): Technology for Improving Speaking and Writing Taking Control of Multimedia," and the title of Chapter Seven is "Learning Language and Culture with Internet Technologies." In this latter chapter, the authors Lafford and Lafford (1997) mention that the use of technology has shifted from "the early use of tape recorders and traditional language labs in the 1960's and 1970's" (p. 215) to computers in the 1980s. Claybourne (1999) also uses the word *technology* in his article "The status of ESL, foreign language and technology," and he discusses teaching language using software, computer language lab systems, and web-based learning, including the Internet. Therefore, at present, it can be said that the word *technology* is a synonym for knowledge of the computer and actual usage of it.

The term *technology* in the present research study, therefore, includes the computer itself, its related devices, application software, and the Internet. In addition, because of the importance of communication using technological devices, the term *technology* also contains networking devices such as the telephone and satellite networking.

Technology in the Language Classroom

Instructional Technology

As mentioned above, technology has been used in the educational field for a long time. The usage of technology in education is called *instructional technology* and is defined as the following: "A complex integrated process involving people, procedures,

ideas, devices, and organization, for analyzing problems and devising, implementing, evaluating, and managing solutions to those problems in situations in which learning is purposive and controlled" (Heinich, Molenda, Russell & Smaldino, 1999, p. 406). In terms of Instructional technology, the role of technology is to help teachers and learners to design, develop, utilize, manage, and evaluate the processes and resources for learning effectively (AECT, 1999).

Janassen, Peck, and Wilson (1999) describe technologies for fostering learning as (1) tools to support knowledge construction, (2) information vehicles for exploring knowledge to support learning-by-constructing, (3) context to support learning-by-doing, (4) social medium to support learning by conversing, and (5) intellectual partner to support leaning-by-reflecting. Thus, technology cannot only enhance the productivity of learners, make them communicate and collaborate with others outside of the classroom, and access an amount of information, but also engage them in critical and cognitive thinking about what they are learning.

Conceptualization of Computer Usage in Education

According to Levy (1997), there are several acronyms for computer usage in education: Computer-Assisted Instruction (CAI), Computer-Assisted Learning (CAL), Computer-Managed Learning (CML), Computer-Managed Instruction (CMI), Computer-Based Education (CBE), Computer-Based Instruction (CBI), Intelligent Computer-Assisted Instruction (ICAI), Intelligent Tutoring Systems (ITS), and Computer-Mediated Communication (CMC). The term CAL has been commonly used, although each acronym has a slightly different focus. For example, CBE and CBI convey the idea that

"nearly everything that students can do to learn via computers: study programming… use word processors to write essays… gather and manipulate data with spreadsheets" (Pusack, 1988, p. 15), however, ICAI and ITS focus more on "special qualities of the program" (Levy, 1997, p. 79) than on the role of the computer itself. In addition, the term CMC refers to communication between two or more participants via the computer.

Conceptualization of Computer Usage in Language Education

As in the general education field, there are many conceptualizations of computer usage in world language education. Levy (1997) introduces five of them in his book, *Computer-assisted language learning*: Computer-assisted language learning (CALL), Computer-Assisted Instruction (CAI), Intelligent Computer-Assisted Language Learning (ICALL), Computer-Enhanced Language Learning (CELL), and Technology-Enhanced Language Learning (TELL). These conceptualizations vary because of their particular focus.

According to Levy (1997), the term CAI was first introduced in an article in *System* by Wyatt in 1984. In his book, *Computers and ESL*, Wyatt (1984) states that CAI refers to only "drill-and-practice and tutorial materials" while CALL covers the "whole range of possible roles that the computer can play" (1984, p. 4). Presently, CALL is one of the terms used most frequently to refer to computer usage in the language classroom. For example, Phillips (1987) uses *CALL* to express the models and paradigms of computer usage, such as drill-and-practice activities or non-tutorial models in the classroom.

Levy (1997) defines CALL as "the search for and study of application of the computer in language teaching and learning" (p. 1). CALL includes whole aspects that the computer can provide in the language classroom, such as "the word processor… concordancers [sic], email, text-based and video-based computer conferencing, mono- and multilingual dictionaries, and language databases or archives of various kinds" (Levy, 1997, p. 84). Jarvis (2000), however, describes "CALL in Information Technology" including CD-ROM databases, multi-media, e-mails and the Internet, compared with "traditional CALL," consisting of software programs (p. 63).

History of Technology Usage in the Classroom

The computer has been used for language learning since the 1960s (Warschauer & Healey, 1998, p. 57). Some researchers roughly divide 40 years of computer usage in the language classroom into the three main stages: Structural Perspective, Cognitive Perspective, and Sociocognitive Perspective. Because the CALL programs "are not designed to function independently" and "their success depends very much on the skill with which they are integrated into a lesson or series of lessons" (Levy, 1997, p. 3), the history of CALL is related to the development of language learning theories and both teachers' and students' demands for language teaching and learning.

CALL in the 1960s and 1970s – A Structural Perspective

The dominant theory in the language teaching field during the 1960s and 70s was the Audiolingual Method, which was influenced by B. F. Skinner's behaviorism. The main characteristics of behaviorism are stimulus, response, and reinforcement, and it

"had a profound effect on language teaching practices, especially in the widespread introduction and use of the language laboratory" (Levy, 1997, p. 14). Influenced by behaviorism, structural methodologists regarded language learning as "habit formation and thus saturated students with dialogues and pattern drills designed to condition learners to produce automatic, correct responses to linguistic stimuli" (Kern & Warschauer, 2000, p. 3). One of the principles of the Audiolingual Method (ALM) is that language is acquired with habit formation and repetition; "Language learning is a process of habit formation. The more often something is repeated, the stronger the habit and the greater the learning" (Larsen-Freeman, 1986, p. 32). Other principles in the ALM are that the errors should be corrected by teachers immediately when they occur and that students "learn to answer automatically without stopping to think" (Larsen-Freeman, 1986, p. 41). Major objectives of the language teaching method focus first on the structural pattern and then on learning vocabulary.

At this time, CALL was first established in the 1960s, based on this behaviorist learning model. CALL in this period "featured repetitive language drills, the so-called drill-and-practice method" (Lee, 2000, p. 1). The computer was seen as a tutor "which never grew tired or judgmental and allowed students to work at an individual pace" (Warschauer & Healy, 1998, p. 59). CALL programs embraced the "computer-as-tutor model" (Kern & Warschauer, 2000, p. 8). The programs provided learners repeated drill materials of grammar and vocabulary and language testing instruments. They also provided "immediate positive or negative feedback to learners on the formal accuracy of their responses" (Kern & Warschauer, 2000, p. 8) to help learners form accurate pattern formation of the language.

Some of the famous projects of behaviorism CALL are the PLATO (Programmed Logic for Automatic Teaching Operations) Project which was initiated at the University of Illinois in 1960 and TICCIT (Time-Shared, Interactive, Computer Controlled Information Television) at Brigham Young University in 1971 (Levy, 1996). They were held in a restricted system, and mainly used for extensive drills, explicit grammar instructions, vocabulary drills, and translation tests (Ahmad, Corbett, Rogers, & Sussex, 1985).

CALL in the Late 1970s and 1980s – A Cognitive Perspective

In the 1970s and 80s, researchers noticed the complicated aspect of language acquisition, and the focus of language teaching shifted to the needs of individuals. The behaviorist Audiolingual Method was criticized because of its being "overly mechanical and theoretically unjustified" (Kern & Warschauer, 2000, p. 3). Thus, the ALM was rejected theoretically and pedagogically by both researchers and teachers. Chomsky insisted that people were able to create many utterances that were not the same as models based on imitation and that languages were acquired by innate cognitive structures rather than through behavioral reinforcement. Chomsky's theory changed language teaching from inculcating accurate language behaviors to "fostering learners' mental construction of a second language system" (Kern & Warschauer, 2000, p. 4).

People who support the cognitive perspective of language acquisition purport that second language learning is an active "process" of decoding, analyzing, storing, and producing (Towell & Hawkins, 1994, p. 43). Krashen was another noteworthy researcher during this same period. He focused on the learner's internal processing system that

"subconsciously screens incoming language based on what psychologists class 'affect': the learners' motives, needs, attitudes, and emotional states" (Towell & Hawkins, 1994, p. 27). One of his hypotheses of second language acquisition, the Affective Filter Hypothesis, explains the differences between successful learners and less successful ones, both of whom receive the same amount of information, or language input. In Krashen's hypothesis, the focus is on learners' mental attitudes; "When people are very inhibited, the filter is 'high' and presents a lot of L2 [second language] input from being converted into acquired knowledge [which develops subconsciously in learners]. Where people are less inhibited, the filter is 'lower,' allowing a greater proportion of L2 input to be converted into acquired knowledge" (Towell & Hawkins, 1994, p. 27).

Because of these theories which emphasized learners' mental and cognitive factors on language learning, some new humanistic methods, such as Community Language Learning and Total Physical Response, were proposed during this period. The Community Language Learning method was developed by Charles Curran (1977) in his book, *Counseling-learning in second language*. Curran thought that language teachers had to reduce learners' fears and give them a secure feeling. Building relationships and communication with and among students seemed very important. In the language classroom, class learners' native language was used because they felt "more secure when they [understood] everything" (Larsen-Freeman, 1986, p. 41). A method which demonstrates this philosophy is Asher's Total Physical Response (TPR) method, which emphasizes listening comprehension with TPR. Learners at the beginning level listen to commands from the teacher and follow them (Asher, 1977). The teacher does not correct

learners' errors during their initial attempts at oral communication since such errors are expected by the language teacher.

The most widespread approach of language teaching during this period was Communicative Language Teaching (CLT). The aim of CLT is to (1) make communicative competence the goal of language teaching, and (2) develop procedures for teaching the four language skills that acknowledge the interdependence of language and communication (Richard & Rodgers, 1986). In this approach, students are expected to be able to apply linguistic knowledge in negotiating meaning; thus, they are encouraged to have interaction between and among teachers and other students. Because the focus of teaching is on real language use, authentic language (language used in a real context) should be introduced and games in pairs or small groups are encouraged.

As the teaching theories used by teachers significantly changed over the years, "rapid change was also taking place in computing" (Levy, 1997, p. 22). In 1973, the Apple I computer was released, and the first serious educational applications were subsequently introduced in 1977. At the same time these computer devices developed, software dealing with language teaching/learning was released, and the CALL field grew dramatically. Some journals which specialize in CALL, such as *CALICO Journal* (1983), were initially published during this period. Also, word processing programs such as WordMaster (1978), Word (1983), and WordPerfect (1984) were released and subsequently used in the language classroom.

Language teachers were able to create programs using BASIC programming language and authoring systems such as Storyboard and HyperCard. Storyboard, written by John Higgins, was a "text-reconstruction program for the microcomputer where the

aim is to reconstruct a text, word by word, using textual clues such as the title, introductory material, and textual clues within the text" (Levy, 1997, p. 24). On a larger application of CALL, the Massachusetts Institute of Technology established the Athena Language Learning Project (ALLP) in 1983. Computers on campus were interconnected to provide for cross-referencing of texts, video, audio, and graphic materials.

CALL programs released during this period did not focus on teaching grammar structure explicitly, but rather focused on "using forms than on the forms themselves" (Warschauer & Healey, 1998, p. 59) and teaching grammar implicitly (Lee, 2000, p. 23). Students who used CALL were expected to generate original utterances rather than manipulating prefabricated forms (i.e., drills and practices), which used to be seen as important in the period of the behavioral perspective (Jones & Fortescue, 1987). Students worked alone or in groups with computer-based activities which included text reconstruction programs and simulations (Warschauer & Healey, 1998). Text reconstruction programs "allowed students working … to rearrange words and texts to discover patterns of language and meaning," and simulations "stimulated discussion and discovery among students working in pairs or groups" (Warschauer & Healey, 1998, p. 60).

Computers and CALL programs gave learners autonomy to engage in individual works at their own paces. However, computers were also used as tutors within a closed system so that they made "a greater contribution to marginal rather than to central elements" of the language learning process (Kenning & Kenning, 1990, p. 90). In addition, computers did not provide "genuine negotiation of meaning" (Kern & Warschauer, 2000, p. 10), which is one of the most important concepts of the

Communicative Approach, although computers were able to create simulated negotiation with learners.

CALL in the 1990s – the Sociocognitive Perspective

In 1971, Dell Hymes used the words *communicative competence* to express social appropriateness of language use; Hymes claimed that syntax and language forms should have been understood as "meaning resources used in particular conventional ways in particular speech communities" (Kern & Warschauer, 2000, p. 5). During the 1980s, researchers and language teachers realized that learners needed to acquire not only communicative competence but also sociolinguistic, discourse, and strategic competences. Thus, many teachers moved from the cognitive view of communicative teaching to a more social or socio-cognitive view, "which placed greater emphasis on language use in authentic social contexts" (Warschauer& Healey, 1998, p. 60). Researchers supporting the sociolinguistic view claimed that learning enhanced not only individuals' cognitive structures but also their discourse and activity (Crook, 1994, p. 78). Therefore, language instruction was viewed "as helping students enter into the kinds of authentic social discourse situations and discourse communities that they would later encounter outside the classroom (Kern & Warschauer, 2000, p. 5). Thus, teachers emphasized learner-centered, task-based, project-based, and content-based teaching and learning in the language classroom.

In terms of technology development, the 1990s were the most significant decade due to the Internet, the world-wide network. The Internet was developed by the U.S. Government's Department of Defense in 1969 as "an electronic communications network

capable of surviving a nuclear attack" (Levy, 1997, p. 31). At the same time, local networking, a closed system, in the form of LANs (Local Area Networks), was developed. In the late 1980s, the wide network system was built, and in 1991 Gopher, "a menu-based system for exploring the Internet," (Levy, 1997, p. 32) was released. Other browsers, Mosaic and Netscape Navigator, were also released to view information on the Internet in 1993 and 1994. The Internet has become very popular and user-friendly with easy and inexpensive access. It has continually been evolving and developing dramatically since its inception, in term of both quality and quantity; thus, the capacity of passing digital information, such as texts and video and audio materials, has increased.

Language teachers who had a sociocognitive perspective tried to integrate the various skills of language learning and teach languages in authentic environments. The teachers realized that technology was able to satisfy their desire because students could "learn to use a variety of technological tools as an ongoing process of language learning and use, rather than visiting the computer lab on a once a week basis for isolated exercises" (Warschauer& Healey, 1998, p. 60). What technology enabled itself to do was to shift from learners' interaction with computers to interaction with other people via computers; the developing computer networking "allow[ed] the computer to be used as a vehicle for interactive human communication" (Kern & Warschauer, 2000, p. 11).

Recent technological advancements in network-based communication such as e-mail exchanges, led to create a new concept of CALL, which is called Network-based Language Teaching (NLT). Because computer networking facilitates access not only to other people but also to information and data, it can be helpful for language acquisition which requires the skills of reading, and writing. The most significant characteristic of

NLT is that it "permit[s] not only one-to-one communication but also one-to-many communication" (Kern & Warschauer, 2000, p. 12).

According to Kern and Warschauer (2000), computer networking in the language classroom consists of two technological and social developments: (1) computer-mediated communication (CMC) and (2) globally-linked hypertext (p. 11). CMC allows learners "access to communicate with other learners or speakers of the target language in either asynchronous (not simultaneous) or synchronous (simultaneous, in real time) mode" (Kern & Warschauer, 2000, p. 12). Exchanging e-mails and participating in discussion lists and bulletin boards are examples of asynchronous activities. The Tandem Network, which begun in 1994 by Helmut Brammerts, is a large network for language learning to enable learners to learn languages in the Tandem Network on the Internet (Brammerts, 1995). Examples of asynchronous activity include participating in chat and audio- and video-conferences. Via computer networking, learners are able to communicate with others using listening, speaking, reading, and writing skills.

Globally-linked hypertext and hypermedia, such as the World Wide Web, provide people with a new device to access other people and much information. Kern and Warschauer (2000) note four important features of globally-linked hypertext: (1) informational representation through multilinear strands linked electronically, (2) integration of graphic, audio, and audiovisual information together with texts, (3) rapid global access, and (4) ease and low cost of international publication (p. 12). Learners can access information that could be matched with their interests from around the world within a few minutes with low or virtually no cost. Also, they can publish their

materials to share with other people, including study partners and target language speakers.

Researchers suggest some significant contributions that network-based technology provides. These are (1) Autonomy in the learning process; (2) Changing roles for teachers and learners; (3) Equality in networked learning environment; and (4) Dynamics of the learning process; and (5) Authentic materials and experiential learning.

Autonomy in the Learning Process

CMC communication provides language learners with "a much better opportunity for control and initiative in language learning" (Warschauer, Turbee & Roberts, 1996, p. 3). Learning using computer networking is "less restrictive" (Peterson, 1997, p. 30) than traditional language learning, and it frees learners from time and distance limitations. Learners initiate their study place, time, and the actual interaction itself. They are able to communicate at their own pace without waiting for the teacher's permission to talk (Warschauer, Turbee & Roberts, 1996, p. 4). Autonomy and independence enhance learners' motivations to continue to learn language. Self-instruction strategies enhanced with network-based technology can strengthen learners' linguistic skills and self-confidence (Lee, 2000).

Changing Roles for Teachers and Learners

As the learner's autonomy increases, the teacher's traditional role in the language classroom is reduced by using network-based teaching. Thus, the teacher's role in the

language classroom, based on networked technology, enables him/her to become a facilitator, coordinator, moderator, and advisor of the learner activity (Peterson, 1997, p. 32). Barson, Formmer, and Schwartz (1993) describe the essential teachers' roles as "a supportive, coaching role acknowledging the value of student initiative, discreetly identifying errors in appropriate language use, a necessary by-product of the activity, in order to offer constructive feedback, reshaping it opportunely into more appropriate discourse" (p. 560).

Equality in Networked Learning Environment

Another benefit of learning with computer networking is that "it allows more equal participation by those who are often excluded or discriminated against, including women, minorities, the disabled, shy [and inhibited] students, students with unusual learning styles, and students who are apprehensive about writing" (Warschauer, Turbee & Roberts, 1996, p. 5). Warschauer, Turbee, and Roberts provide some reasons why CMC has democratic characteristics: (1) electric discourse reduces the visual and aural cues (age, race, and appearance); (2) it reduces dynamic social context cues (frowning and hesitating); and, (3) it allows learners to take their time and pace themselves to interact with others. Technology is able to provide equality for "traditionally marginalized learner groups" (Peterson, 1997, p. 32) in the traditional classes in which teachers tend to favor learners who often speak well.

Dynamics of the Learning Process

Computer networking increases learner interactions and their utterances in the classroom. Pratt and Sullivan (1994) found that 85% of the conversational turns were taken by college ESL students in an electronic discussion, compared with 35% in a traditional oral discussion (1994). In addition, Warschauer, Turbee, and Roberts (1996) claim that computer networking could develop students' learning skills and critical learning perspectives. They note that writing skills help learners think and develop their ideas.

Authentic Materials and Experiential Learning

Language learners are able to gain "various recourses of authentic reading materials either at school or from their home" (Lee, 2000, p. 95) in their native and target language anytime they want, at a relatively low cost. Teachers are able to help learners "practic[e] communication on a global level" (Lee, 2000, p. 95). When learners search information on the Internet, they "develop thinking skills and choose what to explore" (Lee, 2000, p. 95). Network-based technology allows language learners to not only receive information but also create and send it to others.

In addition, the new communication via computer networking has spread all over the world, and "it is imperative that language students be exposed to [it] in the classroom" (Kern & Warschauer, 2000, p. 12). One of the goals of language teaching is to help learners use the target language in authentic discourse communities where the target language is used. Since many people are communicating in cyberspace, it seems

appropriate to "incorporate on-line activities for [learners'] social utility" (Kern & Warschauer, 2000, p. 13) in the second language classroom.

Disadvantages of the Use of Technology

Although technology helps both teachers and students to teach and learn languages, there are several possible disadvantages. Lee (2000) identifies four disadvantages of technology usage in language education: (1) financial barriers, (2) difficulty of accessibility to computer hardware and software, (3) lack of technical and theoretical knowledge of technology usage, and (4) difficulty of acceptance of the technology.

Financial Barriers

The cost issue of technology is mentioned "most frequently in the literature by language education practitioners" (Lee, 2000, p. 4). In order to use technology in language classes, educational institutions need to spend "start-up costs" (Brett, 1997), which include hardware, software, and other related technological devices. Computer hardware and software are much more expensive than other traditional teaching/learning materials such as books and audiotapes. Considering the production of software, "the cost of production of CD-ROMs is … much higher than that of textbooks, especially when video is filmed specifically for a CD-ROM" (Brett, 1997).

In addition, technology requires continuous maintenance. If teachers want to use networking, its cost "remains prohibitive for disadvantaged groups and third world nations" (Peterson, 1997, p. 34).

Difficulty of Accessibility to Computer Hardware and Software

While learners can study language anywhere using textbooks, they need to go the place where they can access hardware, software, and networking if they want to learn languages using technology. At the same time, teachers have to have access to technological hardware and software which are usually "costly and time-consuming" (Lee, 2000, p. 5).

Lack of Technical and Theoretical Knowledge

A lack of technical and theoretical knowledge of technology is another problem. Lee (2000) mentions that "[n]ot only is there a shortage of knowledge about developing software to promote learning, … but many instructors do not understand how to use the new technologies" (p. 5). Because of the rapid changes in technology, even teachers who use it in the classroom always need to be aware of new developing of technology as well as theoretical framework of language acquisition along with new usage of technology.

Moreover, the inequalities of the knowledge of technology may cause a problem in the classroom; "more computer knowledge, or even better typing skills take advantage of the network's power to control discussions" (Warschauer, Turbee, & Roberts, 1996, p. 8) in networking communication. These kinds of inequalities of technology knowledge may result in not only discouraging students to learn and take opportunities to speak, but also cause students to engage in thoughtless, hostile, or vicious comments in their conversations in the cyber environment.

Difficulty of Acceptance of the Technology

Even though the factors mentioned above are physical difficulties, this issue may be a psychological one for both teachers and students. Some learners may feel "technostress" (Peterson, 1997, p. 34); this can be lead by just *technology* or the large amount of texts and information produced in technological environment. Learners also may feel *aloneness* using technology or talking by electronic medium. Peterson (1997) mentions that this kind frustration is experienced due to a lack of direct feedback from other people.

Because "there is a natural tendency for organizations to resist change" (Lee, 2000, p. 5), teachers may not want to investigate a new methodology using technology and keep using a traditional way to teach languages. They think machines do not belong in humanities and have "vague suspicion that what the computer people have in mind is somehow replacing teachers" (Underwood, 1984, p. 95). This kind of tendency creates negative feelings that lead to avoiding technology for both themselves and their students.

Current Practices

In this section of the chapter, the current practices of technology usage in the language classroom will be discussed. Teachers use technology outside of the classroom to create teaching materials, manage their classes, and communicate with their students; students use technology outside of class to study by themselves. However, the focus of this section is on actual usage of technology in the language classroom by students. The following is a list of students' current technological practices developed by the researcher.

