5-13-2011

EXPERIENCES OF INTERNATIONAL STUDENTS USING INFORMATION COMMUNICATION TECHNOLOGY IN COLLEGE IN THE UNITED STATES

Olena Zhadko
University of Missouri-St. Louis, zhadkolena@gmail.com

EXPERIENCES OF INTERNATIONAL STUDENTS USING INFORMATION COMMUNICATION TECHNOLOGY IN COLLEGE IN THE UNITED STATES

BY

Olena Zhadko

Bachelor in Secondary Education, Nizhyn Gogol State University, Ukraine

Master of Education in Adult and Higher Education, University of Missouri-St. Louis

DISSERTATION

Submitted to the University of Missouri-St. Louis

in partial fulfillment of the requirements

for the degree of Doctor of Philosophy in Education

2011

St. Louis, Missouri

Advisory Committee
Carl Hoagland, Ed.D.
Chairperson
Wolfgang Althof, Ph.D.
Natalie Bolton, Ph.D.
Joseph L. Polman, Ph.D.

ABSTRACT

The economic, social and political landscape of universities in the United States has been changing under the pressure of internationalization of education globally as well as with rapid progressive technology development. There is an urgent need to learn how the increasing population of international students adapts to the digital culture.

This study surveyed 262 international students at two four-year institutions of higher education regarding their experiences with technology while in college in the United States. The study evaluated frequency of trends of Information Communication Technology usage by means of descriptive statistics. A sequential mixed methods design (Creswell, 2003) was utilized. Multiple regression analysis was used to determine which demographics of international students predict their comfort level with technology. The study further explores the experiences of international students using technology by means of face-to-face interviews to investigate those results in more depth. The researcher used a basic or generic qualitative study design with elements of grounded theory for data analysis.

In this study, it was found that 1) the majority of international students feel comfortable using technology (95.5%); 2) hours a week spent using technology for school related purposes predict international students' comfort level with technology (explains 6% of the variance); 3) the majority of international students learn on their own how to use technology (82%); 4) international students spend almost equal amounts of time using technology for academic and non-academic purposes; 5) students who spend more than 10 hours a week using technology tend to spend more time on non-academic purposes than on academic work; students who spend less than 10 hours a week using technology tend to focus their time on academic work; 6) international students use a wide range of programs/applications/software for various purposes

ranging from school work and job search to communication and entertainment; 7) technology fulfills communication needs with family and friends, instructors, mentors, advisors and classmates; 8) international students believe even though there are a few negative aspects of using technology, the positive outweighs the negative, and 9) access to technology, early exposure and use of technology for school purposes helps students adapt faster to college life in the U.S.

Keywords: International students, information communication technology, educational technology, higher education.

ACKNOWLEDGEMENTS

This study could not have been completed without the support of my dissertation committee: Carl Hoagland, Wolfgang Althof, Natalie Bolton and Joseph Polman. They offered insightful advice in developing the proposal and the results throughout the process of working on the dissertation. This study could not have been completed without their generous support.

Carl Hoagland, my chair, my mentor, my advisor, made this educational journey possible and supported me during this learning discovery.

Wolfgang Althof, an expert of research methodology, a mentor, an inspiration to try harder, was very encouraging and supportive from the very beginning of the dissertation journey process. On the days when it was hard to continue work he was the one whom I did not want to disappoint and continued working.

Natalie Bolton's expertise with data analysis and her technical skills as well as her ability to explain was tremendously helpful in analyzing the data.

Joseph Polman was kind enough to provide constructive critical feedback on the structure, formatting as well as the content of the study.

My deep appreciation also goes to Peggy Cohen, who was very supportive during the processes of my professional development in the field of teaching and learning.

Chani Smason, Bob Baumann, Katie Bradarich, and Tanya Mykhaylychenko good friends, proofread the chapters and provided feedback and editing expertise.

I am also very appreciative of all my friends at the E. Desmond Lee Technology and Learning Center who supported me and helped me to stay on track. Special thanks to Brian Huxtable who helped me think critically.

Finally, my deep gratitude goes to the faculty and staff of the University of Missouri-Saint Louis, particularly Jim Wilson, and Marilyn Ulrich, for all their kind support and trust they had in me.

To my good friends, Keeta Holmes and Philippe Breton, I offer thanks for encouraging me in the very last stages of writing and believing in me.

This study would never have happened without the support of my family: my parents, Zhanna and Alexander Zhadko, and my sister, Katrine Andruschenko, and my niece, Polina. I offer special thanks for their support from the very beginning and their trust in me, being so far away but being so close.

The dissertation is dedicated to those passionate about international education and educational technology. It's a time for a change, let's go digital!

CONTENTS

List of Figures

List of Tables

CHAPTER ONE: INTRODUCTION

In this chapter, the researcher presents an overview of the study and states the problem, purpose and significance of the study. The researcher defines selected terms used in the study and presents limitations and delimitations. The researcher approaches the study using three lenses: educational technology, international students, and higher education.

Background of the study

Over 690, 923 foreign international students were registered and enrolled in classes in U.S. colleges and universities according to the Open Doors Press Release (Open Doors Press Release, 2010, para. 1)

International college students come from approximately 250 countries and take a large scope of courses from business to education. The level of education they receive varies from undergraduate to post-graduate, including professional degrees and certifications. No other country attracts such large numbers of international students as the United States does (Open Doors, 2010). "The United States continues to host more international students than any other country in the world," said Allan Goodman, President and CEO of the Institute of International Education (Open Doors Press Release, 2010, para. 6).