1. CALL programs (software on the CD-ROM or floppy diskette, or downloaded from the Internet)
    (1) Drills, Practice and Tutorials
    (2) Simulation
    (3) Educational Games
2. Internet
    (1) Information Acquisition
    (2) Drills and Practices / Tutorial (developed by their teachers, other teachers, and institutions)
    (3) E-mail Exchanging
    (4) Chat
    (5) Bulletin Boards
    (6) Audio-conferencing
    (7) Video-conferencing
3. Word-Processing
4. Electronic Presentation
5. Desktop publishing
6. Telecommunication (Audio-conferencing with telephone, Video-conferencing with satellite/site TV networking)

CALL Programs

CALL software can be delivered with a CD-ROM or floppy diskette or via the Internet. CD-ROM, however, is the most commonly used because its capacity is so large

that it contains much digital information including video, texts, photographs, and sound. Pawling (1999) notes, "CD-ROM is potentially a liberating instrument for teachers and learners alike in that it has the special facility of incorporating practice in all four language skills" (p. 164). According to Pawling, software on CD-ROM provides the four language skills: listening, speaking, reading, and writing. For example, learners watch video clips with or without captions (listening, reading). They read articles and engage in some exercises related to the articles (reading). Watching a video clip, learners are required to orally answer the questions that the computer asks (listening and speaking). The voice of learners can also be recorded and compared with native speech. Learners are able to learn about target cultures because video clips have "cultural authenticity" and are "easy to replay at [the] click of mouse" (Pawling, 1999, p. 169). Also, learners can take dictation and complete writing activities, using CD-ROM programs.

In the survey for CALL material developers by Levy (1997), the aims of CALL software are listed as listening, speaking, reading, writing, database, games, gap-filling, simulation, text reconstruction, tutorial, word processing, logical thinking, interactive audio, and interactive video. Therefore, CALL software enables learners to engage in many activities, which can enhance their language skills in the closed environment, that is, through communication with computers.

The Internet

One of the most formidable functions of the Internet is retrieving and accessing information; "The World Wide Web [WWW] is … a virtual library at one's fingertips; it is a readily available world of information for the language learners" (Singhal, 1997,

¶ 13). Learners are able to gather information about not only target languages but also target cultures on the Internet; "understanding the culture of the target language enhances understanding of the language" (Singhal, 1997, ¶ 14).

The WWW also provides drill and practice activities developed by teachers themselves at post secondary institutions or in commercial sectors. Hypertext Markup Language (HTML) enables the sites to be interactive, so learners visiting the WWW site can participate in interactive activities such as drills with immediate feedback, learning practices, and tutorial activities. Also, HTML and other browsing languages such as JAVA have "potential for collecting feedback, language testing, and teaching at a distance" (Levy, 1997, p. 172) with field types, text entry, true/false, multiple-choice, ranking and gap-filling questions. The WWW site can also provide "reading tests and comprehension questions, grammar exercises, pronunciation exercises… cloze tests, vocabulary exercises, and so forth" (Singhal, 1997, ¶ 15). While there are many web sites for language learning, teachers actually make their own sites to not only manage the class but also teach certain topics such as writing systems and grammar structures.

Another significant feature of the Internet is communicating with others in synchronous and asynchronous modes. This type of communication is called network-based communication (NBC). Audio-/video conferencing is synchronous communication. Exchanging e-mails and using bulletin boards are asynchronous communication. Chatting lies in the middle between synchronous and asynchronous communication because two or more people can communicate at the same time (that is in the synchronous mode) but also write their ideas, having a few seconds to read their messages before sending them to others (that is in the asynchronous mode). Chatting,

exchanging e-mails, and using bulletin boards are written communication while conferencing is oral communication. While using the Internet or other electronic networking, learners can communicate with other learners who are inside or outside of the classroom and with the native speakers of the target language being studied. This cyber communication can break the border of the classroom communication.

Some researchers claim that written communication in cyberspace can enhance learners' language acquisition; "it seems logical to assume that language practice through NBC will reap some of the same benefits for second language development as practice through oral interaction" (Pellettieri, 2000, p. 59). According to Leh (1997), e-mail exchange in language classes motivates learners, helps in learning culture, enhances social presence, and assists language learning. The advantages of synchronous conferencing are that learners can have opportunities for authentic dialogue and immediate responses which are similar to face-to-face communication. However, there are some disadvantages; this type of conferencing needs a skilled moderator to facilitate dialogue (Peterson, 1997).

Current technology allows people to 'talk' to others, with or without graphics, via the Internet. Because of the development of equipment such as the digital camera and the increase in information transfer capability of telephone circuits, learners are able to talk to each other or have audio/videoconferencing through the Internet.

In addition, students are able to dispatch the information transfer they have to others via the Internet. Web site publication in the target language can increase not only students' language skills but also their motivation for learning a second language.

Word-Processing

Although it has some limitations, word-processing is also one of the most popular uses of technology. This writing tool does not offer direct feedback or comments on learners' writing. In addition, it is debatable "whether the word processor improves writing or makes it more effective" (Levy, 1997, p. 209). However, this kind of technology enables learners to edit, revise, and manipulate words and texts much more easily than would be possible with pen and paper. In addition, current word-processing software has *comment functions* with text or voice; thus, teachers can give students comments on their writing electronically. Based on the teachers' comments, students are able to correct errors or revise their writing without rewriting or retyping whole papers.

Writing with a word processor is different from working with the traditional pen and paper. According to Haas' study (1988), students who used the word processor to write had less conceptual planning and more sequential planning than ones who used pen and paper for writing. Biesenbach-Lucas and Weasenforth (2001) identified the difference between word-processing and e-mail writing. They reveal that the word-processing texts were significantly longer than e-mail texts and that "text-initial conceptualization was more prominent in the word-processed than in the electronic mail texts" (p. 135). That is, using word-processing writing, learners provided more background information on the topic with various forms than those using e-mail; the latter tended to "begin right away by providing their personal opinion" (p. 150), using explicit markers, such as *in my opinion* and *I think*. This shows that e-mail writing is more similar to the oral communication style while word-processing writing is more beneficial in terms of academic writing development.

Electronic Presentations

Using software, such as Powerpoint (Microsoft) or Persuasion (Adobe), learners are able to present their project work in front of other learners in the classroom. Project work may be about the target culture or reports of interviews with the native speakers of the target language.

Desktop Publishing

Desktop publishing software, such as Page Maker (Adobe) and Word (Microsoft), helps students make sophisticated documents easily. Using the software, computers, and printers, students can create and publish a yearbook, journal, newsletter, portfolio, and/or brochure in the target language.

Telecommunication

Telecommunication systems can be used effectively for language education. This category includes the use of the telephone for audio-conferencing and the use of satellite/site TV networking for video-conferencing. Students are able to communicate with teachers, other learners, or native speakers of the target languages via the telephone or satellite/site TV networks. These devices are used not only for the classroom activities but also for distance education. For example, since 1996, Georgia Public Broadcasting (GPB) has offered Japanese language courses, called *Irasshai*, to both private learners and students in public institutions, including high schools, colleges, and business companies. The courses use satellite TV instruction, web/multimedia, and telephone interaction. The program "uses the telephone to get learners speaking. With the use of a

computer and an internet connection, viewers can interact electronically with other students in the course" (The Georgia Public Telecommunications Commission, 1996). Learners and institutions can choose the courses (activities) or services from the program offered. For instance, in a Japanese class in a high school, a teacher who is not a native speaker of Japanese can ask for telephone or satellite communication activities with a native Japanese speaker to be provided by the program.

Videoconferencing is held not only via the Internet but also via the telephone. Kinginger (1998) introduced international videoconferencing between American learners of French and French learners of English. The two-way videoconferencing using four telephone lines, cost $84 per hour for each line. This telecollaborative arrangement gave learners a positive and even enthusiastic impact while this kind of communication created some problems. Researchers found "new forms of language classroom anxiety induced by the stress of public speaking in a networked or linked environment" (Kinginger, 1998, p. 484).

Videoconferencing using the satellite system is also utilized at the college level. The Japanese courses at the University of North Carolina, Wilmington, for example, use satellite videoconferencing between American students of Japanese at the American university and Japanese students of English at a university in Japan (Kano, 2001).

Surveys of Technology Usage in the Language Classroom

The previous sections in this literature review chapter discussed the history of foreign language teaching and technology usage in the classroom. As mentioned above, researchers and teachers of world languages document that technology has been

introduced into the language classroom. They have investigated what kind of technology can be used and how it has been utilized. Much research about technology usage in school has been carried out, however, there are only a few research studies investigating what types of technology are actually used in the field of world language teaching.

Gray (1997) conducted a survey asking about technology usage with 87 heads of department of modern languages in the Midwestern United States. As of July 1994, of the 87 universities, five schools had said that they never used technology in the modern language classroom and 31 schools said that they used it rarely or infrequently. Nine schools, however, claimed that they used technology quite regularly. Also, 12 schools said that the frequency of use of technology varied, depending upon the teachers and/or groups. Gray notes that the most commonly used types of technology were word-processing, games, and desktop publishing; "the computer was found to be useful for illustrating and enhancing written work" (Gray, 1997, p. 55). According to the survey, the most popular technology activities "in the modern language classroom were the learning and revision of vocabulary and the production of texts, particularly of letters" (Gray, 1997, p. 55). At the time, some schools claimed they had just begun using technology in the language classroom. Some of them claimed that they did not have enough hardware, software, trained teachers, and/or a school/department policy for technology usage.

Another research study investigating the usage of technology in the world language classroom was conducted by Moore, Morales, and Carel (1998). They explored what types of technology were used for teaching culture in the world language classroom. The participants of this study were 388 elementary, middle, and high school teachers in

Texas. The study revealed that teachers with advanced degrees tended to use technology for teaching culture. Also, teachers in urban and suburban settings had higher scores in technology use than teachers in rural settings. In addition, the least experienced teachers (with 0-2 years of teaching experience) tended to use technology less frequently than more experienced teachers, except with respect to CD-ROM. Although Spanish, French, and German are the most popular languages taught in the U.S., and software for these languages has been released more than for other languages, the same research study showed that Japanese teachers used technology more frequently than did other language teachers. Most of the activities using the WWW "involved students 'surfing the net' for information on specific geographical areas, historical topics, famous personalities, or weather reports. Students then shared the information they collected with the rest of the class through either oral or written presentations" (Moore, Morales, & Carel, 1998, p. 118). While a few teachers utilized films on videodiscs, many teachers used videocassette materials for culture teaching; the videocassette player/recorder was the most often utilized equipment. Some teachers used CD-ROMs to reinforce grammar, vocabulary, or pronunciation, and to conduct research using an encyclopedia CD-ROM. The authors concluded that their research shows "minimal use of technological facilities for teaching culture" (Moore, Morales, & Carel, 1998, p. 120). The reasons cited by the authors for the limited use of these technologies include the fact that schools did not have enough facilities, such as computers, software, Internet access, including trained technical staff, and the teachers did not have access to suitable materials for teaching culture.

Chapter Summary

In an effort to provide a theoretical framework for the present study, this chapter has provided a review of the literature related to the present study. The conceptualization of technology and history of technology usage in the world language classroom were examined. In addition, current practices of technology were mentioned with some actual examples. This chapter clearly brings out the fact that technology has been used in various ways in language education for a long time. Chapter 3 will detail the methods and procedures employed in this research study.

CHAPTER III

METHODS AND PROCEDURES

Introduction

This study investigated the use of computer and networking technology in the teaching and learning of world languages on the first and second year of language level at post-secondary institutions in Tennessee. The purpose of this research was to discover what types of computer and networking applications and devices are actually used in world language education and how often they are used.

This chapter presents the methods and procedures employed in this research study. The research questions guiding the study are presented, followed by descriptions of the survey participants, instrumentation, procedures, and data analysis.

Research Questions

1. What types of computer and networking technology are used in world language education on the post-secondary level by both instructors and students?
2. What are the differences of major languages and other languages taught in universities and colleges in relation to usage of technology?
3. What are the differences of teachers' experience of teaching in relation to usage of technology?
4. Is there any relationship between availability of computer and networking technology and its usage?

5. Which language skills do teachers want to teach by using specific technology devices?

Survey Participants

The survey participants in this study consisted of post-secondary teachers of world languages (except English) who taught first and second year levels in Tennessee during the spring semester, 2002. The survey participants were second language teachers, including full-time faculty, full- and part-time instructors, and graduate teaching assistants, who taught their own classes.

The universities and colleges where the potential survey participants were teaching included all 26 Tennessee public and private four-year institutions which offered world languages. Two institutions that did not respond to the request for identifying world language teachers or that were not willing to participate in this research study were excluded. Thus, the total number of universities and colleges participating in the study was 24 (see Table 1).

The potential total number of survey participants in this research was 285; 121 (42.5%) responded. Among these respondents, only data collected from 102 (35.8%) could be used for further analysis in this study since 19 survey participants did not complete the entire survey. Some of them stopped responding halfway, and others skipped some questions. The total number of returned surveys may have been increased if the survey package had been sent out earlier in the spring semester (e.g., February or March).

Table 1

Institutions Participating in the Study

Name of Institutions	Number of Survey participants
Austin Peay Sate University	9
Bryan College	2
Carson-Newman College	8
East Tennessee State University	6
Fisk University	7
King College	3
Lambuth University	3
Lane College	2
Lipscomb University	5
Lee University	6
Lemoyne-Owen College	5
Maryville College	4
Middle Tennessee State University	27
Milligan College	5
Rhodes College	17
Southern Adventist University	3
Tennessee Technological University	10
The University of Tennessee, Chattanooga	8
The University of Tennessee, Knoxville	61
The University of Tennessee, Martin	11
Union University	5
University of Memphis	49
University of the South	7
Vanderbilt University	22
Total	285

Instrumentation

The instrument used for this research was an original survey designed by the researcher of this study (see Appendix C). The first section of the survey elicited demographic data, including: the language being taught; duration of teaching experience; the native language of the survey participants; the type of courses the survey participants teach; and information about available computer labs.

The second section of the instrument asked the survey participants about their own usage of 12 computer/networking technology items for teaching the target language. They responded to each item by checking the appropriate answer from the following categories: I am using it daily, weekly, once or twice a month, less than once a month, and I am not using it. This section ended with a space for the respondent to add additional information not elicited by the survey. The items in the questionnaire were chosen by the principal investigator from published research studies that explored technology usage.

The third section of the instrument asked the survey participants to report on perceived students' usage of 13 computer/networking technology items for second language learning, both inside and outside of the classroom. The survey participants put a check in the appropriate column for each technology item to indicate how often (daily, weekly, once a twice a month, and less than once a month) their students used it for the study of the target language inside and outside of the classroom.

The last section of the instrument asked for teachers' perceptions concerning to what degree language skills (listening, speaking, writing, and reading) in the target language could be enhanced by using computer/networking technology. The survey

participants were asked to rate their expectations concerning which particular skills could be enhanced by using technology.

Even though the terms used on the instrument include examples and brief explanations, some of them might have been unfamiliar to some survey participants. The researcher was concerned that if the survey participants were not familiar with technology usage or were not using any technology in their language teaching, that they might not return the questionnaire. Thus, in the cover letter, and on the first page of the questionnaire, a statement was added, asking the survey participants to complete just the first page of the questionnaire and return it if they were not using any technology in their teaching.

Procedures

The survey was submitted for review and approval by the department review committee (DRC) for research projects involving human survey participants at The University of Tennessee, Knoxville.

Before being sent to the survey participants of this study, the survey was piloted with 10 post-secondary teachers who taught second languages or who taught prospective teachers of languages in the U.S. and Japan. Although the pilot study population differed from the survey population, the procedures for administering the pilot survey were nearly identical to the primary study.

The purpose of the pilot study was to verify the clarity of the instrument. The researcher asked the participants of the pilot study to complete the survey and write comments about clarity, appropriateness, and potential bias. This pilot study revealed

some participants' confusion on directions and categorization of items. Some items and their explanations were not clear enough to answer correctly. In addition, participants pointed out that the survey seemed very long. Thus, the layout and the content of the instrument for the primary study were modified accordingly.

The potential subject institutions were drawn from universities and colleges listed on the web site of The Tennessee Foreign Language Teaching Association (TFLTA, 2001). The researcher also researched the web sites of all four-year institutions in Tennessee in order to look for other colleges and universities which might offer world languages in the state. The researcher then contacted the department heads or secretaries of world language education departments at these universities and colleges and asked them to identify the instructors of world languages in their respective departments. The researcher sent the questionnaire with the cover letter (see Appendix B) and a self-addressed stamped return envelope to each language teacher, as suggested by Dillman (1978).

Confidentiality for the survey participants was assured in the cover letter. For conducting a follow-up contact, a unique identification number was put on each return envelope.

To ensure the highest return rate possible, a reminder postcard was sent out two weeks after the first survey package was mailed to those who had not yet returned the survey, as suggested by Dillman (1978). Then, a second package, with a revised cover letter, survey, and return envelope, was distributed three weeks after the first survey package had been mailed.

Data Analysis

This research was a descriptive study whose focus was to investigate the usage of technology at post-secondary institutions in Tennessee. All data collected in this research were tabulated to determine percentages and frequencies of the use of each item of technology under all the categories on the instrument. Due to the limited size of the total number of survey participants, additional statistical analysis (i.e., ANOVA and Chi Square test), could not be conducted.

Following analysis of the demographic data of the survey participants (including target languages, native languages, and years of teaching experience), the number of those who had computer labs at their respective institutions, the use of them by the survey participants, and the number of computers in the computer labs were further analyzed to calculate percentages for each, controlled by target languages taught by the survey participants.

Teachers' usage of the 12 items of technology listed on the instrument were then analyzed to calculate percentages of use of each item, controlled by target languages taught. In addition, percentages for the frequency of students' usage of the technology, availability of technology for the students, and perceived students' usage of the 13 items of technology listed on the instrument, were calculated. The percentages of the use of technology among the situations where specific items of technology were available were also calculated.

Then, the percentage of the survey participants who were interested in using technology but who were not using it was calculated. In addition, teachers' perspectives

concerning language skills for each technology item were calculated to yield percentages, controlled for each language skill (listening, speaking, reading, and writing).

In addition, how target languages and teachers' teaching experience affected the use of technology in language education was investigated. Finally, in order to find any relationship between teachers' and perceived students' technology usage, the percentages of teachers who were using the four most frequently identified technology items (i.e., word-processing, information retrieval, on-line communication, and webpage publication) and the percentages of those who were not using them, in addition to the percentages of students who were perceived to be using and not using these same technology items, were calculated.

Chapter Summary

This chapter discussed the methods and procedures used in this study. It described the research questions, survey participants, procedures, survey instrument, and methods used to analyze the data collected for this study.

CHAPTER IV

ANALYSIS OF THE DATA AND DISCUSSION OF THE FINDINGS

Introduction

This chapter presents the results of the analysis of the data collected from 102 world language teachers in post-secondary institutions in Tennessee. The results are only reported in percentages due to the limited number of survey participants which made it impossible to conduct additional statistical analyses (i.e., ANOVA and Chi Square test). The main purpose of this study was to describe what kinds of technology were actually used in the language classroom and how often they were used. More specifically, the researcher sought answers to the following research questions:

1. What types of computer and networking technology are used in the world language education on the post-secondary level by both instructors and students?
2. What are the differences of major languages and other languages taught in universities and colleges in relation to usage of technology?
3. What are the differences of teachers' experience of teaching in relation to usage of technology?
4. Is there any relationship between availability of computer and networking technology and its usage?
5. Which language skills do teachers want to teach by using specific technology devices?

Demographic Characteristics of the Respondents

Among the 102 respondents, there were 5 teachers who were teaching two languages[1]. Therefore, the number of the languages taught by the survey participants was 107. Spanish was taught by the largest number of teachers (n=42) as shown in Figure 1. Other languages taught included French (n=27), German (n=15), Italian and Japanese (n=5 each), Greek (n=4), Chinese (n=2), and Portuguese (n=1).

The survey participants' teaching experience varied (see Table 2). The mean of the duration of the survey participants' teaching experience was 11.9 years; the range of teaching experience varied from 1 to 42 years. The years of teaching experience of the Japanese and Portuguese teachers were relatively short, and the other survey participants' means of years of teaching experience except Spanish teachers were almost the same

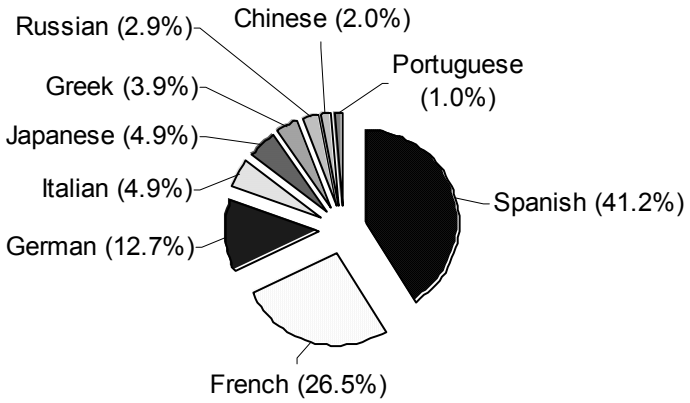

Figure 1. Target Languages Taught by the Survey Participants (N=107)

[1] Two teachers teaching French and German and three teaching French and Spanish

Table 2

Duration of Teaching Experience according to Target Languages

Language	N	Range of Years of Teaching Target Language	Means of Duration of Teaching Target Language (years)
Chinese	2	15-16	15.5
French	32	1-31	14.0
German	13	1-39	16.2
Greek	4	6-8	14.5
Italian	5	3-25	14.4
Japanese	5	1-13	5.8
Spanish	42	1-42	10.1
Portuguese	1	2	2
Russian	3	8-25	15.0
Total	107[2]	1-42	11.9

[2] This number contains teachers who taught two different languages.

(14-16 years). The years of teaching experience of Spanish teachers was about 10.

Table 3 shows the survey participants' native languages. Sixty-eight percent of the survey participants (73) in this study spoke English as their native language. Many (12) teachers of Chinese, Italian, Japanese, Portuguese, and Russian spoke the target languages as their native languages while many (69) of teachers of French, Greek, German, and Spanish spoke English as their native language.

Table 3

Native Languages of Survey Participants

Target Language	N	Survey participants' Native Language		
		English	Target Language	Others
Chinese	2	0	2	0
French	32	28	3	0
German	13	8	4	1 (Russian)
Greek	4	4	0	0
Italian	5	2	3	0
Japanese	5	0	4	1 (Chinese)
Spanish	42	29	12	1 (German)
Portuguese	1	0	1	0
Russian	3[3]	2	2	0
Total	107	73 (68.2%)	31 (29.0%)	3 (2.8%)

[3]One subject declared that he or she was bilingual in both English and the target language (Russian).

Computer Labs

The survey asked the participants if there were computer labs dedicated to teach languages in their respective departments and/or universities. Their responses are shown in Table 4 and Table 5.