In January 2007, the Assistant Secretary of State for Educational and Cultural Affairs, Goli Ameri, defined the leading role of the U.S. in attracting the highest volume of international students in the world:

> In today's competitive international environment, the increase in enrollments noted in this year's Open Doors data demonstrates again that the U.S. remains the premier destination for international students. U.S. higher education is unparalleled in its vitality, quality, and diversity. The U.S. government joins the U.S. higher education community in a commitment to welcome international students to the United States. As someone who graduated from an American university as an international student, I have experienced America's welcome personally and can testify that America's universities not only accept

> and welcome international students warmly, but transform their lives. (United States Department of State Press Release, 2008, para. 2)

According to the National Center for Education Statistics report (2007) college (postsecondary degree-granting institutions) enrollment reached a projected record level of 18.0 million in fall 2007 in the United States. Between fall 2008 and fall 2016 enrollment is expected to increase by 14 percent bringing the enrollment to 20.442 million (National Center for Education Statistics, 2007). The increase in the number of international students around the world also increases the demands on hosting institutions to provide more services (Arthur, 2004). United States Secretary of State Condoleezza Rice confirmed the responsibility of the U.S. colleges in her comments about education: "… its transformative power, making certain that each and every individual can achieve whatever they can and become who they were really meant to be, is what makes for the richness of America" (United States Department of State Press Release, 2008, para. 3).

In their leadership position, American colleges would be advised to adapt and serve the needs of this diverse and rapidly growing international student group. In addition to this task, "knowledgeable observers inside and outside the academy state that an important goal of higher education is to prepare culturally competent individuals with the ability to work effectively with people from different backgrounds" (Carnevale, 1999; Mori, 2000; Sandhu, 1995; Smith & Schonfeld, 2000), as cited by Zhao, Kuh, & Carini (2005). Interestingly, the development and implementation of new technology operates with no cultural boundaries, but most likely with cultural differences. Carlson (2007) suggests that there is a need to revise the way we look at the movement of technology across history and cultures. The author wants to address the issue by taking into consideration the ideas "…about diversity and progress as they relate to technology" (2007, p. 128).

The diverse group of international students is united by a goal: all of them come to the United States to obtain their degrees or certificates, thereby attaining new knowledge and skills. But to be able to succeed one needs to be proficient with the tools and resources and know how to make the best use of them. It is vital for international students to know how to use digital tools common in higher education as the U.S. college environment is highly digital. Knowing these tools not only helps international students to achieve their educational goals, but also increases their preparation for becoming technologically functional members of the American society, and it allows students to keep ties with their home country. When international students come to the United States, they no longer have the same support they might have had in their home countries. Not only do students have to learn how to be away from their friends and family for months, and even years at a time, they also have to adapt to a new foreign working language, and a new culture. The volume and the kinds of experiences that international students gain in college in the U.S. often differ immensely from the experiences in their home country. They face new tasks and take on new responsibilities. They go through multiple processes of psychological, physical, and mental adjustment **(**Pascarella & Terenzini, 2005). They are responsible for fulfilling their educational needs as well as their personal 'living' needs, such as finding a place to stay, paying bills, shopping, etc. They mature and enter adulthood by finding themselves in the midst of new experiences. Zhao, Kuh, and Carini (2005) suggest "creating learning environments that promote and value diversity, as well as intentionally exposing students to multiple and sometimes competing perspectives that challenge previously unexamined assumptions" (p. 209). Exposure to new technology in the United States becomes a learning experience and definitely a challenge to many newly-arrived international students.

Edgerton (2007) claims that people across a variety of cultures use technology to shape their lives in remarkably diverse ways. Surprisingly, extensive research has not been done on the

experiences of international students' use of Information Communication Technology (ICT) in college. Charles Lipson, an international politics professor at the University of Chicago recently published a book, *Succeeding as an International Student in the United States and Canada* (2008). Lipson (2008) covers topics such as moving to a foreign country and includes more detailed descriptions of academic challenges and strategies for succeeding as an international student. However, he does not address international students' experiences with technology. This case is not an exception. None of the literature identified and reviewed by the researcher covered technology use by international students.

In order to investigate the topic of international students' experiences with technology, the researcher will start with the general overview of technology tools that are used in a variety of settings to fulfill one's needs in the modern society.

Lima and Brown (2007) state that, "The globalized world is organized around integrated networks of computers and serves as the heart of the information systems and communication processes" (p. 144). Course management software such as Blackboards or Moodle, SecondLife, blogs, videogames, craigslist, Amazon, podcasts, eBay, emails, chats, and Skype are just a few examples of ICT. Gudynas (2003) states that information technology (IT) skills are becoming the most important life skills. Buying air tickets, train tickets, concert tickets, applying to college, applying for a job, scheduling an interview for a visa, taking a class, communicating with friends, family, or co-workers, getting news, reading books, selling a car or a house, going on a vacation, and many more things often require knowing how to use technology. According to Gudynas (2003), ICT encourage both scientific and economic progress, as well as the development of digital experiences. Technology also enters the world of education; according to Dawson, Forster, and Reid (2006), information communication technology (ICT) learning environment provides university students with swift access to new information. Churchill (2007)

claims that a number of cases have proven that ICT uplifts students' thinking level and facilitate their problem-solving skills. ICT is being used to serve a countless number of purposes. Zhao (1996) classifies the application of ICT into four major aspects: instruction, communication, resources and tools, and guidance for technology improvement and multiple learning. Thus, each individual can find an ICT tool to fulfill many of his or her needs.

Some research studies on the use of technology call attention to the effect that technology might have on learning. Brown's investigations of several concrete examples of ICT, such as Web 2.0 and social bookmarking or Facebook-like functionality, demonstrate that they may actually improve learning (2007). He calls for a need to revisit and reconsider the idea that we actually do not need to wait and that it makes sense "to move at full speed and implement Web 2.0 features into the course management system (CMS)…" (p. 8). It is important to understand that Web 2.0 tools have already entered the lives of students in college. Surprisingly, there is no significant research found in the selected literature that gives a full perspective on international students' experiences with technology in college.

The study being proposed will address the use of ICT by international students enrolled in colleges in the United States. The focus of the study will be on the experiences of international students using ICT throughout their college life in the United States for academic and non-academic purposes.