According to the survey, 78 (72.9%) teachers reported that they had at least one computer lab dedicated solely to teach languages in their departments or universities (see Table 4). Among those who answered that they had a computer lab in their institutions, 51 (65.4%) teachers were actually using it for their teaching (see Table 5). This means that although 73% (78) of the survey participants in this study were able to access a computer lab for their teaching, not all (65%, 51) of those teachers were actually using

Table 4

The Number of Survey Participants Who Answered They Had Computer Labs for Teaching Languages

Q. Do you have a computer lab(s) dedicated solely to teach languages? (N=107) A. Yes.			
Language	Total N	N	Percentage
Chinese	(2)	1	50%
French	(32)	24	75%
German	(13)	10	76.9%
Greek	(4)	3	75%
Italian	(5)	3	60%
Japanese	(5)	4	80%
Spanish	(42)	29	69%
Portuguese	(1)	1	100%
Russian	(3)	3	100%
Total	107	78	72.9%

Table 5

The Numbers of Survey Participants Who Answered That They Used the Computer Lab

Q. Do you use a computer lab(s) to teach languages? (N=78) A. Yes.			
Language	Total N	N	Percentage
Chinese	(1)	1	10%
French	(24)	21	87.5%
German	(10)	5	50%
Greek	(3)	2	66.7%
Italian	(3)	0	0%
Japanese	(4)	3	75%
Spanish	(29)	17	58.6%
Portuguese	(1)	1	100%
Russian	(3)	1	33.3%
Total	78	51	65.4%

the facility. Overall, then, 47.7% (51) of all the target languages taught by the survey participants were actually taught in computer labs in some way.

According to the survey, the average number of computers in the computer labs at each participants' institution was 19.5 (see Table 6), and the mean number of the students in participants' classes was 18.2. (min=3, max=40, SD=7.4). The average number of computers in a computer lab at each respondents' institution and the mean of the number of students in their classes were almost the same.

Table 6

The Number of Computers in Computer Labs Dedicated for Language Education and the Mean of the Number of Students per Class

Language	Number of those who use the lab	Number of computers		Students per class
		Range	Mean	Mean
Chinese	1	20	20	12.5
French	21	3-30	19.0	18.8
German	5	6-30	18.8	24.3
Greek	2	8-25	16.5	11.5
Italian	0	-	-	18.2
Japanese	3	20-50	33.3	17.8
Spanish	17	3-30	22.1	21.2
Portuguese	1	10	10	5.0
Russian	1	-[4]	-	5.2
Total	107	3-50	19.5	18.2

[4] The subject who used the computer lab in his or her teaching of Russian did not write the number of computers in the lab.

Technology Usage in Language Teaching

For those language teachers who did not know technology well and did not use it at all, both the cover letter sent to the survey participants with the questionnaire and the questionnaire itself asked them to return only the first page of the questionnaire. This provided only information about demography and computer labs if they did not use technology in their teaching at all. Table 7 shows the number of those survey participants who only returned the first page of the questionnaire.

Overall, about one-fourth (24, 23.4%) of the teachers in this study were not using any type of technology in their language teaching throughout the fall semester, 2002.

Table 7

The Number of Survey Participants Who Were Not Using Technology in Teaching

Language	Total N	N	Percentage
Chinese	(2)	1	50%
French	(27)	3	11.1%
German	(11)	2	18.2%
Greek	(4)	1	25.0%
Italian	(5)	3	60.0%
Japanese	(5)	2	40.0%
Spanish	(39)	10	25.4%
Portuguese	(1)	0	0%
Russian	(3)	2	66.7%
2 Languages[5]	(5)	0	0%
Total	102	24	23.4%

[5] Two teachers teaching French and German and three teaching French and Spanish

Whereby, more than half of the teachers of Italian and Russian were not using technology, more than 70% of the French, Spanish, German, Portuguese, and dual language teachers reported using technology in their teaching. Therefore, 76.6% (78) of the survey participants used any kind of technology in their language teaching.

Teachers' Usage of Technology

This section explains what kinds of technology the survey participants were using and how often they were using them. The total number of participants to be analyzed in this section is 102; the number includes the respondents who completed the survey (respondents who were using any type of technology in their teaching) and those who sent back only the first page (respondents who were not using technology in their teaching). Figure 2 shows the percentage of use for each type of computer and networking technology by the survey participants. Table 8 shows the frequencies of teachers' usage of technology.

Word-processing was the most frequently used type of technology by the survey participants; about three-fourths of the survey participants (74.5%, 76 participants) used it. Because 23.4% (24) of the survey participants answered that they were not using any type of technology in their teaching, the high number of those using word-processing means that almost all survey participants who answered they were using some type of technology actually were using word-processing technology. Over 60% (64) of the survey participants answered that they used technology for word processing daily, and 11.7% (12) of the survey participants answered they were using it weekly or a few times a month.

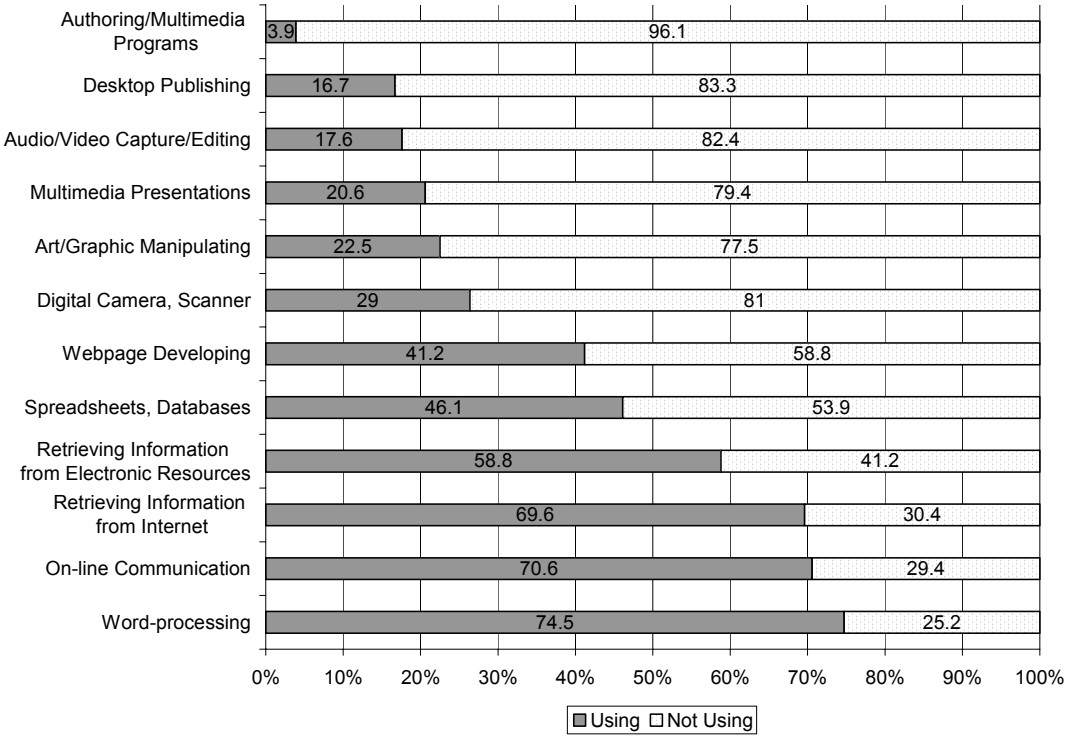

Figure 2. Teachers' Usage of Computer and Networking Technology (N=102)

Technology for on-line communication and information retrieval from the Internet, both of which are considered as networking technology, was used frequently, too. About 71% (72) of the survey participants used technology for on-line communication, about 60% (62) of them used it regularly (53.9% daily and 6.9% weekly). The results of this research showed that many of the survey participants were using technology on a regular basis (daily or weekly) for word-processing as well as for on-line communication. Nearly 70% (71) of the survey participants retrieved information

Table 8

The Frequencies of Teachers' Usage of Computer and Networking Technology (N=102)

Applications and Devices	Using				Not Using
	Daily	Weekly	Once or Twice a Month	Less Than Once a Month	
Word processing	64	9	3	0	26
On-line communication	55	7	9	1	30
Retrieving information from Internet	26	25	15	5	31
Retrieving info from electronic resources	8	12	24	16	42
Spreadsheets/databases	21	15	7	4	55
Webpage developing	11	11	8	12	60
Digital camera/Scanner	0	2	13	12	75
Art/graphic manipulating	0	4	9	10	79
Multimedia presentations	1	5	3	12	81
Audio/video capture/digitizing/editing	1	5	2	10	84
Desktop Publishing	2	6	2	7	85
Authoring or multimedia programs	1	1	0	2	98

from websites; 50% (51) of them used technology devices for retrieving information from the Internet regularly (25.5% daily and 24.5% weekly).

Forty-seven (46.1%) survey participants reported using spreadsheets or databases. Unlike retrieving information from electronic resources, many teachers using spreadsheets or databases used them regularly (19.6% daily and 14.7% weekly). This is due to the fact that these applications are usually used for class management such as keeping grades of students, tasks that are usually required daily or weekly.

Forty-one percent (42) of the survey participants developed and created their own web sites for their teaching. About 21% (22) of the survey participants reported publishing their own web pages regularly (10.3% daily; 10.3% weekly), and about 19%

(20) of the survey participants reported creating websites occasionally (7.5% once or twice a month; 11.2% less than once a month).

Retrieving and manipulating digital pictures and movies were not popular among the survey participants in this study; 29% (27) of the survey participants used the digital camera and scanner, and 22.5 % (23) of the survey participants used applications and devices for manipulating graphics, sounds, and movies. Many of those who answered that they used these kinds of technology actually only used them a few times during the semester.

Twenty percent of the survey participants (21) reported using technology for multimedia presentations, such as Power Point, in the classroom. This kind of technology was not used on a regular basis; only 6% of the survey participants (6) used it daily or weekly, and about 15% of the survey participants (15) used multimedia presentations in their teaching several times throughout the semester.

Few survey participants availed themselves of technology for desktop publishing. Only 17 survey participants (15.6%) used this kind of technology, and more than half of them (9) just used this technology a few times during the semester.

The least used technology applications or devices in this study were authoring/multimedia programs. These included software on the market, such as Flash and Director (Macromedia), and local-produced programs which are teachers' original programming software. In this research study, only four teachers (2.8%) used this kind of application in their teaching.

Students' Usage of Technology

Students' Use of Technology

Figure 3 and Table 9 show the students' use of technology based on teachers' perceptions in world language learning. The survey participants referred to in this section were 102 teachers, and included those who completed the entire survey and those who returned only the first page.

According to the teachers' perceptions, the most highly used technology by the students was word-processing (65.7%; 67 survey participants). It was used frequently in their language learning; 7.8% (8) of the survey participants answered that their students were using it daily, 24.5% (25) weekly, 23.5% (24) once or twice a month, and 9.8% (10) less than once a month.

About 64% (65) of the survey participants answered that their students were using technology to gather information from the Internet. According to the teachers' perceptions, 20.6% (21) of the students used technology for information retrieval from the Internet weekly, 21.6% (22) once or twice a month, and 17.6%(18) less than once a month.

The survey participants reported that 42.2% (43) were using CALL programs for drill-and-practice or tutorials. About 23% (23) of the survey participants reported that their students used the programs weekly, and 12.7% (13) of them required their students to use the technology once or twice a month.

About 32% (33) of the survey participants required their students to use e-mail to

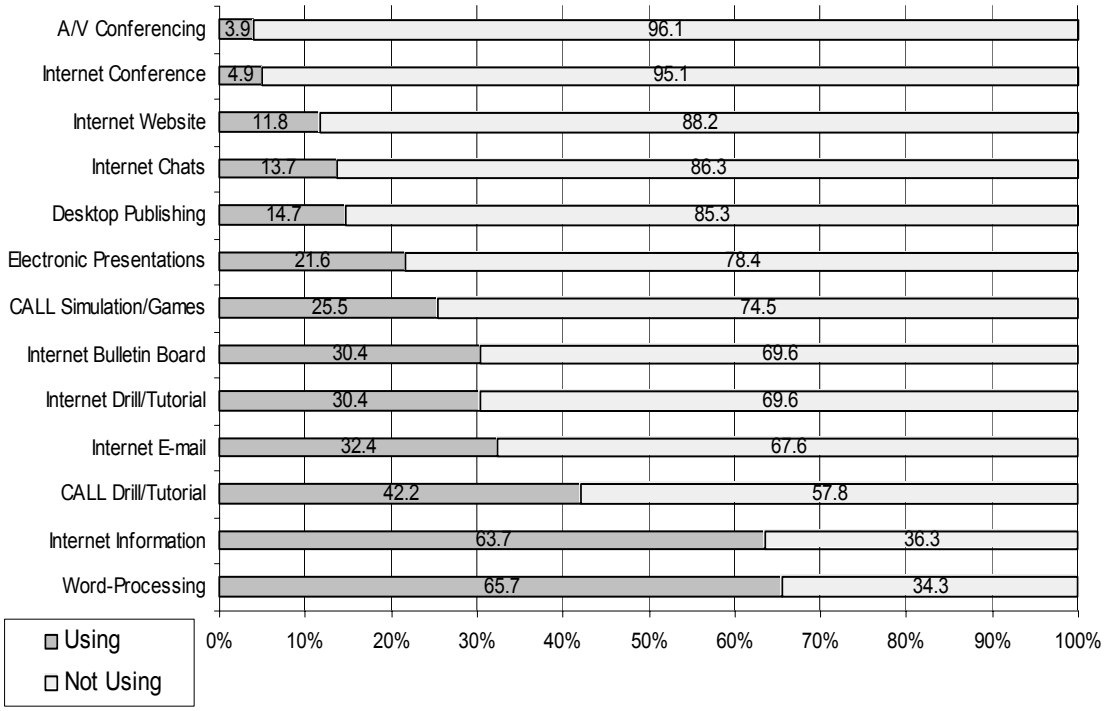

Figure 3. Teachers' Perceptions of Students' Use of Technology in World Language Learning (N=102)

Table 9

Students' Use of Technology in World Language Learning Perceived by Their Teachers (N=102)

	Using					Not Using
	Daily	Weekly	1-2 /M	<1/M	Total	
Word-Processing	8	25	24	10	67	35
Internet Information	4	21	22	18	65	37
CALL Drill/Tutorial	4	23	13	3	43	59
Internet E-mail	5	12	8	8	33	69
Internet Drill/Tutorial	3	8	14	6	31	71
Internet Bulletin Board	6	12	5	8	31	71
CALL Simulation/Games	2	11	8	5	26	76
Electronic Presentations	1	3	3	15	22	80
Desktop Publishing	1	1	4	9	15	87
Internet Chats	1	1	6	6	14	88
Internet Website	1	0	4	7	12	90
Internet Conference	0	0	1	4	5	97
A/V Conferencing	0	0	0	4	4	98

learn languages. The students exchanged e-mail for their learning weekly (11.8%; 12 survey participants), once or twice a month (7.8%; 8 survey participants), and less than once a month (7.8%; 8 survey participants). Six percent (5) of the survey participants reported that their students used this kind of technology daily.

About 30% (31) of the survey participants reported that their students used bulletin board or listsevs for their learning on the Internet. Many of them used it weekly (11.8%; 12 survey participants), 12.7% (13) used it a few times during the semester; however, about 6% (8) of the survey participants answered that they required their students to use this kind of technology daily.

The use of CALL programs for simulations or educational games was less than that for drill-and-practice or tutorials; 25.5% (26) of the teachers reported that their students used the program for simulations or games. Many of those who used this type of technology used it weekly (10.8%; 11 survey participants) or a few times a month (7.8%; 8 survey participants).

Technology for electronic presentations and desktop publication was the least used type of technology. Only a few survey participants (4 for electronic presentations, 2 for desktop publishing) answered that they were using technology for those purposes on a regular basis. About 15% (15) of the students used technology for their presentations less than once a month, and 8.8% (9) of the students used applications for desktop publishing less than once a month.

Only 13.7% (14) of the survey participants reported that they required their students to use chats, and 11.8% (12) of the survey participants answered that their students published websites. In addition, only 4.9% (5) of the survey participants

reported that they required their students to use technology for audio-/video-conferencing on the Internet. The least used technology by the students in world language education in this research study was the one for audio-/video- conferencing using telephone lines, satellites, or site TV networking (3.9%). These kinds of technology, which were used by students of a few survey participants (4), were not actually used on a regular basis.

Availability and Use of Technology by Students

According to Figure 4, Table 10, Figure 5, and Table 11 (which show the teachers' perceptions of availability of technology for students to learn world languages at their universities or colleges), many language teachers in Tennessee had a variety of technology available for their students. Availability was calculated by dividing the total number of survey participants (those who reported that they were using specific technology items and those who reported that they thought specific technology items were available but did not use them) by the number of 78 participants who completed the survey. Those who completed only the first page (24 survey participants) did not respond to questions proceeding this information. Thus, availability discussed in this research was based on the perspectives of teachers who were using some kind of technology for either/both teachers themselves and/or for their students.

Technology for word-processing was the most available and most frequently used among all types of technology in this study. Among 76 survey participants (97.4%) who answered technology for word-processing was available for students, 67 survey participants (88.2%) required their students to perform this kind of activity.

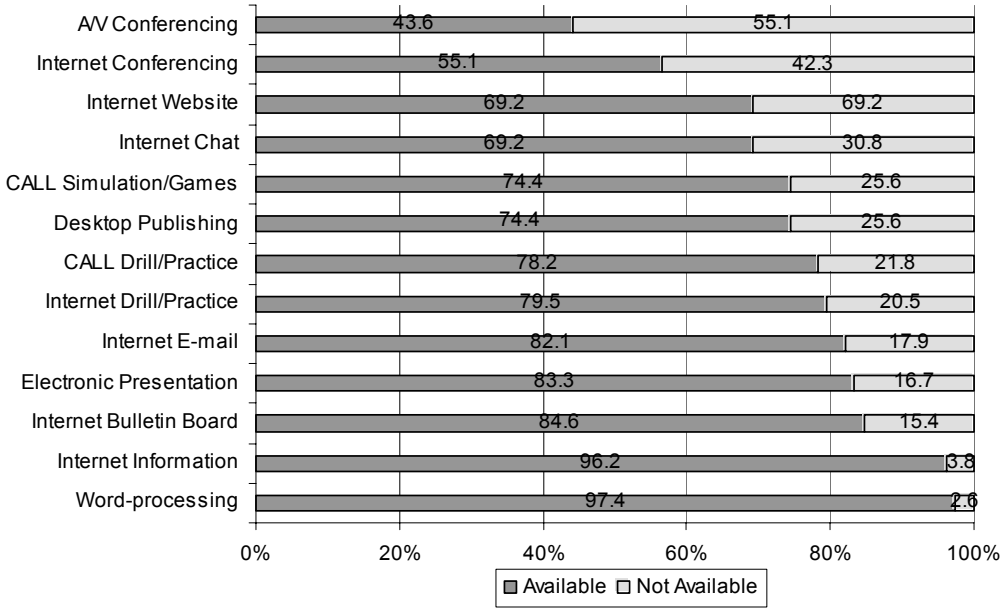

Figure 4. Percentages of Availability of Technology for Students to Learn World Languages (N=78)

Table 10

Frequencies of Availability of Technology for Students to Learn World Languages (N=78)

	Availability	(Percentage)
Word-processing	76	97.4
Internet Information	75	96.2
Internet Bulletin Board	66	84.6
Electronic Presentation	65	83.3
Internet E-mail	64	82.1
Internet Drill/Practice	62	79.5
CALL Drill/Practice	61	78.2
Desktop Publishing	58	74.4
CALL Simulation/Games	58	74.4
Internet Chat	54	69.2
Internet Website	54	69.2
Internet Conferencing	45	55.1
A/V Conferencing	35	43.6

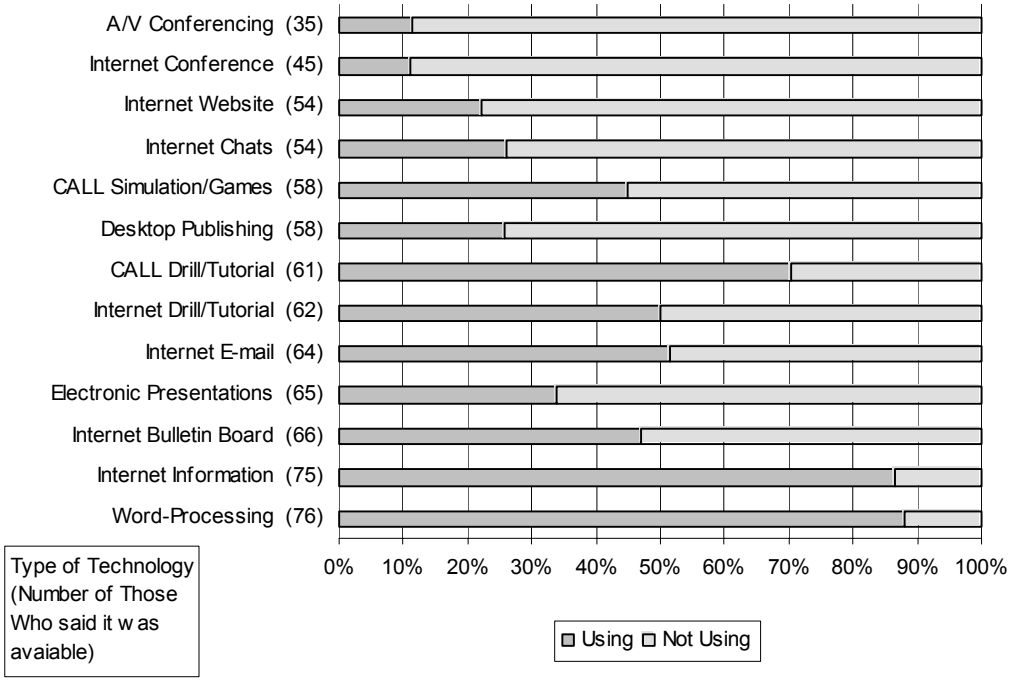

Figure 5. Students' Actual Usage Based on Availability

Table 11

Students' Actual Usage Based on Availability (Percentages)

Type of Technology (Number of those who said it was available)	Using	(Percentage)	Not Using	(Percentage)
Word-Processing (76)	67	88.2%	9	11.8%
Internet Information (75)	65	86.7%	10	13.3%
Internet Bulletin Board (66)	31	47.0%	35	53.0%
Electronic Presentations (65)	22	33.8%	43	66.2%
Internet E-mail (64)	33	51.6%	31	48.4%
Internet Drill/Tutorial (62)	31	50.0%	31	50.0%
CALL Drill/Tutorial (61)	43	70.5%	18	29.5%
Desktop Publishing (58)	15	25.9%	43	74.1%
CALL Simulation/Games (58)	26	44.8%	32	55.2%
Internet Chats (54)	14	25.9%	40	74.1%
Internet Website (54)	12	22.2%	42	77.8%
Internet Conference (45)	5	11.1%	40	88.9%
A/V Conferencing (35)	4	11.4%	31	88.6%

Seventy-five survey participants (96.2%) reported that technology for retrieving information from the Internet was available, and among them, 65 teachers (86.7%) were actually asking their students do so.

Sixty-six survey participants (84.6%) answered that technology for using bulletin boards or listservs was available; however, this kind of technology was not used frequently by the students. Only 31 survey participants (47%) reported that their students used technology for that purpose. The fourth available type of technology was electronic presentations; 65 survey participants (83.3%) reported that this kind of technology was available for students. However, only one-third of them (33.8%) required their students to use it.