Purpose of the Study

This study investigates experiences of international students who use information communication technology (ICT) in college in the United States. With the constantly developing new technology and internationalization of educational systems, international students' college and life experiences change dramatically. Educational systems are required to adapt to the development of technology. Both the quality and essence of college experiences of current

students are constantly shaped by new technology tools and their use and application to their lives.

International students bring change to the U.S. college cultures and social relations. Lengnick-Hall and Sanders (1997) state that "one of the challenges facing educational institutions worldwide is the increasing diversity of students" (p. 1334). The arrival of the information society and globalization introduces new information communication technology tools that are being used for both academic and non-academic purposes by international students.

The purpose of this study is to investigate how international college students use the Internet and other electronic technologies that aid in their college experiences. The following research questions are sought to be answered in this study:

1. How do the demographics of international students predict their comfort level with technology?
2. What experiences do international students have with technology while in college in the United States? More specifically,
    a. What Information Communication Technology (ICT) do international students use in college in the United States and for what purposes?
    b. What positive and/or negative experiences international students have with technology in college?
3. How do international college students experience ICT in the United States? More specifically, what contributes to international college students' experiences with technology?

In this study, the use of ICT in the classroom is addressed. In addition, the study explores the use of ICT by international college students in a broader sense; college experiences of this particular population are diverse as they go beyond just academic use of the ICT. The focus is on

the experiences of international students with ICT in college life in the United States that fulfill academic and non-academic needs.

Significance of the Study

Research on the international student use of technology is limited. The results of the study will hopefully add to the body of knowledge and will provide insights to the discourse in the field of international education and educational technology.

Although there have been studies done on the use of technology by students, their primarily focus is on one country and the impact of technology on learning, as well as partnership and/or collaborative international projects where the focus is on learning. Even though a number of studies examined international students' experiences, their primary focus is on other aspects of international students' lives such as adaptation processes, personal adjustment, college life and culture, counseling, success; no focus has been directed at the international students' experiences with technology.

The study offers international college students an opportunity to voice their views regarding their experiences with technology, college's technology integration as well as how their college provides technological support. The findings of this study are potentially useful and informative to a wide spectrum of people working in higher education involving international students. Two types of audiences will be served at large: domestic (U.S.) and international.

The domestic (U.S.) audience is the following:

Higher education institutions (i.e., community colleges, colleges and universities) can benefit from the study by learning about international students in terms of the Information Communication Technology and will be able to prepare international students to adapt to the new technology-enhanced environment in American college communities. Technology may enable international students to meet academic requirements and be more productive and

successful academically which can result in international student retention and recruitment of new international students. International Student Service Offices might use the findings of this study to prepare international students for their academic endeavors in the United States before and after their arrival to the United States by providing them with the knowledge base and teaching them technological skills. Recruitment and retention program administrators can gain knowledge that will allow them to serve international students more efficiently. A full range of academic and student affairs administrators and staff should find this study useful for international students' activities that are dependent on or supported by Information Communication Technology.

Graduate students preparing to work in the area of international education or in postsecondary education will find a comprehensive analysis of the selected literature on the following topics: information communication technology, higher education, and international students in the United States. The results of the study provide an overview of a wide variety of issues on international students' experiences regarding the use of technology. The results of the study could identify areas in the literature that require further research.

Computer companies and software developers might develop an understanding of the international market and gain ideas for further growth and development in the international arena.

The international audience is the following:

Foreign policymakers and their staff might be able to extract useful information from this study to make changes to educational policies for the benefit in their countries and reallocate funds to invest in Information Communication Technology (ICT) tools.

Prospective international students preparing to pursue their education in the United States will find a comprehensive description of the experiences of other international students with

technology and might use that information to prepare themselves to meet requirements and demands of the U.S. educational system and life abroad.

Worldwide Education Advising Centers supported by U.S. Department of State's Bureau of Educational and Cultural Affairs might benefit from the findings of this study by gaining an in-depth perspective into international college students' experiences of technology. The results might be used for developing training and resource materials for prospective international students.

As indicated above, beyond all practical implications that the results of this study could offer, the findings of this study might bring new insights to the discourse in the field of international education and educational technology and call for further research.

Definition of Terms

For the purpose of this research the following definitions will be used:

Information Communication Technology(s) (ICT(s)) or Technology includes multimedia technology tools such as computers and all related software that are being used as means of learning, communication, and guidance for technology improvement and multiple learning.

Higher Education means formal education in higher education institutions (e.g. doctoral research universities, master's (comprehensive) universities and colleges, baccalaureate colleges, associate of arts colleges, specialized institutions, and postsecondary vocational and technical schools), which includes studies undertaken in degree-granting institutions for academic credit; it can be either a degree or non-degree-granting education.

College student is defined as anyone who has graduated from high school and is currently enrolled in college programs (undergraduate, graduate, and postgraduate).

An international student is a person who is currently enrolled in college classes in a foreign country, the United States of America in this case, and is a permanent resident and a visa

holder (F-1 or J-1). The category Permanent Residents ("Green Card" Holders) includes students with pending applications for Permanent Residency. A traditional international student is a nonimmigrant student or an exchange visitor (EV) who enters the United States.

Limitations

The majority of international students are not native English speakers. In fact, some international students come to the United States to study English. But as a rule, at a four year college one of the admission requirements is at least basic knowledge of English, which is verified by a standardized test, such as the Test of English as a Foreign Language (TOEFL), or the International English Language Testing System (IELTS). Even though the range of the English language competency of international students may vary, most likely their English language proficiency is above a basic level of understanding of English and thus they are expected to understand the questions of the survey and the interview of this study. In preparing both parts of the study, five international students from five different countries took the survey and reviewed interview questions and provided feedback on clarity and language of the two data collection instruments.