Sixty-four survey participants (82.1%) answered that their students could access their own e-mail accounts for language learning, yet, 33 teachers (51.6%) required their students to use it. Sixty-two survey participants (79.5%) reported that their students could use technology for drill-and-practice or tutorial activities on the Internet, and only 31 survey participants (50%), half of those who said it was available, answered that they required their students to use it. Sixty-one survey participants (78.2%) reported that CALL programs for drill-and-practice/tutorial activities were available for their students. Teachers required their students to perform drills and tutorials using CALL programs more than they asked them to do the same activity on the Internet; 43 survey participants (70.5%) actually required their students to use CALL programs for drill-and-practice/ tutorials. Availability of the Internet and CALL programs for drill-and-practice or tutorials was the same; thus, world language teachers tended to use CALL programs much more than the Internet for that purpose.

In terms of using CALL programs for simulations and educational games, 58 survey participants (74.4%) reported that their students could access this type of technology, which was almost the same percentage as use of CALL programs for drill-and-practice/tutorial activities. However, there was a large difference of usage between CALL programs for drill-and-practice/tutorials and those for simulations/games. Although 70.5% (43) of the survey participants made their students use CALL programs for drill-and-practice/tutorials, only 44.8% (26) of the survey participants actually required their students to use them for simulations and games.

Availability and actual usage of technology for desktop publishing, website creation, and chats on the Internet by their students were almost the same. Availability for these technology items was about 69-74% (54-58 participants), and 19-23% of the participants (12-15) were actually using them.

Technology for synchronous interaction was the least frequently used by the students. Forty-five survey participants (55.1%) reported that Internet conferencing was available; however, only 5 survey participants (11.1%) were using it. Audio- and/or video-conferencing (i.e., using telephone lines or other high-speed networking) was the least available in this research (43.6%); and only 4 survey participants (11.4%) reported that they were using the system.

Teachers' Interest in Using Technology

In this section, teachers' interest in requiring their students to use specific types of technology will be discussed. Table 12 and Figure 6 show the comparison of the

number of survey participants who wanted to use specific types of technology, those who did not want to use them, and those who actually used them.

The most popular type of technology for the survey participants who wanted to use technology was CALL programs for simulation or educational games; 34 survey participants (43.6%) reported that they would like to use them. Twenty-one survey participants expressed their interest in being able to access this kind of technology, and 13 survey participants said that they wanted to use it if it were available.

Thirty-two survey participants (41.0%) answered that they wanted to use technology for audio-/video-conferencing. This is the teachers' second choice for technology usage; however, the number of survey participants who were not using this type of technology and had no interest in using it was greater than those who wanted to use it if it were available. Forty-two survey participants (53.8% of those who were not requiring their students to use that technology) answered that they were not interested in using technology for conferencing.

Thirty-one survey participants (39.7%) reported that they wanted to use technology for drill-and-practice/tutorials. Publishing websites was the next desired item by the survey participants; 30 survey participants (38.5%) answered that they wanted to use technology for that purpose. However, almost half of the survey participants (46.2%, 36 participants) did not require the students to use this type of technology and had no interest in using it.

The number of survey participants who wanted to require their students to use technology for bulletin boards, chats, e-mails, and conferences on the Internet, was almost the same (34.6-35.9%, 27-28 participants); however, the numbers of those who

Table 12

Teachers' Interest and Usage of Technology (N=78)

	Want to Use			No Interest			
	Available Not Using	No Available	Total	Available Not Using	No Available	Total	Using
CALL Simulation/Games	21	13	34 43.6%	11	7	18 23.1%	26 33.3%
A/V Conferencing	12	20	32 41.0%	19	23	42 53.8%	4 5.1%
Internet Drill/Tutorial	19	12	31 39.7%	12	4	16 20.5%	31 39.7%
Internet Website	18	12	30 38.5%	24	12	36 46.2%	12 15.4%
Internet Bulletin Board	20	8	28 35.9%	15	4	19 24.4%	31 39.7%
Internet Chats	18	10	28 35.9%	22	14	36 46.2%	14 17.9%
Internet E-mail	19	8	27 34.6%	12	6	18 23.1%	33 42.3%
Internet Conference	12	15	27 34.6%	28	18	46 59.0%	5 6.4%
CALL Drill/Tutorial	13	12	25 32.1%	5	5	10 12.8%	43 55.1%
Electronic Presentations	18	6	24 30.8%	25	7	32 41.0%	22 28.2%
Desktop Publishing	15	6	21 26.9%	28	14	42 53.8%	15 19.2%
Internet Information	6	3	9 11.5%	4	0	4 5.1%	65 83.3%
Word-Processing	5	1	6 7.7%	4	1	5 6.4%	67 85.9%

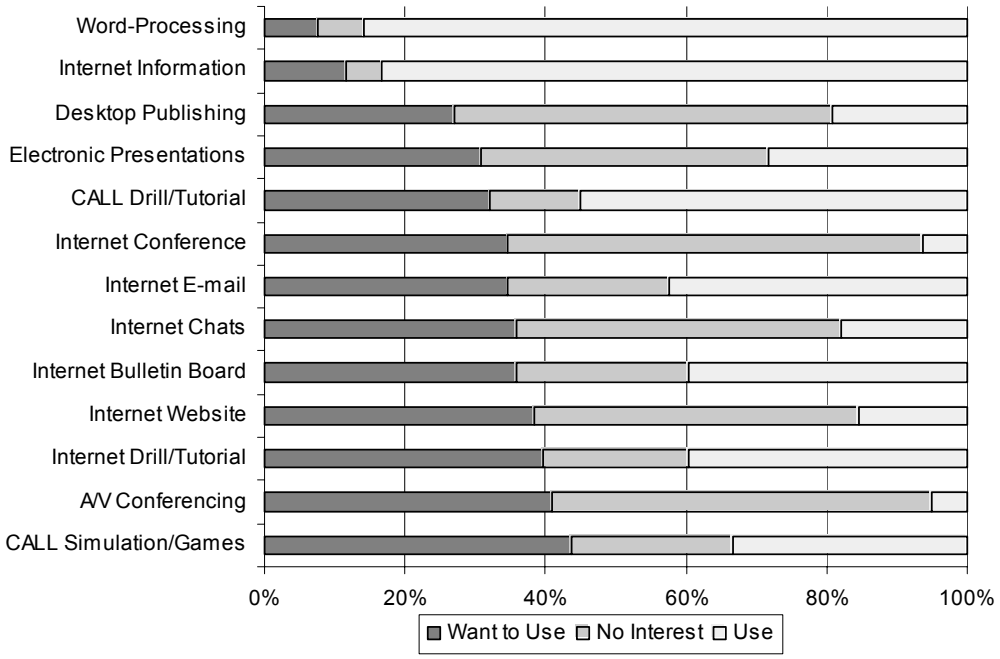

Figure 6. Teachers' Interest in Using Technology (N=78)

were not interested in using it for those purposes were different. The percentages of those who wanted to use bulletin boards and e-mails (both of which are in the asynchronous mode), were close; 28 survey participants (35.9%) required to make their students to use technology for the purpose of bulletin boards, and 27 survey participants (34.6%) did so for e-mail exchanges. The percentages of those who had no interest in this type of technology were 23-24%. Among those who answered that they would like to use technology for asynchronous communication, the number of those who already had access to those types of technology was high. On the other hand, even though the actual number of those who wanted to use technology for the purpose of chats and

conference on the Internet was high, the number of those who were not interested in using it for those purposes was also high. Thirty-six survey participants (46.2%) answered that they had no interest in using technology for chats on the Internet, whether or not that kind of technology were available. Forty-six survey participants (59.0%) reported that they were not interested in making students use technology for conferencing on the Internet.

Twenty-five survey participants (32.1%) reported that they would like to require their students to use technology for CALL drill-and-practice and tutorials. Because many teachers were actually using this type of technology, the frequency was small; however, among those who were not using this kind of technology, many of the survey participants answered that they would like to make their students use technology for CALL for drill-and-practice or tutorials. That is, this type of technology was one of the most popular in this study.

Twenty-four survey participants (30.8%) reported that they wanted to require their students to use technology for presentations. This type of technology was not attractive to a large percentage of the survey participants; more than 40% of the survey participants answered that they had no interest in requiring their students to use it for language learning even though this kind of technology was generally available at their institutions.

Desktop publishing was one of the least attractive items for the survey participants. Twenty-one survey participants (26.9%) reported that they wanted to use it, and 42 survey participants (53.8%) answered they were not interested in using this kind of technology.

The number of survey participants who wanted to use technology for the purposes of gathering information from the Internet and word-processing was small because many of the survey participants had already asked their students to use it. Among those who were not using those types of technology, many of them answered that they would like to require their students to use it; six survey participants (7.7%) reported that they wanted to use technology for word-processing, and nine survey participants (11.9%) answered that they would like to ask their students to use the Internet for information collection.

Target Skills by Using Technology

In this section, teachers' perspectives on language skills (i.e., listening, speaking, writing, and reading) for each technology item, will be discussed. Figures 7 through 19 show how much the survey participants thought computer/networking technology could enhance their students' language skills. Table 13 shows details of frequencies and percentages of target skills by using specific types of technology.

According to this research, many teachers thought that CALL programs for both drill-and-practice/tutorials and simulations/educational gaming were effective for all language skills. On both items, among the survey participants who were using those kinds of technology, over 78% of them reported that they were effective for each language skill, including speaking (see Figure 7 and Figure 8).

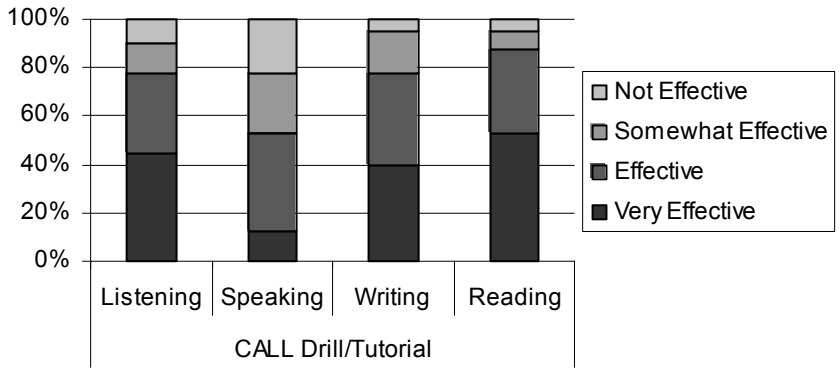

Figure 7. Teachers' Perspectives on CALL Drills/Practices/Tutorials (N=40)

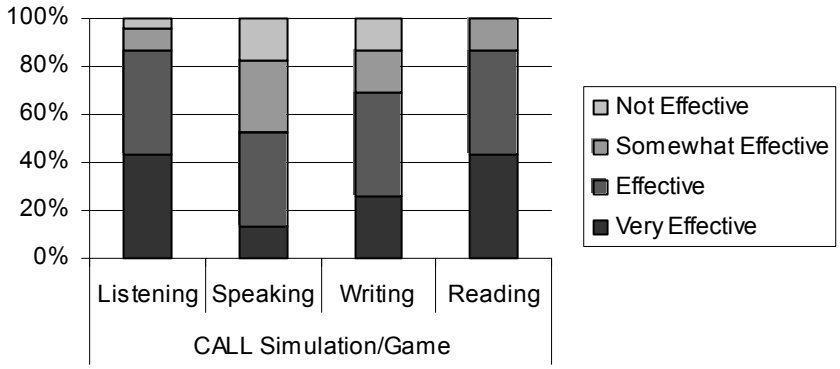

Figure 8. Teachers' Perspectives on CALL Simulations/Gaming (N=23)

Table 13

Teachers' Perspectives of Language Skills on Each Technology Item

		Very Effective (3)		Effective (2)		Somewhat Effective (1)		Not Effective (0)	
CALL Drill/Tutorial	Listening	18	45.0%	13	32.5%	5	12.5%	4	10.0%
(N=40)	Speaking	5	12.5%	16	40.0%	10	25.0%	9	22.5%
	Writing	16	40.0%	15	37.5%	7	17.5%	2	5.0%
	Reading	21	52.5%	14	35.0%	3	7.5%	2	5.0%
CALL Simulation/Game	Listening	10	43.5%	10	43.5%	2	8.7%	1	4.3%
(N=23)	Speaking	3	13.0%	9	39.1%	7	30.4%	4	17.4%
	Writing	6	26.1%	10	43.5%	4	17.4%	3	13.0%
	Reading	10	43.5%	10	43.5%	3	13.0%	0	0.0%
Internet Information	Listening	12	19.7%	2	3.3%	13	21.3%	34	55.7%
(N=61)	Speaking	5	8.2%	3	4.9%	17	27.9%	36	59.0%
	Writing	14	23.0%	10	16.4%	22	36.1%	15	24.6%
	Reading	38	62.3%	17	27.9%	5	8.2%	1	1.6%
Internet Drill/Tutorial	Listening	8	32.0%	7	28.0%	6	24.0%	4	16.0%
(N=25)	Speaking	2	8.0%	7	28.0%	5	20.0%	11	44.0%
	Writing	6	24.0%	12	48.0%	7	28.0%	0	0.0%
	Reading	9	36.0%	15	60.0%	0	0.0%	1	4.0%
Internet Web publication	Listening	0	0.0%	0	0.0%	4	33.3%	8	66.7%
(N=12)	Speaking	0	0.0%	0	0.0%	4	33.3%	8	66.7%
	Writing	8	66.7%	2	16.7%	2	16.7%	0	0.0%
	Reading	8	66.7%	2	16.7%	2	16.7%	0	0.0%
Internet E-mail	Listening	2	4.8%	3	7.1%	9	21.4%	28	66.7%
(N=42)	Speaking	3	7.1%	5	11.9%	12	28.6%	22	52.4%
	Writing	20	47.6%	16	38.1%	5	11.9%	1	2.4%
	Reading	20	47.6%	17	40.5%	3	7.1%	2	4.8%
Internet Bulletin board	Listening	1	4.2%	0	0.0%	6	25.0%	17	70.8%
(N=24)	Speaking	1	4.2%	1	4.2%	6	25.0%	16	66.7%
	Writing	5	20.8%	8	33.3%	7	29.2%	4	16.7%
	Reading	5	20.8%	13	54.2%	5	20.8%	1	4.2%
Internet Chats	Listening	1	4.8%	1	4.8%	3	14.3%	16	76.2%
(N=21)	Speaking	1	4.8%	3	14.3%	6	28.6%	11	52.4%
	Writing	5	23.8%	10	47.6%	6	28.6%	0	0.0%
	Reading	4	19.0%	10	47.6%	6	28.6%	1	4.8%
Internet Conferencing	Listening	4	66.7%	2	33.3%	0	0.0%	0	0.0%
(N=6)	Speaking	3	50.0%	1	16.7%	2	33.3%	0	0.0%
	Writing	0	0.0%	0	0.0%	3	50.0%	3	50.0%
	Reading	0	0.0%	0	0.0%	3	50.0%	3	50.0%
Word-processing	Listening	2	3.1%	3	4.7%	7	10.9%	52	81.3%
(N=64)	Speaking	1	1.6%	4	6.3%	8	12.5%	51	79.7%
	Writing	35	54.7%	25	39.1%	4	6.3%	0	0.0%
	Reading	17	26.6%	29	45.3%	11	17.2%	7	10.9%
Electronic presentation	Listening	3	15.0%	3	15.0%	2	10.0%	12	60.0%
(N=20)	Speaking	5	25.0%	5	25.0%	3	15.0%	7	35.0%
	Writing	5	25.0%	10	50.0%	5	25.0%	0	0.0%
	Reading	5	25.0%	9	45.0%	5	25.0%	1	5.0%
Desktop publishing	Listening	0	0.0%	0	0.0%	2	16.7%	10	83.3%
(N=12)	Speaking	0	0.0%	1	8.3%	1	8.3%	10	83.3%
	Writing	5	41.7%	4	33.3%	2	16.7%	1	8.3%
	Reading	4	33.3%	2	16.7%	3	25.0%	3	25.0%
Conferencing	Listening	2	50.0%	1	25.0%	1	25.0%	0	0.0%
(N=4)	Speaking	2	50.0%	1	25.0%	1	25.0%	0	0.0%
	Writing	0	0.0%	0	0.0%	1	25.0%	3	75.0%
	Reading	0	0.0%	0	0.0%	1	25.0%	3	75.0%

The survey participants using the Internet for information collection answered that many of them thought it was very effective for reading skills but not effective for listening and speaking skills (see Figure 9). Thirty-nine percent (24) of the survey participants answered that it was very effective or effective, and 36% (22) of them said that it was somewhat effective for writing.

The survey participants who used the Internet for drill-and-practice/tutorials reported that it was effective for reading skills; 36% (9) felt it was very effective, 60% (15) felt it was effective (see Figure 10). The majority of these survey participants thought that it was effective for writing, also; 24% (6) felt it was very effective; and 48% (12) felt it was effective. In addition, many survey participants answered that this type of activity was effective in some ways for listening (84%; 21 survey participants) and speaking skills (56%; 14 survey participants).

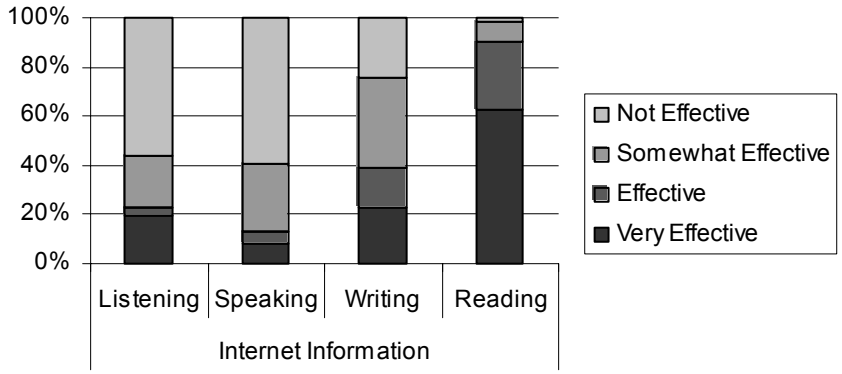

Figure 9. Teachers' Perspectives on Information Retrieval on the Internet (N=61)

The survey participants who required their students to publish websites thought that this activity were effective for writing and reading skills; 8 survey participants (66.7%) out of 12 reported that it was very effective, and 4 (34.4%) answered it was effective or somewhat effective (see Figure 11). On the other hand, they thought that it was not effective for listening and speaking skills.

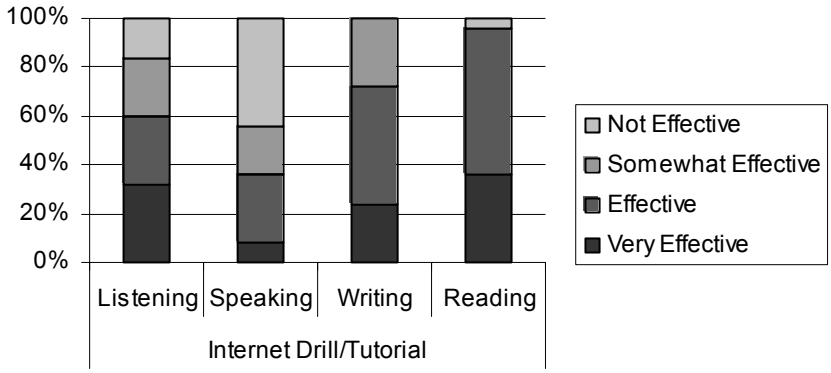

Figure 10. Teachers' Perspectives on Drills/Practices/Tutorials on the Internet (N=25)

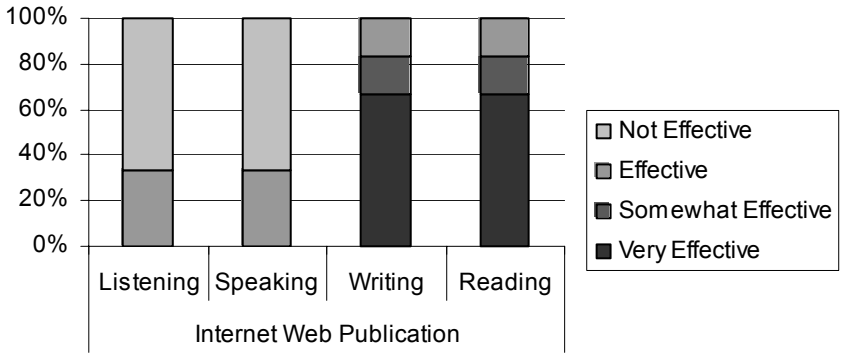

Figure 11. Teachers' Perspectives on Website Publication on the Internet (N=12)

E-mail exchange was one of the popular activities among the survey participants, and they thought it was very effective for writing and reading skills. Among 42 survey participants who required their students to exchange e-mails in target languages, 20 survey participants (47.6%) reported that the activity was very effective for both listening and reading skills, and 16 (38.1%) survey participants answered that it was effective for writing and 17 (40.5%) for reading (see Figure 12). However, some of them thought that writing and reading activity via e-mail was effective for listening and speaking; 47.6% (20) of the survey participants who used this kind of technology answered that it was effective in some way for speaking skills.

Using bulletin boards on the Internet was the same type of communication style (asynchronous mode), as e-mail exchanges; however, the survey participants thought these types of technology differed in terms of their effect on language skills. Compared with e- mail exchange, the survey participants tended to answer that using bulletin boards was less effective than exchanging e-mail for writing, reading, and even speaking skills (see Figure 13).

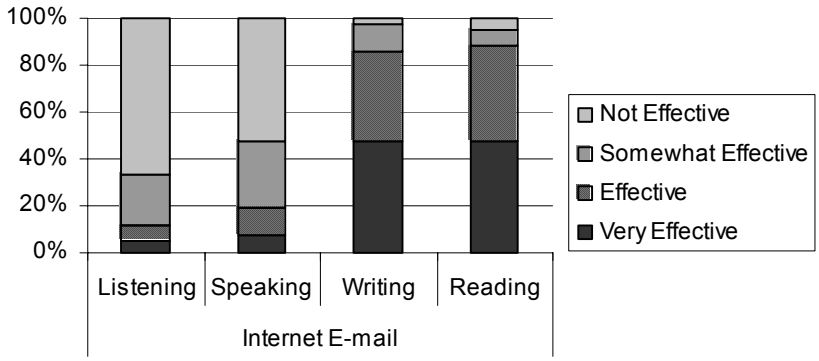

Figure 12. Teachers' Perspectives on E-mail Exchanges on the Internet (N=42)

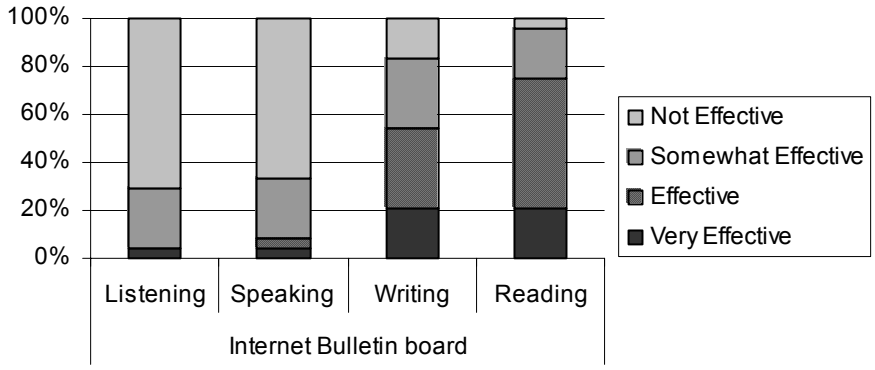

Figure 13. Teachers' Perspectives on Bulletin Boards (N=24)

Twenty-one survey participants required their students to use technology for chats on the Internet (see Figure 14). Almost all of them thought that activity worked effectively for writing and reading skills; there was only one subject using chats who answered that it was not effective for reading, and no one answered that it was not effective for writing. Only 5 survey participants (24.8%) thought that activity was effective in some ways for listening, and 10 survey participants (47.6%) answered that chatting was effective in some ways for speaking skills.

Using technology for audio-/video- conferencing on the Internet was the second least popular item in this research (N=6). The survey participants using this kind of technology clearly reported that it was effective or very effective for listening and speaking skills (see Figure 15). Half of those who used this technology item (50%, 3 participants) felt it was somewhat effective and the other half felt it was not effective for writing and reading skills.

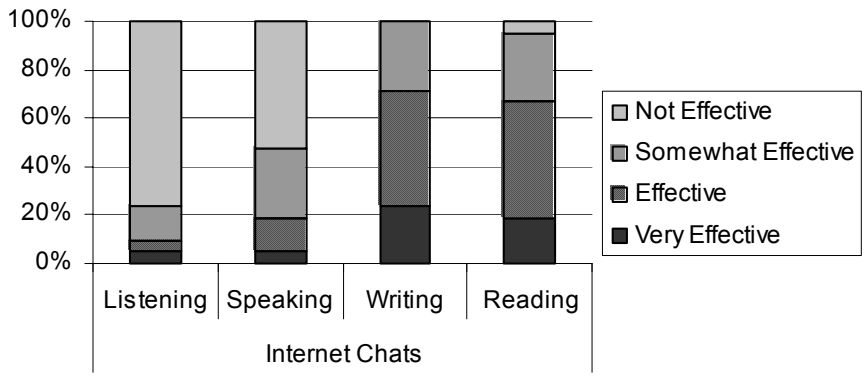

Figure 14. Teachers' Perspectives on Chats on the Internet (N=21)

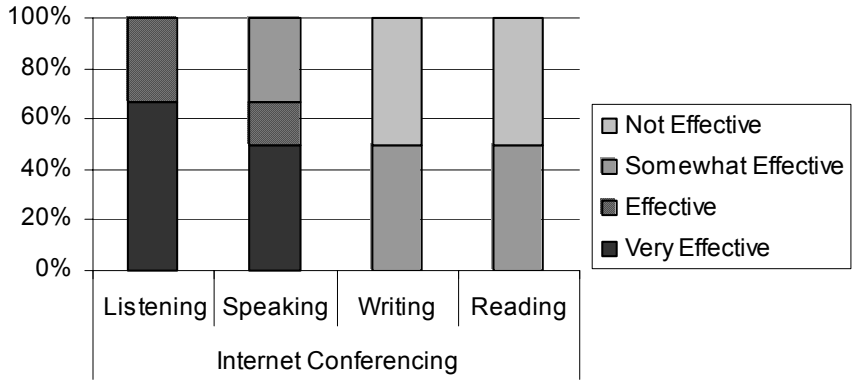

Figure 15. Teachers' Perspectives on Conferencing on the Internet (N=6)

Word-processing was the most frequently used type of technology by the language students. Almost all survey participants who required their students to do this type of activity thought that it was effective for writing; 54.7% (35) of the survey participants reported that it was very effective, and 39.1% (25) answered that it was effective for writing skills (see Figure 16). In addition, 89.1% (54) of them thought that word-processing was effective for reading in some way (26.6% thought it was very effective; 45.3% thought it was effective; and 17.2% thought it was somewhat effective). The majority of the survey participants reported that this type of technology was not effective for the other linguistic skills, listening and speaking.

Almost all of the survey participants who required their students to use electronic presentations reported that this kind of activity was effective for writing and reading skills; all survey participants answered that it was effective for writing in some ways, and

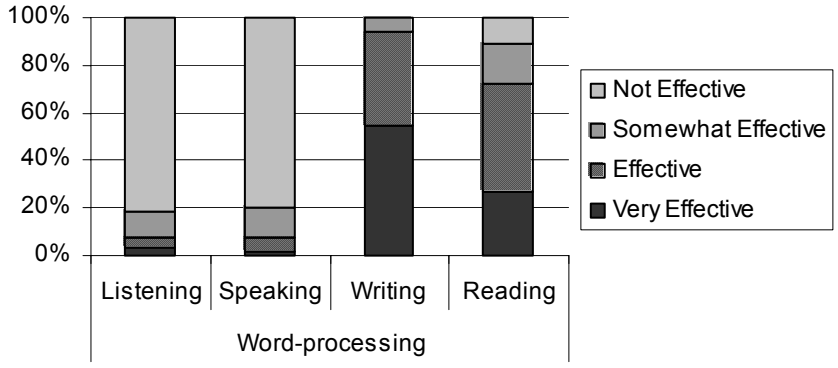

Figure 16. Teachers' Perspectives on Word-processing (N=64)

95% (19) of them answered that it was effective for reading (see Figure 17). Thirteen survey participants (65%) thought that students' presentations using technology could enhance their speaking skills. However, 12 survey participants (60%) thought that this kind of activity was not effective for listening skills.

Technology for desktop publishing (see Figure 18) was not used by many survey participants. However, among those who required their students to use it, they thought it could enhance students' writing and reading skills, just the same as word-processing (see Figure 17). Compared with word-processing, the percentage of the category of *somewhat effective* on desktop publishing was higher than that of word-processing.

The least frequently used technology in this research study was audio-/ video-conferencing using telephone lines, satellites, or site TV networking (N=4). All four survey participants using this type of technology thought that it was effective in some way for listening and speaking skills (see Figure 19). Only one subject (25%) reported that it was somewhat effective for writing and reading skills.

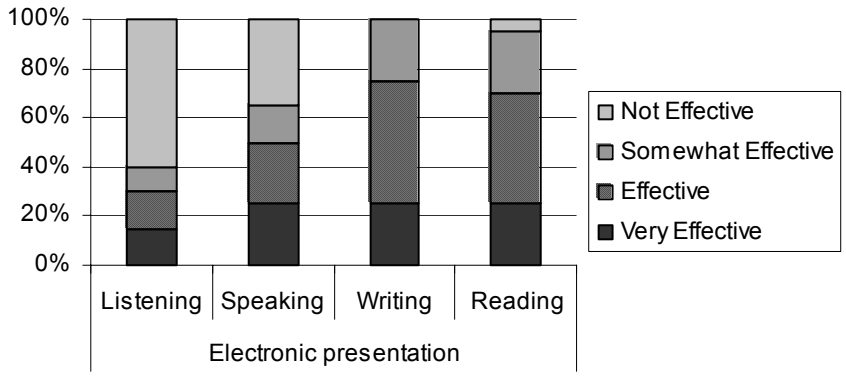

Figure 17. Teachers' Perspectives on Electronic Presentations (N=20)

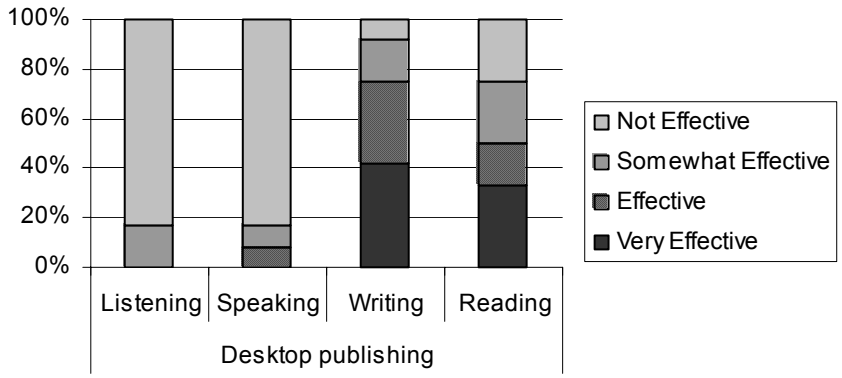

Figure 18. Teachers' Perspectives on Desktop Publishing (N=12)

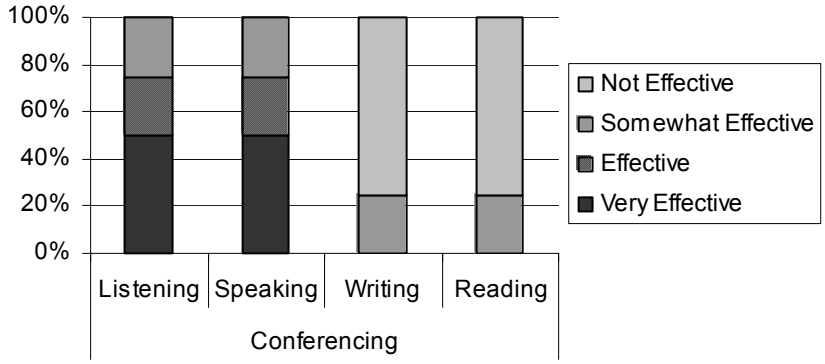

Figure 19. Teachers' Perspectives on Conferencing (N=4)

Differences on Using Technology According to Target Languages

In this section, the differences of usage of technology controlled by the target languages taught will be presented. Due to a limited amount of data collected, the languages were grouped into three main categories: French (N=32), Spanish (N=42), and other less commonly taught languages (N=33). In addition, only six items, which were used by more than 40% of the survey participants, were selected for further analysis in order to identify the differences among the languages: word-processing; spreadsheets/databases; retrieving information from electronic resources; webpage developing; on-line communication; and retrieving information from the Internet.

Overall, the survey participants who taught French used technology the most for their teaching (see Figure 20). About 88% (28 participants) of the French teachers used at least one type of technology; 76.2% (32 participants) of the Spanish teachers used technology, and 69.7% (23 participants) of the other less taught language teachers (including Chinese, Greek, German, Italian, Japanese, Portuguese, and Russian) used technology in their classes.

Figure 21 shows the six most frequently used technology items by the survey participants for their teaching. About 91% (29) of the French teachers in this research reported that they were using technology for word-processing. Thirty Spanish teachers (71.4%, 30 participants) also used it, and other language teachers (66.7%, 22 participants) used word-processing the least frequently.

Technology for on-line communication on the Internet was the second most frequently used item, and the French teachers, again, were using it the most. Sixty-three

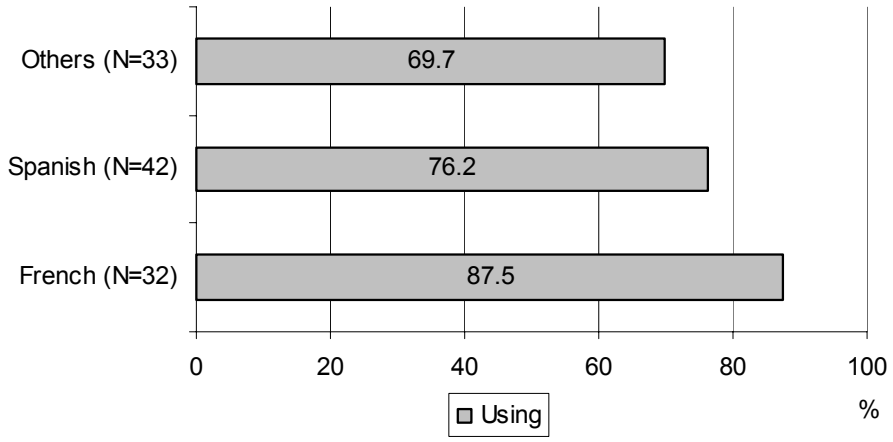

Figure 20. Overall Percentages of Use of Technology Comparing Languages (N=107)

percent (20) of the French teachers used it regularly, and 18.8% (6) of them used it a few times during the semester. Although the total percentage of Spanish teachers who used technology for on-line communication was higher than those who taught other less taught languages, the percentage of Spanish teachers who were regularly using on-line communication with their students was less than that of those who taught other languages.

French teachers used technology for the purpose of retrieving information from the Internet the most (56% used it regularly; 22% barely used it). Spanish teachers were second to French teachers for using it.

The percentage of French teachers who were using technology for retrieving information from electronic resources was the highest among the three categories. About 66% (21) of the French teachers reported retrieving information from electronic resources

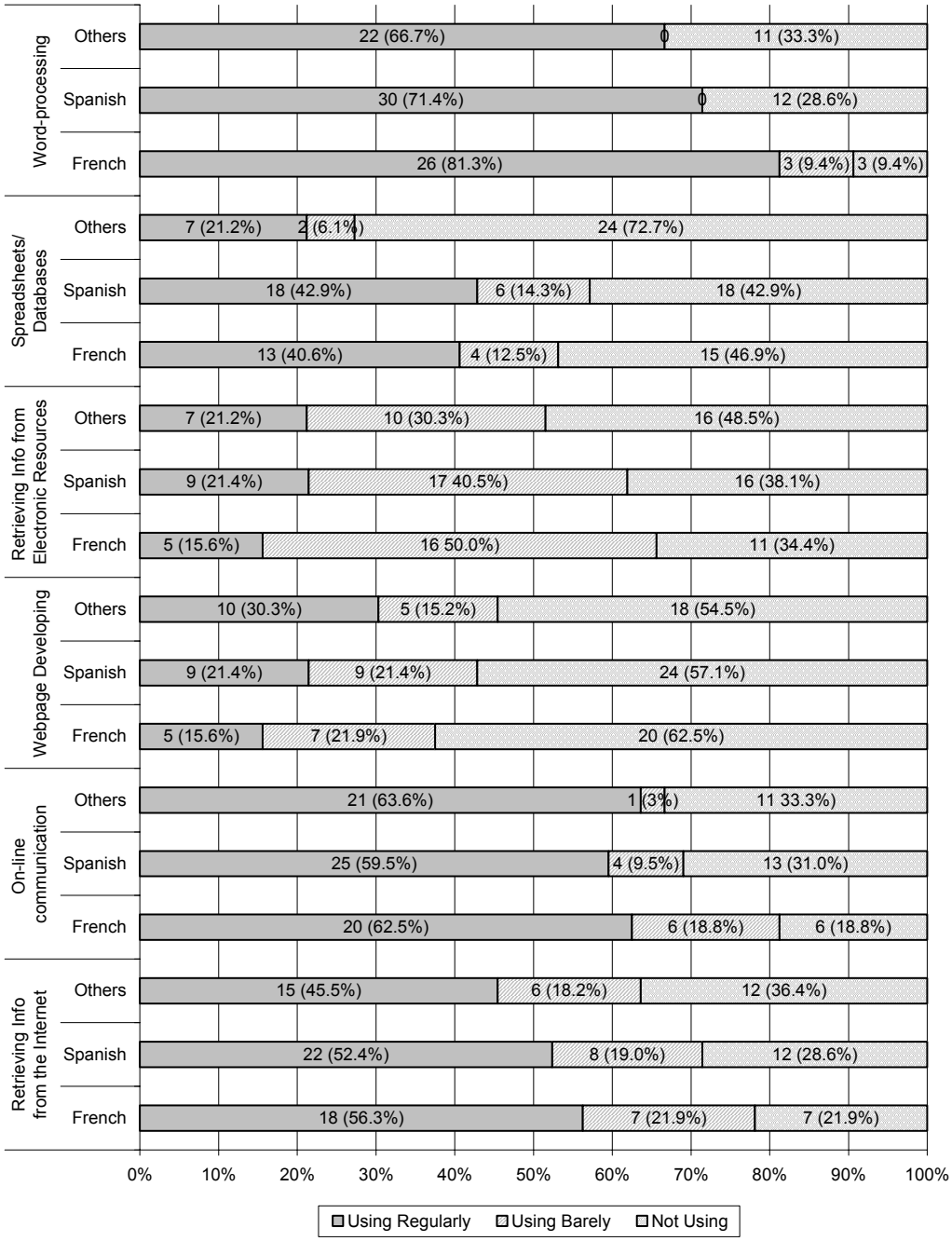

Figure 21. Language Differences of Six of Most Frequently Used Technology Items by Teachers

(i.e., CD-ROMs). The percentage of Spanish teachers who used technology for that purpose (62%; 26 survey participants) was second in rank and higher than those of the other less taught language teachers (52%; 17 survey participants). However, in terms of usage on a regular basis, the percentage of Spanish teachers who used that technology was the highest and that of French teachers was the lowest.

The only category where the Spanish teachers used technology the most among the three language groups was spreadsheets/databases. About 57% (24) of Spanish teachers reported using technology for that purpose, and 53% (17) of the French teachers in this research used it. The percentage of other language teachers (27.2%, 9 participants) who used this kind of technology was low, compared with Spanish.

The only category of technology that the other less taught language teachers used the most was webpage publication. In terms of both regular and occasional usage, the percentage of other less taught language teachers who reported developing their own websites was the highest (45.5%; 15 participants); that of Spanish teachers was second (42.8%; 18 participants), and that of French teachers was the lowest (37.5%; 12 participants).

Differences of Usage of Technology by Survey Participants' Teaching Experience

In this section, the differences of survey participants' usage of technology and their perceptions of students' usage, controlled by the survey participants' teaching experience, will be discussed. Table 14 presents the teaching experience of the survey participants, and Figure 22 and Table 15 show the average number and percentage of survey participants who reported that they use some kind of technology, controlled by the

Table 14

The Number of the Survey Participants Categorized with their Teaching Experience (N=102)

Teaching Experience	0-2 yrs.	3-5 yrs.	6-10 yrs.	10+ yrs.
	16 15.7%	16 15.7%	21 20.6%	49 48.0%

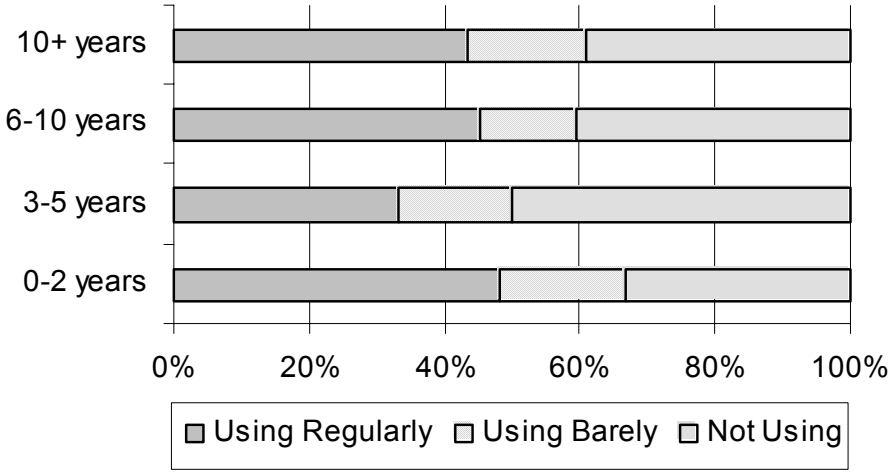

Figure 22. Differences of Usage of Technology Controlled by Survey Participants' Teaching Experience (N=102)

Table 15

Differences of Usage of Technology Controlled by Survey Participants' Teaching Experience (Overall Average, N=102)

	Using Regularly	Using Barely	Not Using
10+ years (N=49)	21.3 (43.5%)	8.5 (17.3%)	19.2 (39.2%)
6-10 years (N=21)	9.5 (45.2%)	3.0 (14.3%)	8.5 (40.5%)
3-5 years (N=16)	5.3 (33.1%)	2.7 (16.9%)	8.0 (50%)
0-2 years (N=16)	7.7 (48.1%)	3.0 (18.8%)	5.3 (33.1%)

years of their teaching experience.

In terms of usage of technology regularly (daily and weekly) and barely (once or twice a month and less than once a month), the percentage of survey participants who had fewer than two years of teaching experience used technology the most (66.9%). The second group who frequently used technology consisted of those who taught languages more than 10 years (60.8%). The least percentage (50.0%) of survey participants who used technology were those who had 3 to 5 years of teaching experience.

The six most frequently used types of technology were selected by the researcher in order to identify the differences of usage of technology, based on the survey participants' teaching experience. These are: retrieving information from the Internet; spreadsheets/databases; webpage development; word-processing; on-line communication; and retrieving information from electronic resources. Figure 23 describes the frequencies of usage for each item, categorized according to years of teaching experience of the survey participants.

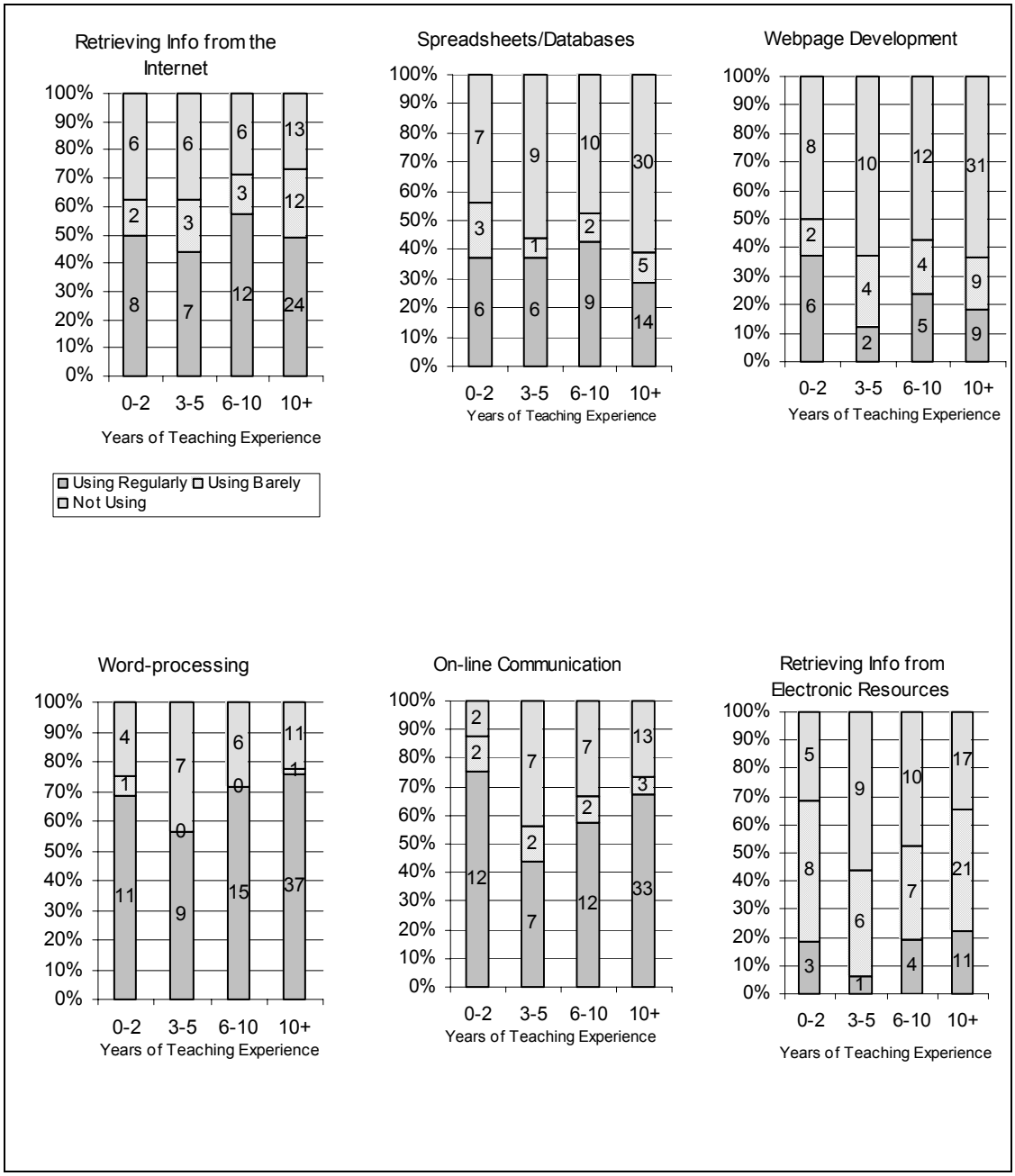

Figure 23. Differences of Usage of Technology Controlled by Survey Participants' Years of Teaching Experience (Six items)

Although the frequency of use of each item differs, there are some common tendencies among them. For example, the survey participants teaching languages for 3 to 5 years tended to use technology the least compared with survey participants having other categories of teaching experience, with the exception of spreadsheets/databases. Those survey participants tended not to use technology for word-processing, on-line communications, and retrieving information from electronic resources. In addition, the survey participants who had more than 10 years of experience tended to use technology for those purposes more than the survey participants who had 3 to 5 years of teaching experience. However, in terms of information retrieval from the Internet, spreadsheets/databases, and webpage development, insufficient data disallowed examination of these types of technology, controlled by years of teaching experience.