The researcher of this study has a deep and zealous interest in issues pertaining to international education. The fact that the researcher herself is an international student might be a limitation to the study. The researcher might assume that some notions of the experiences of an international student might be self-explanatory, when, in fact, an outsider might need more details to be able to fully comprehend the notion. The researcher will address this issue with awareness. On the other hand, research participants might be more likely to speak openly about their experiences living abroad without any reservations with the researcher who is also an international student. The researcher may be able to provide an insider’s perspective into an

international student's experience by having an ability to understand and relate to international students' college life.

Delimitations

In this study, the use of technology for academic and non-academic purposes is addressed. The study is different from other studies on technology use as it addresses the use of ICT by international college students in a broader sense. College experiences of this particular population are diverse as they go beyond just academic use of the ICT and are related to the fact that college life experiences of a student living abroad encompasses a wide range of new roles that one takes on.

The scope of the study is limited to two universities in the Midwest. The participants in this study are international students from two universities, one public and one private, each representing about a hundred countries. The schools were chosen because they represent a range of students from diverse backgrounds (economic, social, etc.). The two colleges, as nearly every college in the United States, partner with a diverse group of institutions in a number of countries for student and scholar exchange programs similar to other institutions in the United States.

Organization of the Dissertation

This remainder of the dissertation is organized into four chapters, references, and appendices. Chapter Two provides an overview of the relevant literature as well as theoretical framework pertaining to the topic of the study. Chapter Three delineates the research design and methodology of the study. Sample selection, data collection methods and procedures and analysis are described. Chapter Four contains the results of the study. A discussion of the findings, a summary, conclusions drawn from the results and recommendations for further research are presented in Chapter Five.

CHAPTER TWO: REVIEW OF THE LITERATURE

In this chapter, the researcher presents a review of selected theoretical and research literature pertaining to the topic of the research study, *Experiences of international students using Information Communication Technology (ICT) in college in the United States*; and the analysis of major variables and concepts across sources, answering the questions: "what is known?" and "what is unknown?" (Roberts, 2004, p. 17).

The researcher approaches examination of the literature using three lenses: International Students, Higher Education (in the United States) and Information Communication Technology (ICT). This synthesis of the selected literature provides a broad perspective on the research problem.

Demographics of International Students

The Institute of International Education, established in 1919, to catalyze educational exchange, is the only leading resource on international students in the U.S. and Americans studying abroad (Institute of International Education Homepage, para.2). It supports Open Doors, a comprehensive information resource that publishes annual reports and keeps track of the international students' statistics. Since 1948 the Institute of International Education has published data on international students studying in the United States. This clearly indicates that international students started to come to the United States to pursue their educational goals a long time ago. Descriptive statistical data on international students allow gaining a better understanding of the international student population served by higher education institutions in the United States.

Consequently, the majority of data in an overview of demographics of international students in this study come from Open Doors and all figures in this chapter were created by the researcher from the data reports cited. The researcher does not use the most current data on

international students intentionally; she uses the 2008 Open Doors report to provide an overview of the international students' population of 2007-2008 to better understand the sample of the study; the data collection took place in 2009.

According to *Open Doors Report* (2008), new international enrollment – students enrolling for the first time at an institution in Fall of 2008 – increased 10.1% over the previous year in college in the U.S. Figure 1 shows a gradual rise in new international student enrollment from 2004 through 2008.

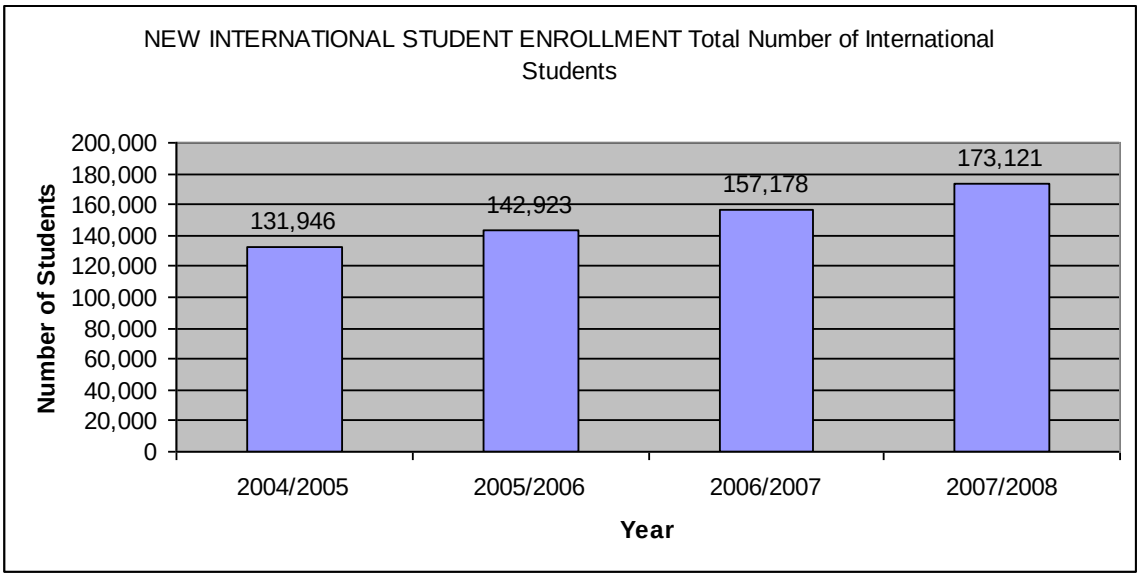


Figure 1. *New International Student Enrollment, 2007/08*

The percentage change in the numbers of new international students is increasing: in 2005-2006 enrollment was 8.3% greater than in 2004-2005; the 2006-2007 and 2007-2008 was 10.0% and 10.1% respectively. In 2007-2008 623,805 international students studied in the U.S. Thus, the total enrollment was 7 % higher than the previous year. Figure 2 shows the rise of the total number of international student population over the period of the last 50 years. If the trend is extrapolated, the numbers of international students would continue to grow in the future.

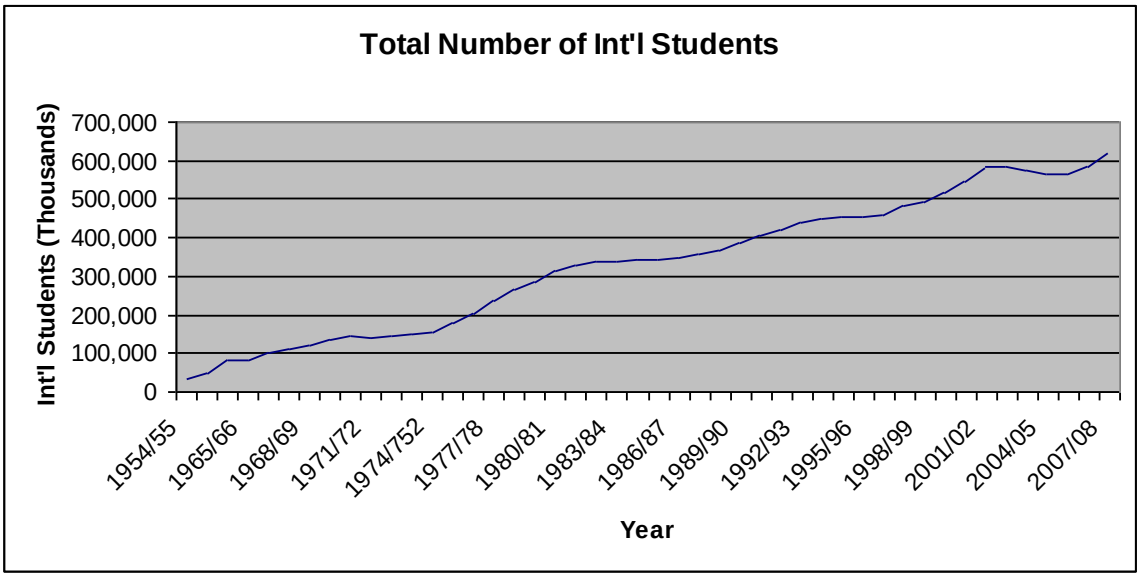


Figure 2. *Total Number of International Students, 2007/08*

Figure 3 represents an annual percentage change in terms of the total international students' enrollment. As shown below, the graphical representation is very dynamic, but it grows continuously, and there have been just two cases when the drop was severe and went into the negative numbers. This occurred in 1971/72 (-3.2%) as well as over the period that started in 2003 and ended in 2006 (-2.4%, -1.3%, -0.05% respectively).

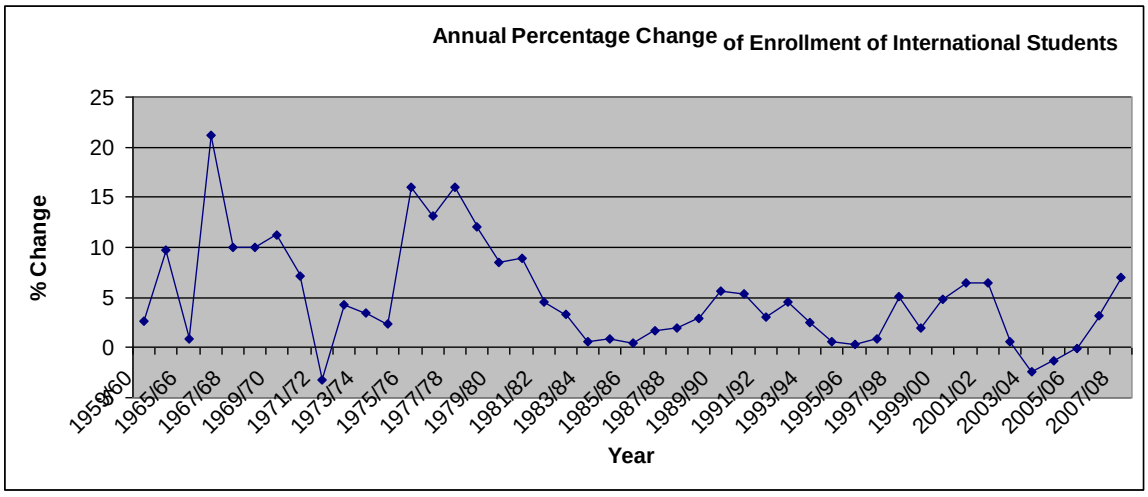


Figure 3. *Annual Percentage Change of Total Enrollment of International Students, 2007/08*

Figure 4 represents a nearly continuous growth of the percentage of international students that come to the United States to go to college.