Figure 24 shows the differences of teachers' perceptions of their students' technology usage, controlled by years of teaching experience of the survey participants. The five most frequently used types of technology by students were selected for this analysis; they were CALL programs for drill-and-practice; retrieving information from the Internet; e-mail exchanges on the Internet; bulletin boards or listservs on the Internet; and word-processing. The percentages of survey participants who required their students to use CALL programs gradually increased from the less experienced teachers to the more experienced ones. In terms of using technology for retrieving information from the Internet and e-mail exchanges, teachers who had the least amount of teaching experience required their students to use that technology the most. Those teachers with 3-5 years of experience required their students to use technology for information retrieval from the Internet the least. Those teachers with 6-10 years of teaching experience asked their

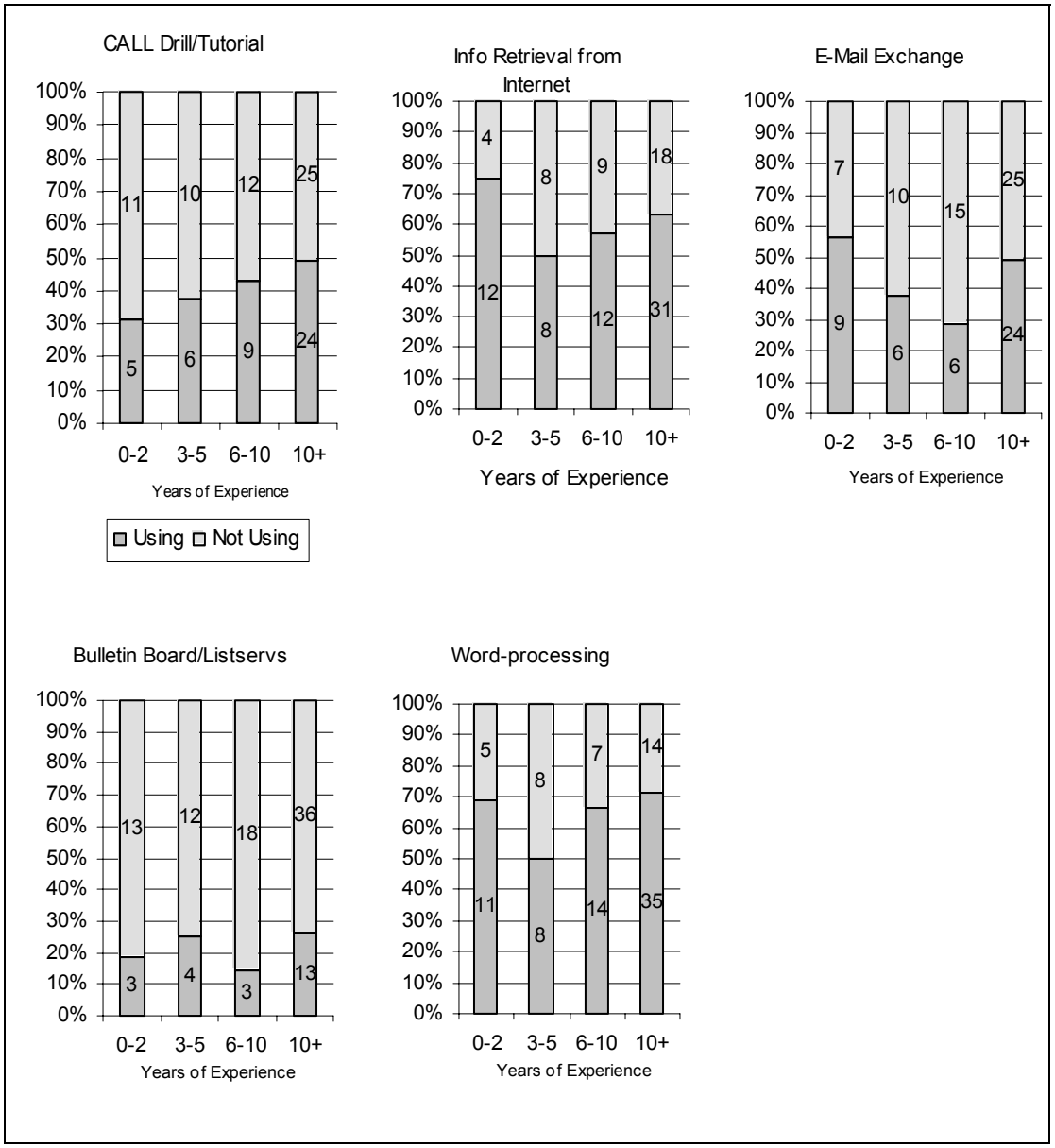

Figure 24. Differences of Teachers' Perspectives for their Students' Usage Controlled by Years of Teaching Experience of Survey Participants

students to use e-mail exchanges the least. Teachers who had more than 10 years of experience required their students to use bulletin boards or listservs the most; those who had taught languages for 6 to 10 years required their students to use them the least.

Therefore, in terms of perceptions of students' usage of technology, there does not appear to be a particular tendency for student technology usage associated with survey participants' number of years of teaching experience. Those who had the least experience tended to required their students to use some specific technology more, but this phenomenon was not applicable to other items of technology.

Relationship between Teachers' Usage and Students' Usage

The last item for analysis from the data collected in this research study was the relationship between teachers' usage and perceived students' usage of technology. Table 16 shows the number and percentages of the same answers and different ones for the questions concerning the use of technology of teachers and students. The four most frequently used types of technology by teachers were selected for this discussion. In terms of using technology for word-processing and retrieving information from the Internet, the survey participants who answered that they were using technology and who also required their students to use technology for the same purpose, and those who did not use it and did not make their student use it, were 68 (87.2%). However, only 10 survey participants (12.8%) answered that they used it for themselves but did not require their students to use it and those who did not use it for themselves but reported that their students used it. The number of survey participants who answered that both they and their students were using on-line communication and who answered both of them were

not using it were 55 (70.5%), and the survey participants who answered differently were 23 (29.5%). The number of survey participants who published their own websites for their teaching and asked their students to do website developing activities, and the survey participants who did not make websites and their student also did not do so, were 48 (61.5%). The number of those who made web pages but did not require their students to have their own web pages, and those who did not make web sites for their teaching but asked their students to do the web site publication activity were 30 (38.5%). In each item, the survey participants who did not use technology for the same purpose, but required their students to use it for the same purpose, were few: less than 4% (0-3.8%, 0-3).

Table 16

The Number and Percentage of the Same Answers and Different Answers for the Use of Technology of Teachers (T) and Students (S)

	Same Answer			Different Answer		
	T & S Both Using	T & S Both Not Using	Total	T Using, S Not Using	T Not Using, S Using	Total
Word-processing	67 (85.9%)	1 (1.3%)	68 (87.2%)	10 (12.8%)	0 (0.0%)	10 (12.8%)
Retrieving Info from Internet	64 (82.1%)	4 (5.1%)	68 (87.2%)	7 (9.0%)	3 (3.8%)	10 (12.8%)
On-line Communication	51 (65.4%)	4 (5.1%)	55 (70.5%)	23 (29.5%)	0 (0.0%)	23 (29.5%)
Website Developing	9 (11.5%)	39 (50.0%)	48 (61.5%)	29 (37.2%)	1 (1.3%)	30 (38.5%)

The percentages of those who used technology for specific purposes and at the same time required their students to use it, and those who did not use it and did not require their students to use it, were relatively higher than that of those who used technology but did not require their students to use it. Therefore, the survey participants who used technology for a specific purpose tended to require their students to use technology for the same purpose (except for website development); and, those who did not use technology, tended not to require their students to use it for the same purpose.

Discussion of the Findings

- What types of computer and networking technology are used in world language education on the post-secondary level by both instructors and students?

In terms of teachers' usage, technology used for word-processing and on-line communication was the most frequently used. Technology for information retrieval from the Internet and electronic resources, spreadsheets/databases, and webpage publication was used by more than 40% of the respondents in this study. This indicates that many teachers were using computers as stand-alone machines (i.e., to make handouts and to manage class work) as well as network devices (i.e., to collect information and to teach and communicate with their students).

The data showed that many of the teachers were incorporating web pages on the Internet into their teaching. On the other hand, taking and manipulating digital images, sounds, and movies were not so popular among the teachers. This means that the websites the teachers made for their classes may have mainly texts; the site pages may not have many visual images and sounds, which could make the webpage valuable for

enhancing not only reading skills but also other language skills such as listening and for conveying more information about culture and nonlinguistic expressions such as gestures. The teachers were using the Internet, but still did so mainly for sending and exchanging written information.

According to the Gray study (1997), the most frequently used computer applications by the modern language students were word-processing, games, and desktop publishing. He mentioned that "electronic mail, teletext, simulations, multimedia and other text manipulation packages were also gaining in popularity" (p. 55). The Moore, Morales, and Carel's study (1998) reported that CD-ROMs were used more than the Internet, both of which were used much less than videos. The two articles were published more than four years ago; the present study showed some different results about using technology. The most frequently used technological devices and applications by the students in this study were word-processing (as reported by Gray) and information retrieval from the Internet. They were used by over 60% of the students, according to teachers' perceptions. The reasons why these two technologies were used by so many students in this study may be that computers and their applications have become available in many languages for not only reading but also writing (input). In addition, networking (i.e., the Internet) has become increasingly popular, and available to many people. Even though CALL programs for drill-and-practice, tutorials, simulations, and educational games were still being used by the students, they were not as popular as activities using networking technology, such as e-mail, bulletin boards, drills, and tutorial activities on the Internet.

The least frequently used technology by students was devices for conferencing: audio- or video-conferencing on the Internet and other types of networking (i.e., telephone lines, ADSL, satellites, and site TVs). These kinds of technology, both of which are used for synchronous communication, were not popular nor used frequently by the language students in this study. This may be because these networking devices are not frequently used by many people at this point, and world language teachers tend to hesitate using them. In addition, using satellite and other high-speed networking systems is expensive, which may be an obstacle for teachers using conferencing devices.

- What are the differences of major languages and other languages taught in universities and colleges in relation to usage of technology?

The present study showed that French teachers tended to use technology in their teaching the most, Spanish teachers tended to incorporate technology second most into their teaching, and other language teachers tended to use it the least. Because of the small sample of these teachers, analysis of the data for this study was not able to identify differences among other languages such as Chinese, German, Greek, Italian, Japanese, and Portuguese.

In the Moore, Morales, and Carel's study (1998), the researchers assumed that Spanish, French, and German teachers would have had higher technology usage than other languages in Texas because of the fact that these three languages were the "most frequently taught foreign languages in the US, and … much more software [had] been developed for these three languages" (p. 116). However, the study revealed that Japanese teachers had higher scores on using technology such as CD-ROMs, videos, videodiscs,

and the Internet than teachers of other languages. That was because, according to the researchers, the teacher training program of Japanese in Texas was very effective and its course involved the use of a computer bulletin service (BBS) in order to communicate with other teachers so that Japanese teachers might transfer the technical skills and knowledge to their own classroom teaching.

The results of this study agreed with the assumption of Moore, Morales, and Carel (1998). That is, overall, French teachers tended to use technology the most, Spanish teachers used it second most, and other language teachers used it the least. In terms of each item of technology in the study, excluding webpage publication, French and Spanish teachers had higher percentages of technology usage than other world language teachers. This may be because, as Moore, Morales, and Carel (1998) mentioned, French and Spanish are more frequently taught in the U.S. and the applications (software) for these languages are more available and accessible than other languages, even though in recent years, more software of many less commonly taught languages has been developed and hardware and OS in computers such as Windows XP have become more friendly with languages other than English and the Germanic languages. In addition, because students enrolled in French and Spanish classes are greater in number than other language classes in the U.S., French and Spanish teachers or departments may have a larger budget to buy items and maintain technological equipment, or, they may have more available time to access computers and computer labs.

- What are the differences of teachers' experience of teaching in relation to usage of technology?

On the whole, years of teaching experience appeared to be a factor in determining how frequently the survey participants used technology in their teaching and asked their students to use it. In terms of incorporating technology into their teaching, the least experienced teachers (0-2 years) generally tended to have the highest percentage of usage. The survey participants who had taught world languages for 3 to 5 years had the lowest percentage of usage, and the survey participants who had taught for more than 10 years had higher percentages of technology usage than the subject groups who had 3-5 and 6-10 years of teaching experience. This tendency was seen in the use of word-processing, on-line communication, and information retrieval from electronic resources. In terms of spreadsheets/databases usage and website creation, the least experienced teachers had the highest percentage of usage, and the most experienced teachers (10+ years) had the lowest percentage of use. The percentages of use of technology for information retrieval from the Internet gradually increased with the increase of years of teaching experience.

According to Moore, Morales, and Carel (1998), the least experienced teachers (0-2 years) tended to have the lowest score on the use of the Internet, videodiscs, and videos. They found that the scores increased along with teachers' experience. The least experienced teachers had the highest score only on the use of CD-ROMs. In this present study, in terms of the use of CD-ROMs (in this study, the category was retrieving information from electronic resources), the result was the same. In the present research study, the least experienced teachers also had the highest percentages of using

spreadsheets/databases, webpage development, and on-line communication. They also got the second highest percentage of using word-processing.

Moore, Morales, and Carel (1998) mentioned that the reason why the least experienced teachers made the highest score of the use of CD-ROMs was "that recent college graduates many be more familiar with some of the newer multimedia facilities than their senior colleagues" (p. 116). Because the survey participants in this study who had the least experience tended to take advantage of technology now available (i.e., spreadsheets/databases, on-line communication, and webpage publication) the data from the present study lent support to the finding of Moore, Morales, and Carel. According to the researchers, this tendency may have occurred because junior level instructors may be more familiar with technology than their senior counterparts.

In the Moore, Morales, and Carel study (1998), the teachers with 6 to 10 years of teaching experience tended to have the highest frequency of use of the Internet, videodiscs, and videos. They stated that those experienced teachers tended to use technology in their teaching because they "[were] able to make conscious choices, set priorities, reflect on performance, and be more inventive" (p. 116). The present study showed that the percentages using technology increased along with years of teachers' experience, except with the least experienced teachers. The data from the present study indicate that in Tennessee, more experienced world language teachers may be aware of current trends of education, especially that of incorporating technology into their teaching.

A finding of the present data which differed from that of the Moore, Morales, and Carel study (1998) was that there appeared to be a difference in the use of the Internet

among world language teachers at post secondary institutions. Although their study described a low use of the Internet in classrooms, the present study showed that retrieving information from the Internet was popular with all teachers, yet, other items of technology usage were not as popular. This may be because the Internet has become very familiar to many people, including language teachers; consequently, they may not hesitate to use the Internet in their teaching.

- It there any relationship between availability of computer and networking technology and its usage?

In terms of availability of technology for students studying world languages, nearly two-thirds of them were able to access the computer lab solely dedicated for language study. Even though the computer lab provides appropriate technology and places for language learning, the students can also access some kinds of technology (i.e., e-mail, chats, and bulletin boards on the Internet) from remote areas including their own homes and other computer labs for general use. Therefore, the majority of the students can access the most popular types of technology for their language learning.

Based on teachers' perceptions, many varieties of technology were available for the students. More than half of the survey participants reported that their students were able to access technologies of computer software (word-processing, spreadsheets, and desktop publishing), CALL programs, and the Internet activities (information retrieval, chats, bulletin boards, e-mail, and tutorials). Availability of technology for word-processing and information retrieval from the Internet had the highest percentages of use among the items in this present research. Thus, the teachers understood that their

students could use software and CALL programs with stand-alone computers and perform networking-related activities with the computer connected with networking in an intranet environment or on the Internet.

However, according to the data gathered and analyzed for the present study, technology for conferencing on the Internet and other types of networking were not available for many students. Even though the students are able to have oral and/or visual interactions easily with others on the Internet if the computer has a speaker and a microphone (computers in the computer lab generally have this equipment and are ready for on-line communications), the survey participants thought that this kind of technology was not available for students. This indicates that some teachers did not even know about the availability of this type of technology and its function on the computers they could access.

In terms of students' technology usage, applications and devices were used by more than 50% of the students in the situations where these kinds of technology consisted of four types: word-processing; information gathering from the Internet; CALL for drill-and-practice; and e-mail exchanging on the Internet. The least used technologies were chats on the Internet, website creation, conferencing in a network (intranet environment), and conferencing on the Internet.

The significant finding from these data was that many world language teachers required their students to use computers as stand-alone devices for learning without having electronic interactions with others. That is, students used computers for word-processing and working with CALL program activities, which can be accomplished with computers without connections to the network. They also required their students to

engage in on-line activities for information retrieval, drills and tutorials, bulletin boards, and e-mail exchanges, which do require a networking connection. Even though information retrieval, bulletin board, and e-mail exchange on the Internet are the part of Computer-Mediated-Communication (CMC), which comes from Sociocognitive approaches, exchanging information via bulletin boards and e-mail is asynchronous. The less used technology, chats and conferencing on the Internet or other types of networking, is for synchronous communication. The latter could increase more learner autonomy and the negotiation of meaning, both of which are advantages for using this technology (Blake, 2001). Some scholars have declared that synchronous CMC, which could create learner-centered discourse, is beneficial for students in the sociocultural theoretical framework (Darhower, 2002). That is, languages could be acquired when learners have meaningful social interaction with other individuals. The teachers in this study tended not to use technology in a synchronous mode, which could "offer students the highest level of interactivity" (Blake, 2001, p. 94); instead, they tended to use technology for asynchronous communication. Therefore, they missed one of the greatest advantages of technology usage, which is that learners can have synchronous interactions within a social context with others who are a great distance away from the language learners.

- Which language skills do teachers want to teach by using specific technology devices?

Many world language teachers who used CALL programs for drills, practices, tutorials, simulations, and games answered that these types of technology could enhance all language skills, including speaking. They thought that students were able to acquire

all linguistic skills by using CALL programs, even though this kind of activity provides simulated communications, that is, human to machine communications, not real negotiation of meaning.

In terms of writing activities using technology (i.e., word-processing and desktop publishing) the language teachers thought that these activities were effective for enhancing students' writing and reading skills, but not listening and speaking skills. On the other hand, around 40-50% of the teachers who used technology for website creation, e-mail exchange, bulletin board usage and chats, thought that these activities could enhance not only writing and reading but also listening and speaking skills although these kinds of technology seem to require only writing and reading skills for learners.

The reasons why the teachers thought writing and reading activities using technology with these above activities could improve listening and speaking skills may be related to the content of the activities. The purposes of these activities are sending and conveying information to others, receiving information from others, and rethinking the same topic and sending information to others again. That is, they may feel that through these activities using technology, the negotiation of meaning - social and cognitive interactions - happens.

In addition, according to Warschauer (1998), writing and reading interactions in cyberspace can provide some benefits that oral communication cannot. For example, learners are able to have more time to understand and think about the content when they are reading and writing; thus, they can monitor what they are doing in the target language whether or not the interaction is synchronous or asynchronous. Warschauer (1998) mentioned: "computer-mediated [reading and writing] interaction not only includes many

of the same interactional modifications that are believed to make oral negotiation beneficial, but because they occur in a written environment, these modifications may be even more beneficial for enhancing language acquisition" (¶ 25). Therefore, the teachers in the present research might notice that the interaction in writing and reading are related to and enhance other language skills, listening and speaking. Therefore, they may have answered differently from other writing activities using technology such as word-processing and desktop publishing.

Chapter Summary

This chapter presented the results of the analysis of the data collected from 102 respondents teaching world languages on the first and second year levels at post-secondary institutions in Tennessee. Chapter IV first described the demographic data, and then discussed teachers' usage and students' usage of computer and networking technology, including its availability for students and actual use in language learning/teaching. Teacher interest in using technology, target skills of languages, and differences of usage of technology, controlled for world language teachers' years of teaching experience and target languages, were also discussed. After presenting and explaining the relationship between teachers' and students' technology usage, this chapter ended with a discussion of the findings.

The following chapter will be the final chapter of this study. Chapter V will present a summary of the study, including its purpose, the literature review, research design, findings, and conclusions of the study. It will also discuss the educational

implications of the present research, as well as provide recommendations for further research.

CHAPTER V

SUMMARIES, CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

Introduction

This is the concluding chapter of this research study. It presents a summary of the study, including its purpose, the review of related literature, methods, procedures, findings, and conclusions. In addition, this chapter discusses the educational implications of the research and provides recommendations for further study.

Summary

Purpose of the Study

As technology has dramatically changed people's lives in many ways, the tidal wave of technology has also come to the educational field and made a great impact on education. Not only the federal government, but also states and local schools, allocate a great amount of money for the installation of technology in schools, including facilitating the Internet in schools. Technology has been rapidly and continually introduced into the world language classroom to teach both the target language and its culture. Although computers have been used in language teaching and learning since the 1960s, since then, technology has been used in many different ways due to the development of multimedia computing and the Internet.

Empirical research in the literature has described various types of technology which could be used for world language education, including concepts, examples, and results of technology usage in the classroom. Despite the number of papers published

about the use of specific technology devices and applications in world language education, limited studies have documented what kinds of technology are actually used and how often they are actually used in the world language classroom. In addition, because the speed of the development of technology has been very rapid, studies of technology usage only a few years ago have become out-of-date. Therefore, a study which takes a general view of the current situation of the use of technology in world language education was needed.

This study investigated what kind of technology the post-secondary language teachers were actually using in the classroom and how often technology was used for language teaching. The target language skills, which teachers using technology wanted to enhance, were also explored. In addition, this study investigated which types of computer technology devices were available for teaching and learning world languages inside and outside of the classroom, and described how much they were actually used.

The research questions discussed in this research were the following:

1. What types of computer and networking technology are used in world language education on the post-secondary level by both instructors and students?
2. What are the differences of major languages and other languages taught in universities and colleges in relation to usage of technology?
3. What are the differences of teachers' experience of teaching in relation to usage of technology?
4. Is there any relationship between availability of computer and networking technology and its usage?

5. Which language skills do teachers want to teach by using specific technology devices?

Review of the Literature

Technology has been used in the educational field for a long time, and the usage of technology in education is called *instructional technology*, whose role is to help teachers and learners design, develop, utilize, manage, and evaluate the processes and resources for learning effectively (AECT, 1999). Thus, technology cannot only enhance the productivity of learners, make them communicate and collaborate with others outside of the classroom, and access an amount of information, but also engage them in critical and cognitive thinking about what they are learning (Janassen, Peck, & Wilson, 1999). There are several acronyms for computer usage in education in order to describe the use of technology. These include, but are not limited to: Computer-Assisted Instruction (CAI), Computer-Assisted Learning (CAL), and CMC or Computer-Mediated Communication (Levy, 1997; Pusack, 1988).

As in the general education field, there are many conceptualizations of computer usage in world language education. The computer has been used for language learning since the 1960s (Warschauer & Healey, 1998). Some researchers roughly divide 40 years of computer usage in the world language classroom into the three main stages: Structural Perspective, Cognitive Perspective, and Sociocognitive Perspective (Lee, 2000; Levy, 1996, 1997; Kern & Warschauer, 2000).

During the 1960s and 70s when the Audiolingual Method (ALM) was the dominant theory in language teaching, CALL was first established in the 1960s, based on

the behaviorist learning model. The computer was seen as a tutor (Warschauer & Healy, 1998), and the computer programs provided learners repeated drill materials of grammar and vocabulary, language testing instruments, and immediate feedback. In the 1970s and 80s, researchers noticed the complicated aspect of language acquisition, after which the focus of language teaching shifted to the needs of individuals. Influenced by Chomsky and Krashen (both of whose theories emphasized learners' mental and cognitive factors on language learning), some new humanistic methods (e.g., Community Language Learning, Total Physical Response, and Communicative Language Teaching) were proposed. CALL programs released during this period focusing on using forms and teaching grammar implicitly (Lee, 2000) and encouraged students to generate original utterances rather than manipulate prefabricated forms. During the 1980s, researchers realized that learners needed to acquire not only communicative competence but also sociolinguistic, discourse, and strategic competences. Language teachers emphasized learner-centered, task-based, project-based, and content-based teaching and learning in the language classroom. In terms of technology, the Internet has become very popular and user-friendly with easy and inexpensive access. It also facilitated access to varieties of interaction with other people via computers. Based on the concept of Network-based Language Teaching (NLT), the Internet has become a useful vehicle for language acquisition. Computer-mediated communication (CMC) and globally-linked hypertext (World Wide Web) are able to provide autonomy and dynamics in the language learning process, networked learning environment, authentic materials, and experiential learning.

Although technology helps both teachers and students to teach and learn languages, there are several possible disadvantages: financial barriers, difficulty of

accessibility to computer hardware and software, lack of technical and theoretical knowledge of technology usage, and difficulty of acceptance of the technology (Lee, 2000).

Technology has been used in various ways to teach and learn world languages. Recently, CALL programs, using CD-ROMs or floppy diskettes, provide activities for listening, speaking, reading, writing, games, gap-filling, simulation, text reconstruction, tutorials, and logical thinking. CALL software enables learners to engage in many activities, which can enhance their language skills in the closed environment, that is, through communication with computers. Through the Internet, students are able to collect information, perform drills and practice activities, retrieve tutorial lessons, exchange e-mails, chat, write on bulletin boards, and engage in audio/video conferencing. The Internet provides not only asynchronous communications but also synchronous communications. Technology for word-processing enables learners to write, edit, revise, and manipulate words and texts much more easily than would be possible with just pen and paper. In addition, current word-processing software has *comment functions* with text or voice; thus, teachers can electronically give students comments on their writing. Using presentation software, students are able to present their project work in front of other learners in the classroom. Desktop publishing software helps students make sophisticated documents easily; using software, computers, and printers, students can create and publish a yearbook, journal, newsletter, portfolio, and/or brochure in the target language. Telecommunication systems (i.e., the telephone line, ADSL, fiber cables, satellite, site TV networking for audio- and video-conferencing), can be used effectively

for language education. Students are able to communicate with teachers, other learners, or native speakers of the target languages via technological networking.

Much research about specific technology usage in school has been conducted, although there are only a few research studies investigating what types of technology are actually used in the field of world language teaching. In Gray's study (1997), the most commonly used types of technology were word-processing, games, and desktop publishing for illustrating and enhancing written work. The most popular activities using technology were learning vocabulary and producing written work. The study revealed that some of the teachers claimed that they did not have enough hardware, software, trained personnel, and a school/department policy for technology usage.

Another research study investigating usage of technology in the world language classroom was conducted by Moore, Morales, and Carel (1998). Their study revealed that teachers with advanced degrees and in urban institutions tended to use technology for teaching culture in world language courses. In addition, teachers who had the least years of teaching experience and the most years of experience used technology more than other groups of teachers. The research study showed that Japanese teachers used technology more frequently than did other language teachers. In addition, many teachers used videocassette materials for teaching; the videocassette player/recorder was the most often utilized equipment. Some teachers used CD-ROM to reinforce grammar, vocabulary, or pronunciation, and to conduct research using an encyclopedia CD-ROM. However, the researchers concluded that the use of technological facilities for teaching foreign culture was minimal.

Methods and Procedures

The survey participants in this present study consisted of post-secondary teachers of world languages (excluding English) who taught first and second year levels in Tennessee during the spring semester, 2002. The potential total number of survey participants in this research was 285; 121 (42.5%) responded. Among these respondents, only data collected from 102 (35.8%) survey participants could be used for further analysis in this study since 19 did not complete the survey. The universities and colleges where the survey participants were working were all public and private four-year institutions which offered world languages in Tennessee. The total number of universities and colleges participating in the study was 24.

The instrument used for this research was an original survey designed by the researcher of this study. The first section of the survey elicited demographic data, including: the language being taught; duration of teaching experience; the native language of the survey participants; the type of courses the survey participants teach; and information about available computer labs. The second section of the instrument asked the survey participants about their own usage of computer/networking technology for teaching the target language. The third section of the instrument asked the survey participants to report on perceived students' usage of computer/networking technology for second language learning, both inside and outside of the classroom. The last section of the instrument asked for teachers' perceptions concerning to what degree language skills (listening, speaking, writing, and reading) in the target language could be enhanced by using computer/networking technology.

After being submitted for review and approval by the department review committee (DRC) for research projects involving human survey participants at The University of Tennessee, Knoxville, the survey was piloted with 10 teachers who taught second languages or who taught prospective teachers of languages in the U.S. and Japan in order to verify the clarity of the instrument.

The potential subject institutions were drawn from universities and colleges listed on the web site of The Tennessee Foreign Language Teaching Association (TFLTA, 2001). The researcher then contacted the department heads or secretaries of world language education at these universities and colleges and asked them to identify the instructors who were teaching world languages at first and/or second year level in their respective departments. Then, the researcher sent the questionnaire with the cover letter and a self-addressed stamped return envelope to each language teacher. To ensure the highest return rate possible, a reminder postcard was sent out two weeks after the first survey package was mailed to those who had not yet returned the survey. Then, a second package with a revised cover letter, survey, and return envelope, was distributed three weeks after the first survey package was mailed.

Findings

According to the survey, 78 survey participants (72.9%) reported that they had at least one computer lab dedicated solely to teach languages in their departments or universities, and 51 survey participants (65.4%) were actually using the facility to teach world languages at their institutions. The average number of computers in the computer labs at each subject institution was 19.5, and the mean class size in this study was 18.2;

the number of computers in the computer labs was reported as being adequate for the students.

The research study revealed that 78 survey participants (76.6%) used at least one item of technology in their teaching. In terms of teachers' usage, word-processing was the most frequently used types of technology by the survey participants. Technology for on-line communication and information retrieval from the Internet (both of which are considered as networking technology), was also used frequently. Over half of the survey participants reported using electronic resources to retrieve information for their teaching; however, more than half of those survey participants did not use them regularly. The next frequently used types of technology included spreadsheets/databases and websites publication. Retrieving and manipulating digital pictures and movies, using digital cameras, scanners, and application software, was not popular among the survey participants. About one-fourth of the survey participants reported that they used multimedia presentations and desktop publication. The least used technology applications or devices in this study were authoring/multimedia programs.

Many language teachers in Tennessee had a variety of technology available for their students. The survey participants reported that almost all students could access technology for word-processing in the target language and for information retrieval from the Internet. The least available technology reported was audio-/video- conferencing, using telephone lines and other high-speed networking.

According to the survey participants' perceptions, the most highly used technology by the students was the one for word-processing. The order of technology from frequently used to barely used was the following: information retrieval from the

Internet; CALL programs for drills/tutorials; e-mail exchange; drills/tutorials on the Internet; bulletin boards; CALL programs for simulation/games; electronic presentations; desktop publishing; chats; website publication; conferencing on the Internet; and conferencing using telephone lines and other high-speed networking.

The research study revealed that even if specific technology items were available for students, not all teachers required their student to use them. Over 86% of the survey participants required their students to use technology for word-processing and information retrieval from the Internet when it was available, but only 11% of the survey participants required their students to use technology for conferencing when it was available.

Technology items which the survey participants did not use but wanted to use for their teaching were CALL programs, information retrieval from the Internet, drill and tutorial activities on the Internet, bulletin boards, and word-processing. On the other hand, technology applications and devices which were not considered for use by the survey participants were website publications, chats, conferencing on a network, electronic presentations, and desktop publishing.

According to this research, many teachers thought that CALL programs for both drill-and-practice/tutorials and simulations/educational games were effective for all language skills. The survey participants using the Internet for information collection reported that they thought it was very effective for reading skills but not effective for listening and speaking skills. The survey participants who used the Internet for drill-and-practice and tutorials answered that it was effective for reading and writing, and many of them also thought it was effective in some ways for listening and speaking. The survey

participants who made their students publish websites thought that this activity was effective for writing and reading skills. The survey participants making their students exchange e-mails, chat, and write on the bulletin board reported that they thought that these activities were very effective for reading and writing skills but only somewhat effective for listening and speaking skills. The survey participants using conferencing technology clearly reported that it was effective or very effective for listening and speaking skills; on the other hand, the survey participants using technology for word-processing, electronic presentations, and desktop publishing, thought that they were effective only for writing and reading skills.

In this study, overall, the survey participants who taught French used technology the most for their teaching. Spanish teachers followed next, and other language teacher group used technology in their classes the least. Among technology for information retrieval from the Internet or electronic resources, on-line communication, webpage developing, spreadsheets/databases, and word-processing, the only category where Spanish teachers used technology the most was spreadsheet/databases. In addition, the only category of technology that other language teachers used the most was webpage publication.

The research study revealed that the survey participants who had the least number of years of teaching experience tended to use technology the most. The second group who frequently used technology consisted of those who taught languages more than 10 years. The smallest percentage of the number of survey participants who used technology consisted of those who had 3 to 5 years of teaching experience.

In terms of the relationship between teachers' usage and students' usage of technology, the percentages of those who used technology for specific purposes, and at the same time asked their students to use it, and those who did not use it, and did not ask their students to use it, were much higher than that of those who used technology but did not make their students use it. Therefore, the survey participants who used technology for a specific purpose tended to make their students use technology for the same purpose; and, those who did not use technology tended not to make their students use it for the same purposes.

Conclusions

The findings of the research indicated that many Tennessee post-secondary world language teachers incorporated technological application and devices into their teaching which they thought were effective for language acquisition. However, the study also revealed that some teachers had never used technology for their teaching. There were also language teachers who wanted to use some kind of technology but did not actually use it. The following are some specific conclusions which answer the five research questions posed in this study:

- In terms of teachers' usage, technology for word-processing and on-line communication was the most frequently used. Technology for information retrieval from the Internet and electronic resources, spreadsheets/databases, and webpage publication, was used by more than 40% of the respondents in this study. This indicates that many teachers were using computers in a network to collect information and to teach and communicate with their students. Many of the

teachers were incorporating web pages on the Internet into their teaching. On the other hand, taking and manipulating digital images, sounds, and movies were not so popular among the teachers. This means that the websites the teachers made for their classes tended to have mainly text. The most frequently used technological devices and applications by the students in this study were word-processing and information retrieval from the Internet. In addition, activities on the Internet were frequently performed by the students. The least frequently used technology by students was devices for conferencing: audio- or video-conferencing on the Internet and other types of networking (i.e., telephone lines, satellites, and site TVs).

- French teachers tended to use technology in their teaching the most, Spanish teachers tended to incorporate technology second most, and other less taught language teachers tended to use it the least. Because of a small sample for these teachers, analysis of the data for this study was not able to identify differences among other languages (i.e., Chinese, German, Greek, Italian, Japanese, and Portuguese). This result might be related to the fact that French and Spanish applications (software) for these languages are more available and accessible than in other languages, students enrolled in French and Spanish classes are greater in number than other language classes in the U.S., and/or French and Spanish teachers or departments may have a larger budget to buy items and maintain technological equipment than other language teachers or departments.
- In terms of incorporating technology into world language teaching, the least experienced teachers (0-2 years) generally tended to have the highest percentage of usage. The reason why the least experienced teachers used technology more that

those with more experience may be that junior level instructors are more familiar with technology than their senior counterparts. The survey participants who had taught world languages for 3 to 5 years had the lowest percentage of usage, and those who had taught for more than 10 years had a higher percentages of technology usage than the subject groups who had 3-5 and 6-10 years of teaching experience. This tendency was seen in the use of word-processing, on-line communication, and information retrieval from electronic resources. The reason why more experienced world language teachers excluding the least experienced teachers tend to use technology may be that they are aware of current trends of education, especially that of incorporating technology into their teaching. In terms of spreadsheet/database usage and website creation, the least experienced teachers had the highest percentage of usage, and the most experienced teachers (10+ years) had the lowest percentage of use. The percentages of use of technology for information retrieval from the Internet gradually increased proportionally with the increase of years of teaching experience of the survey participants.

- In terms of availability of technology for students studying world languages, nearly two-thirds of them were able to access the computer lab solely dedicated for language study. Based on teachers' perceptions, many varieties of technology were available for the students. More than half of the survey participants reported that their students were able to access technologies of computer software (i.e., word-processing, spreadsheets, and desktop publishing), CALL programs, and the Internet activities (e.g., information retrieval, chats, bulletin boards, e-mail, and tutorials). Availability of technology for word-processing and information retrieval

from the Internet had the highest percentages of use among the items in this present research. However, many survey participants reported that technology for conferencing on the Internet and other types of networking were not available for many students. In terms of students' technology usage, applications and devices which were used by more than 50% of the students, consisted of four types: word-processing, information gathering from the Internet, CALL for drill-and-practice, and e-mail exchanging on the Internet. The least used technologies were chats on the Internet, website creation, conferencing in a network (intranet environment), and conferencing on the Internet. The research reveals that many world language teachers tended to make their students use computers as stand-alone devices for learning without having interactions with others. In addition, survey participants tended to make their students engage in communication activities using bulletin boards and e-mail exchange (an asynchronous mode) rather than chats and conferencing on the Internet or other types of networking communication (a synchronous mode).

- Many world language teachers who used CALL programs for drills, practice, tutorials, simulations, and games, reported that these types of technology could enhance all language skills, including speaking. In terms of writing activities using technology (i.e., word-processing and desktop publishing), the language teachers thought that these activities were effective for enhancing students' writing and reading skills, but not listening and speaking skills. On the other hand, approximately 40-50% of the teachers who used technology for website creation, e-mail exchange, bulletin board usage, and chats, thought that these activities could

enhance not only writing and reading but also listening and speaking skills. The reasons why the teachers thought writing and reading activities using technology with these activities could improve listening and speaking skills may be related to the content of the activities which are, in turn, related to the negotiation of meaning (social and cognitive interactions). In addition, world language teachers in the research study noticed that the interaction in writing and reading is related to and could enhance the other language skills of listening and speaking.

Educational Implications

This research revealed that many world language teachers in Tennessee were incorporating some types of computer and networking technology into their teaching; however, their use was very limited and consisted mainly of word-processing and using the Internet for information retrieval. In addition, many of the teachers still had not used technology and did not even have interest in using it.

One of the reasons why the teachers were able to access various types of technology but they did not use them for their teaching could be that they may not know that technology has such great potential for second language acquisition. Although the teachers (survey participants) had different opinions and teaching opinions, they need to realize the potential of technology and try to use it in their language classes. Many researchers have been claiming that technology could be used in various ways in second language teaching and that it could provide what traditional class instruction cannot do. Technology could therefore provide an alternative pathway to knowledge; "[the use of technology]… is about encouraging students to leave behind the notion that learning

means rote memorization. It is about exploration and the realization that there are multiple pathways to knowledge" (Armstrong & Yetter-Vassot, 1994, p. 483). For instance, students can access varieties of electronic language-centered resources of a target language and its culture whenever they want, wherever they are; they can also *meet* other students or native speakers electronically. In addition, many teachers actually have currently used some kinds of technology at this point, and they reported that it was effective for teaching/learning. Thus, all world language teachers need to at least investigate what kind of technology could be used in their own teaching; "we suggest sensible exploitation of the existing quality material and with it, its great didactic and research potential" (Broncano & Ribeiro, 1999, p. 21). Because computers and computer labs have been made available at almost all post-secondary institutions, teachers of world languages should not avoid investigating new computer and networking materials but try to integrate them into the language curricula. Although many world language teachers in this research study reported that they did not have an interest in using specific kinds of technology, these teachers still need to make themselves aware of available technology used for teaching languages.

Another reason why many of the survey participants used limited technology may be that they did not have enough training for technology use. Results of the present study revealed that many teachers answered that they wanted to use it but they were not actually using it; this indicates that many of the teachers do not know how to use it, even though they think technology could be useful and effective in their teaching and students' learning. In addition, this study showed that there was a relationship between teachers' and students' use of technology; this leads to the fact that if teachers actively use

technology in their work, their students are able to have more opportunities to use it in their language learning. Therefore, the educational institutions and organizations should provide opportunities to teach teachers how to use technology for language teaching and learning, such as workshops or conferences. In addition, the research study confirmed that the least experienced teachers tended to use technology more than teachers having more teaching experience; this may indicate that the least experienced teachers do not hesitate using technology because they may have more familiarity of technology. They may have also learned about the theories and practices of instructional technology in their respective teacher-preparing courses where they completed their terminal degrees. On the other hand, according to the Butter-Pascoe's study (1997), as of 1995, only 25% of the TESOL (Teaching English as a Second Language) master's programs out of 109 programs in the U.S. offered method courses that provided teachers with the skills to integrate technology into their teaching. Therefore, based on the results of the present study, post-secondary institutions should be urged to provide effective training to all teachers (both new and seasoned professional educators) for the integration of technology into world language instruction.

As mentioned above, technology can provide students what traditional language classes cannot do; for example, asynchronous and synchronous communications in cyberspace could lead student-centered interactions. In addition, some researchers claim that specific technology could enhance all language skills; writing activities using word-processing could enhance not only writing skills but also speaking skills (Blake, 2001). Because new technology has been emerging, new applications in education are always needed. Therefore, educational researchers, including world language teachers, should be

encouraged to learn to use technology effectively and integrate it into their teaching in order to provide their students with a new way of studying which will be effective, interesting, dynamic, and exciting.

Recommendations

This research examined the availability and actual usage of computer and networking technology in the post-secondary world language classroom in Tennessee. The linguistic target skills, which teachers using technology wanted to enhance, were also explored. In this descriptive study, the five specific research questions regarding the use of computer and networking technology and teachers' perspectives for target language skills were answered. Nevertheless, the following studies and recommendations are made:

In this research study, only survey participants in Tennessee were studied. Even though the population of this study included almost all post-secondary teachers who were teaching world languages in the state (so that the study was able to describe the use of computer technology for language institutions in Tennessee), the number of survey participants was relatively small. Of a potential grand population of 285, only 121 survey participants returned the questionnaire. As a result of this limited number, the principal investigator was not able to analyze the data controlled for each target language, each technological item, and levels of teaching experience of the survey participants. Also, due to the small number of survey participants, additional statistical data analyses (i.e., ANOVA and Chi Square) could not be conducted. In order to better examine technology usage, controlled by factors such as languages and kinds of technology, and be able to

generalize the results to a greater population, this study should be replicated with a larger population, including all world language teachers from all levels of instruction, from land grant universities and colleges in all states in the U.S.

Furthermore, since fewer than 50% of the survey participants responded, it cannot be said with any certainty that their responses truly represent the target population. In order to increase the potential number of survey participants in the future, it is recommended that the survey package be sent out to the participants earlier in the semester (e.g., September/October or February/March). In addition, a more refined and easier-to-answer survey should be conducted. Data could be collected via a website and/or e-mail.

The present study examined the use of computer/networking technology and the enhancement of linguistic skills by using technology from the perspectives and perceptions of the survey participants, teachers of world languages. That is, all information collected from the study was from a teacher's point of view. Although the information clearly described the teachers' use of technology and their expectations toward learning language skills, the students' usage and their expectations were not investigated in this study. In the future, the researcher could investigate actual students' usage of computer and networking technology and their own perspectives toward using it by asking the students themselves.

This research was conducted during the spring semester, 2002, thus, the researcher was only able to describe the use of computer/networking technology at that point. As mentioned before, technology has been developing and will evolve rapidly and continuously. Even though the conferencing using the Internet was not popular in

language learning/teaching in this study, it could be used more frequently in a few years. Therefore, this kind of study should be conducted intermittently to investigate the states of usage of technology, the effectiveness use of it, and the users' conceptualization toward second language learning and use of technology.

Lastly, a comprehensive qualitative study could be designed and conducted in order to interview world language teachers and their students, regarding all aspects of using different types of computer technology for teaching and learning a second language in the post-secondary language arena.

Chapter Summary

This chapter presented a summary of the study, including its purpose, the review of related literature, methods and procedures, findings, and conclusions. In addition, the educational implications of the research were discussed, and recommendations for further study were provided. This is the concluding chapter of the study. Following it are a list of references and appendices, including the cover letters mailed to the survey participants in the study, the questionnaires used in the study, and the descriptive figures and tables related to the discussion presented in Chapter IV.

REFERENCES

Ahmad, K., Corbett, G., Rogers, M., & Sussex, R. (1985). *Computers, language learning and language teaching*. Cambridge: Cambridge University Press.

Armstrong, K. M., & Yetter-Vassot, C. (1994). Transforming teaching through technology. *Foreign Language Annals, 27, 4*, 475-486.

Asher, J.J. (1977). *Learning another language through actions: The complete teachers' guidebook*. Los Gatos, CA: Sky Oak Publication.

Association for Educational Communications and Technology. (1997). *The definition of educational technology*. Washington, DC: AECT.

Bisesnbach-Lucas, S., & Weasenforth, D. (2001). E-mail and word processing in the ESL classroom: How the medium affects the message. *Language Learning & Technology*, *5*, 135-165.