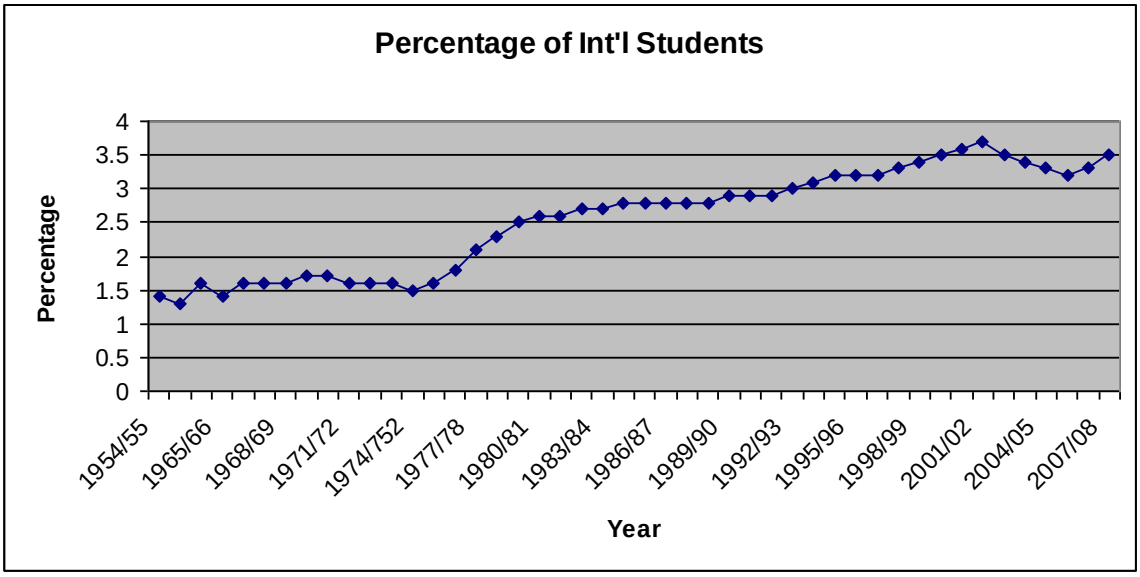


Figure 4. *Percentage of International Students, 2007/08*

International students pay their educational expenditures in a number of different ways. Figure 5 represents the categorization of international students' sources of funding. The primary source of funding is personal and family funds, which makes up 62.3 % of the total. The second leading source is U.S. college or university support which makes up 25.9% of the total. Finally, the third leading source of funding is home government/university which makes up 3.4% of the total. In total, U.S. government, U.S. private sponsor and U.S. college or university funding sources make up 27.4%. Given the funding sources mentioned, it is profitable to have international students in U.S. institutions as 72.6% come from outside the U.S. In addition, at state institutions most international students pay out-of-state tuition at public state universities which is typically twice as high as in-state tuition.

The economic impact international students had on states in the academic year 2007/2008 equaled $15, 543, 1 (million) (*Open Doors Report*, 2008). This number is calculated by

subtracting the U.S. support from the sum of tuition, fees, living expenses and dependents. The U.S. government and U.S. colleges and universities want to increase the enrollment of international students which will bring the nation and its colleges more revenue.

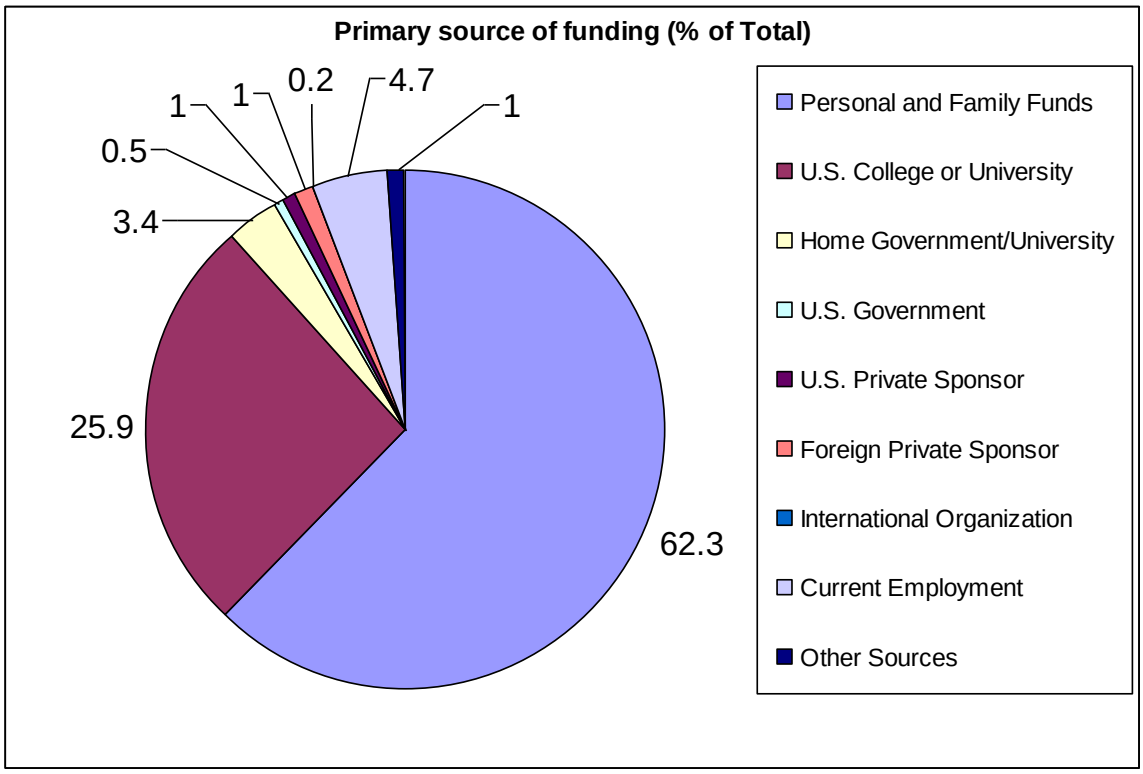


Figure 5. *Primary Source of Funding, 2007/08*

International students come to U.S. colleges to study a variety of subjects. The top study fields of international students enrolled during the academic year 2007-2008 are Business & Management (19.6%), Engineering (17%), Physical & Life Sciences (9.3 %), and Social Sciences (8.7 %). Figure 6 represents the eleven top study fields of the international students.

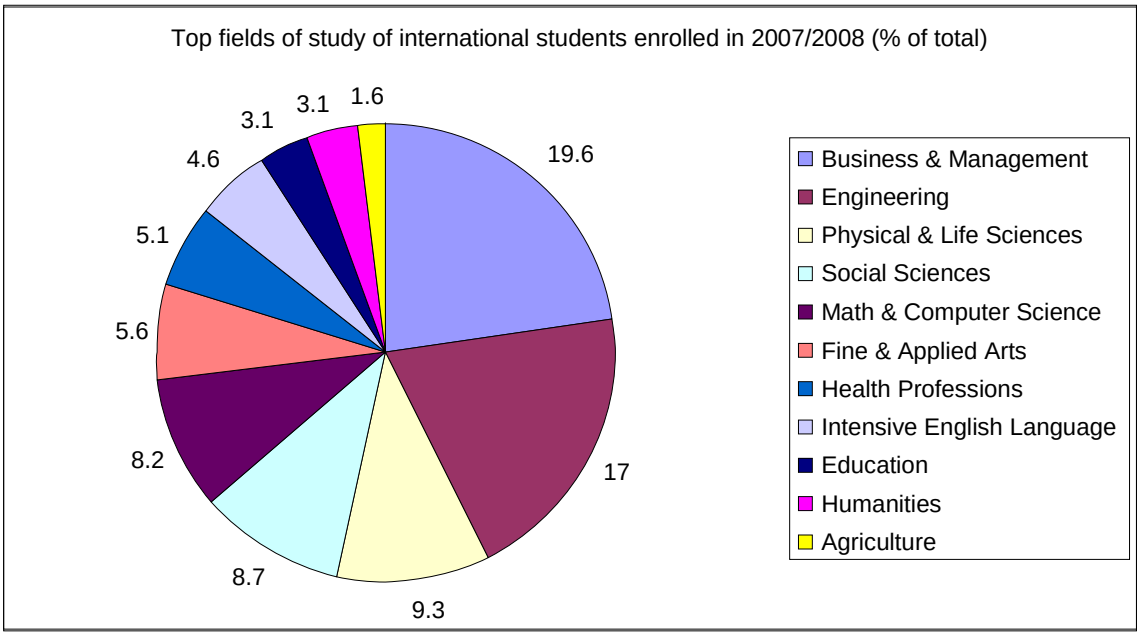


Figure 6. *Top Fields of Study of Currently Enrolled International Students, 2007/08*

Figure 7 represents academic levels of students currently enrolled in the U.S. colleges. The leading academic level is made up by graduate students, which is 48.8% of the total. The second largest number which equals 31.4% of the total comprises undergraduate students working to receive bachelor's degree, and finally 11.5% of the total are the students working on their associate's degrees. The non-degree group is 8.3% of the total.

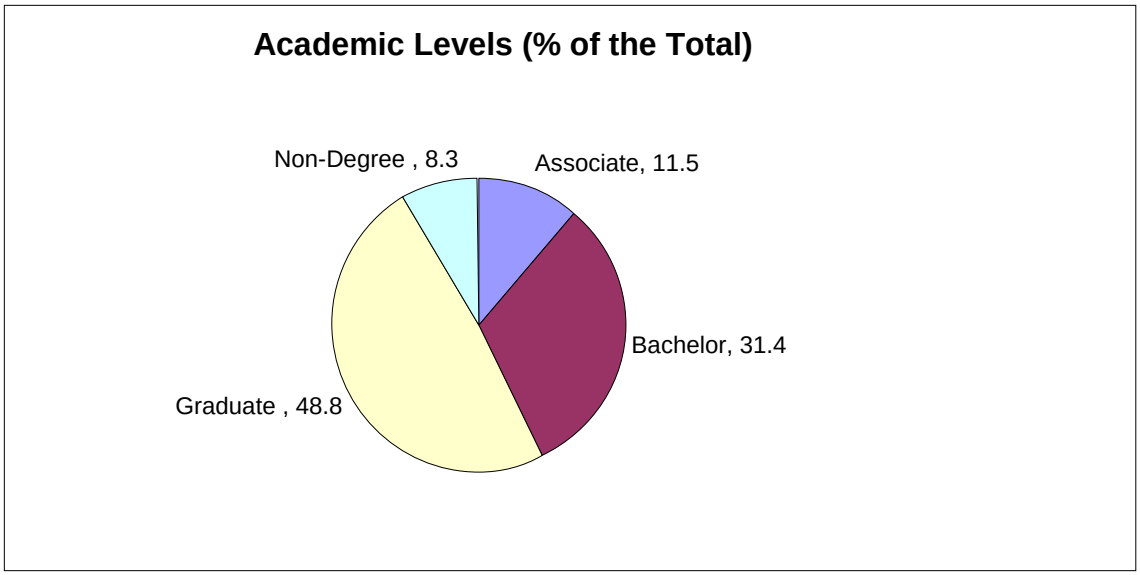


Figure 7. *Academic Levels, 2007/08*

Students come from all around the world. Figure 8 represents the leading places of origin of currently enrolled international students. The top five countries of origin are: India, China, South Korea, Japan and Canada. They comprise 49% of all international students in the U.S. The number of students from the top three countries of origin showed large increases in 2007/2008, with the number Indian students showing a 13% increase, Chinese students -- 20%, and South Korean students --11% over the previous year.