Brammerts, H. (1995). *Language learning in Tandem*. Retrieved October 5th, 2001, from http://www.slf.ruhr-uni-bochum.de

Barson, J., Frommer, J., & Schwartz, M. (1993). Foreign language learning using e-mail in a task-oriented perspective: Interuniversity experiments in communication and collaboration. *Journal of Science Education and Technology*, *2*, 565-84.

Blake, Robert (2001). What language professionals need to know about technology. *ADFL Bulletin, 1, 32*, 93-99

Brett, P. A. (1997). *Multimedia applications for language learning - what are they and how effective are they*. Retrieved February 7th, 2001, from http://pers-www.wlv.ac.uk/~le1969/art3.htm

Broncano, B. & Ribeiro, M. (1999). The shaper of the future: Computers and

multimedia resources in the teaching of Portuguese as a foreign language and culture. *ReCall, 11, 3*, 13-24.

Bush, M. D. (1996). Introduction: Technology-enhanced language learning. In M. D. Bush (Eds.), *Technology-enhanced language learning*. Chicago: NTC/Contemporary Publishing Group.

Butler-Pascoe, M. E. (1997). Technology and second language learners: The promise and the challenge ahead. *American Language Review, 1, 3*, 20-22.

Cattagni, A., & Farris, E. (2001). *Internet access in the U.S. public schools and classroom: 1994-2000*. U.S. Department of Education, Office of Educational Research and Improvement.

Claybourne, T. (1999). The status of ESL, foreign language and technology. *Media & Methods*, *1*, 6-13.

Crook, C. (1994). *Computers and the collaborative experience of learning*. London: Routledge.

Dillman, D. A. (1978). *Mail and telephone surveys*. New York: A Wiley-Interscience Publication.

Darhower, Mark. (2002). Interactional features of synchronous computer-mediated communication in the intermediate L2 class: A sociocultural case study. *CALICO Journal, 19, 2*, 249-277

E-Republic, Inc. (1996). Schools confront Internet costs. Retrieved January 23rd, 2002, from http://www.govtech.net/magazine/gt/1996/july/cvr1july/cvr1july.phtml

The Georgia Public Telecommunications Commission. (1996). *Irasshai: Welcome*

to Japanese. Retrieved October 10th, 2001, from http://www.peachstar.org/irasshai/

Glennan, T. K., & Melmed, A. (1996). *Fostering the use of educational technology: Elements of a national strategy*. Retrieved August 20th, 2001, from http://www.rand.org/publications/MR/MR682/contents.html

Gray, C. (1997). IT in the West Midlands - facts and views. *Language Learning Journal, 15*, 52-59.

Hass, C. (1988). *Writing medium shapes the writing process: Effects of word processing on planning*. Pittsburgh: Carnegie Mellon University.

Heinich, R., Molenda, M., Russell, J., & Smaldino, S.. (1999). *Instructional media and technologies for learning* (6th ed.). Upper Saddle River, NJ: Mervill.

Holmes, J. (1992). *An introduction to sociolinguistics*. New York: Addison Wesley Longman Inc.

Jarvis, H. (2000). The changing role of computers in language teaching and the case for 'study skills'. *Modern English Teacher, 9 (1),* 62-68.

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

Jones, C., & Fortescue, S. (1987). *Using computers in the language classroom*. London: Longman.

Kano, Y. (2001). *Integration of Japanese classes with ESL or EFL classrooms on and off campus: Global virtual university course*. Paper presented at the Southeastern Association of Teachers of Japanese, Raleigh, NC.

Kenning, M. M., & Kenning, M., J. (1990). *Computers and language leaning: Current*

theory and practice. New York: Ellis Horwood.

Kern, R., & Warschauer, M. (2000). Introduction: Theory and practice of network-based language teaching. In M. Warschauer & R. Kern (Eds.), *Network-based language teaching: Concept and practice*. Cambridge: Cambridge University Press.

Kinginger, C. (1998). Videoconferencing as access to spoken French. *Canadian Modern Journal*, *82*, 468-489.

Lafford, P. A., & Lafford, B. A. (1997). Learning Language and Culture with Internet Technologies. In M. D. Bush (Eds.), *Technology-enhanced language learning* (pp. 215-262). Lincolnwood: National Textbook Company.

Larsen-Freeman. (1986). *Techniques and principles in language teaching*. Oxford: Oxford University Press.

Lee, K. (2000). English teachers' barriers to the use of computer-assisted language learning.[Electronic version]. *The Internet TESL Journal*.

Leh, A. S. (1997). *Electronic mail in foreign language learning: Communication and culture*. Paper presented at the National convention of the association for educational communications and technology, Albuqueruque, NM.

Levy, M. (1997). *Computer-assisted language learning*. Oxford: Oxford University Press.

Longman dictionary of American English. (1983). White Plains, N.Y.: Longman.

Montgomery County Public Schools. (1998). An educator's guide to evaluating the use of technology in schools and classrooms. Retrieved August 17th, 2001, from http://www.ed.gov/pubs/EdTechGuide/appc-8.html

Moore, Z., Morales, B., & Carel, S. (1998). Technology and teaching culture: Results of a State survey of foreign language teachers. *CALICO, 15*, 109-128.

Pawling, E. (1999). Modern language and CD-ROM-based learning. *British Journal of Educational Technology*, *30*, 163-175.

Pellettieri, J. (2000). Negotiation in cyberspace. In M. Warschauer & R. Kern (Eds.), *Network-based language teaching: Concepts and practice* (pp. 59-86). Cambridge: Cambridge University Press.

Peterson, M. (1997). Language teaching and networking. *System*, *25,* 29-37.

Phillips, M. (1987). Potential paradigms and possible problems for CALL. *System, 15*, 275-287.

Pusack, J. (1983). Answer-processing and error correction in foreign language. *System, 11,* 53-64.

Richards, J. C., & Rodgers, T. S. (1986). *Approaches and methods in language learning*. Cambridge: Cambridge University Press.

Riggenbach, H., & Lazaraton, A. (1991). In M Celce-Murcia (Eds.), *Teaching English as a second or foreign language* (pp125-136). Boston: Heinle & Heinle Publishers.

Salem-Keizer School District Technology Survey. (1991). Retrieved August 17th, 2001, from http://www.nsba.org/sbot/tookit/sksdts.html

Singhal, M. (1997). The Internet and foreign language education: Benefits and challenges. [Electronic version]. *The Internet TESL Journal, 3*, *6*.

Shuman, J. E. (1998). *Multimedia in Action*. Belmont, CA: International Thompson Publishing Inc.

Survey on IT Application in the Teaching & Learning of Japanese Language. (2001).

Kaigai no nihongo kyouiku to konpuuta [Overseas Japanese language education and computers], 48-53.

The Tennessee Foreign Language Teaching Association (2001). *Foreign Languages at Tennessee Colleges.* Retrieved March 28th, 2002, from http://www.utm.edu/departments/french/tnhighfl.html

Underwood, J. H. (1984). *Linguistics, computers, and the language teacher: a communicative approach*. Rowley, Massachusetts: Newbury House Publication.

Towell, R., & Hawkins, R. (1994). *Approaches to second language acquisition*. Bristol, UK: Multilingual Matters.

Warschauer, M., & Healey, D. (1998). Computers and language learning: An overview. *Language Teaching, 31*, 57-71.

Warschauer, M. (1998). *Interaction, negotiation, and computer-mediated learning*. Retrieved February 2nd, 2002, from http://www.insa-lyon.fr/Departments/CDRL/interaction.html

Wyatt, D. H. (1984). *Computer-assisted language instruction*. Oxford: Pergamon.

APPENDICES

Appendix A: Form A to the Department Review Committee (DRC)

Form A

IRB# _____

Certification for Exemption from IRB Review for Research Involving Human Subjects

---

A. PRINCIPAL INVESTIGATOR(s) and /or CO=PI(s):
Satoshi Hashimoto Dr. Patricia Davis-Wiley

B. DEPARTMENT / UNIT:
College of Education, World Languages / ESL Education

C. COMPLETE MAILING ADDRESS AND PHONE NUMBER OF PI(s) and CO-PI(s):

Satoshi Hashimoto
3500 Sutherland Ave. H-213
Knoxville, TN 37919
(865) 384-3854
shashimo@utk.edu
Doctoral candidate, World Languages / ESL Education

Dr. Patricia Davis-Wiley
UTK, CA 106
Knoxville, TN 37996-3400
(865) 976-4231
pdwiley@utk.edu
Professor and Chair, World languages / ESL Education

D. TITLE OF PROJECT:
Computer and Networking Technology Usage for World Language Education in Post-Secondary Education

E. EXTERNAL FUNDING AGENCY AND ID NUMBER: N/A

F. GRANT SUBMISSION EADLINE: N/A

G. STARTING DATE: March 18, 2002

H. ESTIMATED COMPLETION DATE: July 8th, 2002

I. RESEARCH PROJECT:

1. **Objective(s) of Project**

As technology has been rapidly and continually introduced into the educational arena, it has also been used in the world language classroom to teach both the target language and its culture. Although computers have been used for language teaching and learning since the 1960s, "recent years have shown an explosion of interest in using computers for language teaching and learning" (Warschauer & Healey, 1998, p. 57) due to the development of multimedia computing and the Internet. Therefore, "the role of computers in language instruction has now become an important issue confronting large numbers of language teachers throughout the world" (Warschauer & Healey, 1998, p. 57).

This study will investigate the actual usage of computer technology in the world language classroom at present and the percentage of post-secondary language teachers who are now using it in their classrooms. Technology usage of students and teachers will be discussed separately. The target skills which teachers using technology would like to enhance will also be explored. The results of this study will be able to suggest to language teachers what types of computer technology devices are available for teaching and learning languages inside and outside of the classroom.

2. **Participants**

The potential subjects of this study include the teachers of Spanish, French, and Japanese who are teaching introductory classes at land grant colleges and universities in the U.S. in the spring semester of 2002.

The potential subjects will be drawn from selected land grant colleges and universities in the U.S. The researcher will randomly select one college or university from the several land grant colleges and universities representing each state if there are more than one land grant colleges and universities in a particular state. Thus, the total number of subject colleges and universities will be 50. The researcher will then send several survey packages (cover letter, questionnaire, and self-stamped envelope) to the secretaries of the world language departments of selected colleges and universities and ask them to pass the survey packages to full-time professors and instructors of French, Spanish, and Japanese. The expected total number of the subjects will be approximately 400.

3. **Methods or Procedures**

The instrument used for this research is an original survey designed by the researcher of this study (Appendix B). The survey will be submitted for review and approval by the department review committee (DRC) for research projects involving human subjects at The University of Tennessee, Knoxville. After approval, the survey will then be distributed by mail with a cover letter (Appendix A) and business reply envelope. Confidentiality for the subjects is assured in the cover letter.

The survey is totally anonymous; however, the researcher will write an identifying number on the return envelops for calculating the return rate and for conducting a follow-up contact. The institution name will be subsequently deleted from the database after the completed surveys are returned.

Reminder postcards and a second survey package will be sent to subjects who have not returned completed surveys several weeks after the first survey package is distributed. To ensure the highest return rate possible, a reminder message will be sent out two weeks after the first survey package is mailed; the second package will then be distributed three weeks after the first one is mailed.

To understand the general usage of technology in world language education by teachers and students, the rates of the usage of each technological device will be calculated. Second, in order to identify the differences of technology usage for each target language, data will be categorized into the three language groups and then compared using a X^2-test. The data will also be compared controlling for the teachers', native language, the class size, and subject matter taught (i.e. language skills, literature, culture and linguistics), using a X^2-test. Finally, to learn what student language skills the subjects believe can be enhanced by using language learning technology, the degree of

perceived effectiveness will be calculated. The means and standard deviation of the degree of effectiveness for each computer/networking technology and controlled for each language, skill will be computed.

The investigators will uphold the Belmont Report and follow the instructions of the report. The investigators agree that the participants will not be harmed in any way (physically or mentally) and that they will participate only if they freely agree to do so.

4. **CATEGORY(s) FOR EXEMPT RESEARCH PER 45 CFR 46:** 1

J. CERTIFICATION: This research described herein is in compliance with 45 CFR 46.101 (b) and presents subjects with no more than minimal risk as defined by applicable regulations.

Principal Investigator	Satoshi Hashimoto Name	
	Signature	Date
Student Advisor	Patricia Davis-Wiley Name	
	Signature	Date
Dept. Review Comm. Chair	Name	
	Signature	Date
APPROVED: Dept. Head	Name	
	Signature	Date

Appendix B: First Cover Letter to Survey Participants

April 9, 2002

(Address)

Dear (Name),

Instructional Technology has dramatically changed our lives in many areas including world language education. Despite the number of papers about the specific use of technology in world language education that have been published, a few studies have documented the actual usage of technology in the world language classroom.

Presently, I am conducting a study on the use of technology in teaching and learning of a second language at the first and second year of language level in the state of Tennessee. The purpose of my research is to discover what types of computer and networking devices are actually used in world language education at the post secondary level and how often they are used.

Participation in this survey is totally voluntary, and responses will remain confidential. If you are teaching a foreign language(s) at the first and/or second year of instruction, your cooperation would be greatly appreciated. If you are not teaching a foreign language(s) or introductory-level class(es), please pass this survey on to a colleague who is teaching these classes.

If you are not using any computer technology in your teaching, please just complete the first page of the survey and return it. Even if you are not using technology devices, the information you have is very important.

Please use the self-addressed, stamped envelope to mail the completed survey so that it is postmarked **by April 24th, 2002**. The return of the survey will constitute your consent to participate in this study.

The number on your envelope is only for conducting a follow-up contact if needed. Your name and follow-up number will be deleted from the database right after your completed survey is returned.

If you are interested in the results of this research, please let me know by contacting me at <shashimo@utk.edu>. If you have any questions or concerns, please e-mail me or call me at 865-946-7556.

I thank you very much for your help. I am looking forward to learning how you and other world language instructors are using technology for instruction.

Sincerely yours,

Satoshi Hashimoto, Doctoral student
World Languages and ESL Education, College of Education
The University of Tennessee, Knoxville

Survey for Computer and Networking Technology Usage in Foreign Language Instruction

In this survey, the term Computer and Networking Technology refers to the computer, its associated devices, software, the Internet, and electronic networking systems. Please complete this survey if you are teaching foreign languages at the first and/or second year level.

Section I. General Information *Please provide the following information:*

1. What language(s) do you usually teach? How many years have you taught languages? (include this academic year <2001-2002>)

Language _____ Years _____

Language _____ Years _____

Language _____ Years _____

2. What is your native language? _____

3. Approximately how many students do you have in each of the language classes that you are currently teaching for this semester/quarter/term? Please list below *each section* of each language class and the number of students enrolled in each section. (i.e. If you teach four sections, please give information for all of these sections.)

Language / Level (or Course name) _____ Number of students _____

Language / Level (or Course name) _____ Number of students _____

Language / Level (or Course name) _____ Number of students _____

Language / Level (or Course name) _____ Number of students _____

Language / Level (or Course name) _____ Number of students _____

4. Do you have a computer lab(s) dedicated solely to teaching languages in your department/university?

_____ Yes If your answer is "Yes," do you use it/them? _____ Yes If your answer is "Yes," provide the number of computers in the lab(s).
_____ No _____ No

Number of computers in Lab 1 _____

Number of computers in Lab 2 _____

Number of computers in Lab 3 _____

If you are not using any computer technology in your teaching, please just complete this first page of the survey and return it in the stamped, self-addressed envelope. Thank you.

(Please continue to the next page.)

Section II: Your Personal Usage of Computer and Networking Technology

Please check one column for each item below to indicate approximately how often **you** use the following for teaching the target language. These questions ask for **your usage, not your students' usage** of these devices.

Computer and Networking Applications / Devices for teaching languages	Examples	I am using				I am not using
		Daily	Weekly	Once or twice a month	Less than once a month	
Retrieving information from the Internet	Websites					
Retrieving information from electronic resources	CD-ROM					
Spreadsheets and databases	Excel, File Maker, Claris Works, Grading/attendance software (Grade Keeper)					
Desktop publishing	PageMaker, QuarkXpress, PrintShop					
Multimedia presentations	Powerpoint, Persuasion, HyperStudio					
Art/graphic manipulating	Photoshop, Illustrator					
Digital camera / Scanner						
Audio/video capture / digitizing / editing	Premiere, VideoShop, Quick time Pro, Final Cut, iMovie					
Word processing	Word, Word Perfect, Claris Works					
On-line communication	E-mail, Bulletin board, Chats					
Web page development/publication	Writing HTML, web-editing software (Netscape Composer, Dreamweaver), authoring websites (Blackboard, WebCT)					
Authoring or multimedia programs	Director, Flash					
	Locally produced (making original programs)					
Others	**(Please indicate here.)**					

(Please continue to the next page.)

Section III. Computer and Networking Technology Usage:

Please check one column for each item below to indicate approximately how often **your students** use the following, **inside and outside of the classroom,** for the study of the target language, to complete activities for your course(s). This question also includes lab sessions and homework activities outside of the classroom. These questions ask for **the students' usage, not your usage** of these devices.

			Available and Use				Available but Never Used		Not Available	
			Daily	Weekly	Once or twice a month	Less than once a month	No interest in students using	Would like to make students use	No interest in students using	Would like to make students use
1. Computer-Assisted Language Learning <CALL> Programs (Software on the CD-ROM or floppy diskette)		Drill-and-Practice / Tutorial								
		Simulation / Educational Gaming								
2. Internet	Information Retrieval (gathering)									
	Tutorial / Drill-and-Practice									
	Web Site Creation/Publication									
	On-line Communi-cation	E-mail Exchange (collaborative work, key/pen pal)								
		Bulletin Board / Listservs								
		Chats								
		Audio/Video Conferencing (e.g. NetMeeting, NetForum)								
3. Word-processing (Writing in the target language with word-processing software such as MS Word)										
4. Electronic Presentations (**Students** presenting **their** projects using software such as PowerPoint and HyperStudio)										
5. Desktop Publishing (Making documents such as a yearbook, newsletter, portfolio, and/or brochure with desktop publishing software such as Page Maker and MS Word)										
6. Audio-/Video- Conferencing (Live one-/two- way conversation using telephone lines, satellites, or site TV networking)										
7. Others (Please list them and check the frequency)										

(Please continue to the next page.)

Section IV: Target Skills

How much do you think computer/networking technology could enhance students' language skills? Please rank the following from 3 (very effective) to 0 (not effective) for each item by circling the number in the chart. **Please rank only the ones that you use.**

3: very effective 2:effective 1: somewhat effective 0: Not effective						
			Listening	**Speaking**	**Writing**	**Reading**
CALL Programs (software)		Drill-and-Practice / Tutorial	3, 2, 1, 0	3, 2, 1, 0	3, 2, 1, 0	3, 2, 1, 0
		Simulation / Educational Gaming	3, 2, 1, 0	3, 2, 1, 0	3, 2, 1, 0	3, 2, 1, 0
Internet	Information Retrieval		3, 2, 1, 0	3, 2, 1, 0	3, 2, 1, 0	3, 2, 1, 0
	Webpage Development / Publication		3, 2, 1, 0	3, 2, 1, 0	3, 2, 1, 0	3, 2, 1, 0
	Drill-and-Practice / Tutorial		3, 2, 1, 0	3, 2, 1, 0	3, 2, 1, 0	3, 2, 1, 0
	On-line Communi-cation	E-mail Exchange (Collaborative work, Key/pen pal)	3, 2, 1, 0	3, 2, 1, 0	3, 2, 1, 0	3, 2, 1, 0
		Bulletin Board / Listservs	3, 2, 1, 0	3, 2, 1, 0	3, 2, 1, 0	3, 2, 1, 0
		Chats	3, 2, 1, 0	3, 2, 1, 0	3, 2, 1, 0	3, 2, 1, 0
		Audio- / Video- conferencing	3, 2, 1, 0	3, 2, 1, 0	3, 2, 1, 0	3, 2, 1, 0
Word-processing			3, 2, 1, 0	3, 2, 1, 0	3, 2, 1, 0	3, 2, 1, 0
Electronic Presentations			3, 2, 1, 0	3, 2, 1, 0	3, 2, 1, 0	3, 2, 1, 0
Desktop publishing			3, 2, 1, 0	3, 2, 1, 0	3, 2, 1, 0	3, 2, 1, 0
Audio-/Video- Conferencing (Telephone lines, satellite, or site TV networking)			3, 2, 1, 0	3, 2, 1, 0	3, 2, 1, 0	3, 2, 1, 0

Your participation in this study is greatly appreciated. Please return the completed survey **by May 10th, 2002,** in the self-addressed, stamped envelope or to Satoshi Hashimoto, 701 McClung Tower, Knoxville, TN 37996-0470.

Appendix D: Reminder Post Card

April 17, 2002

Dear (Name),

I have already sent you the survey about technology usage in foreign language education. This mail is to confirm that you received the survey package and to show my appreciation for your help.

If you have not completed the survey yet, please do so and send the completed survey so that it is postmarked **by April 24th, 2002**. I thank you very much for your help.

Sincerely

Satoshi Hashimoto
World Languages / ESL Education, College of Education
The University of Tennessee, Knoxville

Appendix E: Cover Letter of Reminder Package

April 25, 2002

(Address)

Dear (Name),

I'm Satoshi Hahsimoto, the doctoral student who sent you the survey about technology usage in foreign language education a few weeks ago. I would sincerely appreciate your assistance in helping me to collect data for my research.

If you have already completed and returned the survey I sent you, thank you very much. If you have not had the opportunity to complete the survey yet, I would be very grateful if you would take just about five to ten minutes to do so and send the completed survey back to me as soon as possible (hopefully, **by May 10th**, 2002).

If you have already completed the survey and sent it back to me, please accept my appreciation and discard the enclosed questionnaire. If you have not done so yet, please use the enclosed questionnaire and send it back with the enclosed pre-stamped and self-addressed envelope.

I am sending the questionnaire to instructors of foreign language education at the post-secondary level in the state of Tennessee, and your response is very important in order to gather accurate information regarding the current usage of technology in our state.

As a language instructor myself, I do realize what an extremely busy time of the academic year it is, and am even more grateful to you for your time in completing the survey. Without your kind help, I cannot complete my study. Once again, thank you very much for your assistance in my research.

Sincerely

Satoshi Hashimoto, Doctoral student
World Languages / ESL Education, College of Education
The University of Tennessee, Knoxville

VITA

Satoshi Hashimoto earned his Ph.D. in English, Foreign Languages, and English as a Second Language (ESL) Education at The University of Tennessee, Knoxville, TN in August 2002. In 1990, he completed a Bachelor's degree in Education from Shizuoka University, Japan, and in 1992, he earned a Master's degree in Education from the same university. He earned a Master of Science degree in Education from The University of Tennessee, Knoxville, TN, in 1999 in Foreign Language Education. Mr. Hashimoto taught English and Japanese at a private school in Japan from 1992 to 1995. From 1995 to 1998, he also taught Math and Japanese to elementary and junior high school students at the Blount County Japanese School in Maryville, TN. From 1999 to 2002, Mr. Hashimoto was a graduate teaching assistant at The University of Tennessee where he taught Japanese. In the fall of 2002, he will be an instructor of Japanese in Pennsylvania.