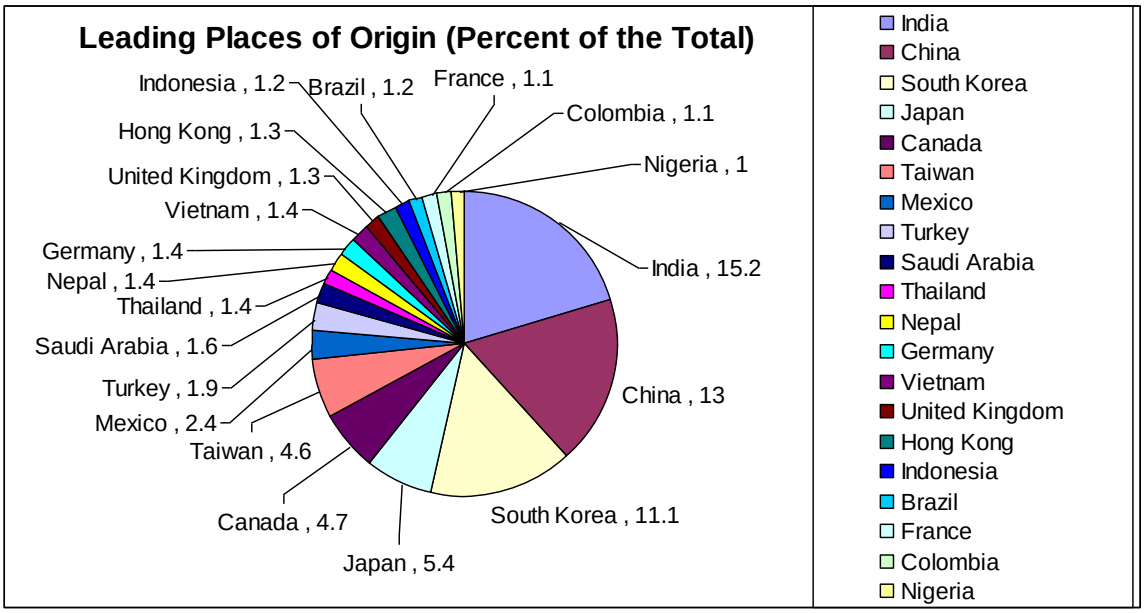


Figure 8. *Leading Places of Origin, 2007/08*

The data represent diversity of the U.S. international college population with Asian countries taking the lead (*Open Doors,* 2008). Undoubtedly, the richness of international students' experiences and backgrounds brings intercultural learning and international exchange to higher education institutions in the United States. Preparation to serve such a diverse group of students is becoming one of the essential roles that hosting institutions take on. Teichler (1999) indicates that colleges became leading actors in the processes of internationalization of higher education.

There is a variety of research literature exploring topics on international students pertaining to issues of adaptation processes, personal adjustment (Al-Sharideh & Goe, 1998), college life and culture (Garrod & Davis (1999), counseling (Arthur, 2004), success (Lipson, 2008, Badke, 2003), academic writing (Bailey, 2006), teaching (Carroll, Ryan & al., 2005), funding (O'Sullivan, Steen, & al., 1996), and mobility (Gŭrüz, 2008) as well as a number of international student handbooks (College Board, 2008) that present a variety of topics related to international students. However, there is a dearth of research literature sources that examines the use of technology by international students.

Structure of the U.S. Higher Education

To fully understand the experiences of international students it is crucial to understand the educational environment they encounter and in which they establish themselves. While the system of education is different in every country, there are some basic elements of an educational system structure along with variations across nations. To shed light on international students' experiences in college in the United States, we will need to describe the background of their experiences and thus the system itself. For this reason it is important to provide an analytical description of the structure of U.S. education.

The U.S. Department of Education describes the system of education in the United States as similar to the systems in other countries. According to the U.S. Department of Education the structure of U.S. education is the following:

Early childhood education is followed by primary school (called elementary school in the United States), middle school, secondary school (called high school in the United States), and then postsecondary (tertiary) education. Postsecondary education includes non-degree programs that lead to certificates and diplomas as well as six degree levels: associate, bachelor, first professional, master, advanced intermediate, and research doctorate. The U.S. system does not

offer a second or higher doctorate, but does offer post-doctorate research programs. Adult and continuing education, including special education, cut across all educational levels (*Structure of the U. S. Education*, 2009)

The three most commonly awarded degrees in the U.S. higher education system are a bachelor's degree, a master's degree and a doctorate. Other degrees and programs include First-Professional Degrees, Intermediate Graduate Qualifications, and Postdoctoral Programs.

According to the International Affairs Office, U.S. Department of Education, the bachelor's degree is the most common first degree in U.S. higher education which also gives access to advanced studies. To complete the study program in order to receive a U.S. bachelor's degree a student typically spends about four academic years of full-time study. However, some degrees take longer to complete, such as those in science-related majors. At the same time, some highly motivated and successful students may finish their coursework in a shorter period of time. Finally, bachelor's degrees are awarded in both academic and professional fields of study.

The master's degree is considered the first graduate-level qualification, or second cycle degree, in the U.S. higher education system. In some cases and in certain areas (i.e., fine arts), master's degrees may be considered terminal professional degrees; sometimes master's degrees may be considered as second degree that may or may not lead to doctoral studies. In certain areas such as behavioral and natural sciences, it is increasingly common to proceed to pursue a doctoral degree. In other areas, such as business administration, an MBA is considered to be the terminal degree, and it is often required by employers. Hence, master's degrees are more common in certain areas than others, and as a result many U.S. research doctoral programs do not require a master's degree as an admittance requirement for students to apply to a doctoral program; a bachelor's degree might be just enough. Master's degrees generally take two years to complete. The length of a program is defined by a number of variables: 1) a degree program

(whether the program is a year-round, twelve-month, or just a nine-month program; 2) the format of the program (whether the program is traditional and taught in day classes, evening classes, or an executive program for full-time working professionals taught in full-day classes over monthly or weekend sessions); 3) student's enrollment (whether a student is enrolled full-time or part-time); 4) degree requirements or prior preparation (some programs might require a student to have certain classes before they can be admitted into the program).

In the U.S. education system the highest academic qualification is the doctorate, according to International Affairs Office, U.S. Department of Education. U. S. doctoral programs are structured independent research programs that are supervised by faculty. To be admitted into a program, applicants usually must take a test (GRE, GMAT, or any other pertinent test) and oftentimes provide a sample of writing. Once a student completes coursework and passes the required exams, he or she becomes a doctoral candidate. A doctoral candidate can select a doctoral dissertation advisor and doctoral committee members (usually 2-5 faculty members). An advisor and a committee approve a dissertation research proposal and advise on the progress of a research process. The research doctorate is awarded once a candidate conducts and completes a research study in the form of a doctoral dissertation and defends this dissertation in a public exam. A doctoral program can take three to six years to complete, and varies widely depending on the field of study. Traditionally, between two and four years are spent to complete the coursework; a candidate conducts an independent research study that could take several years to complete depending on the nature of the topic and other variables, such as personal commitments.

As noted in the previous section, international students primarily come to the United States to pursue a degree, only 8.3% are non-degree seeking students (*Open Doors,* 2008). On average it takes about two years to complete a master's degree and about five to six years to

complete a doctorate (i.e., the Ph.D.). As graduate students comprise almost 50% of all international students (*Open Doors*, 2008), almost half of all international students stay in the U.S. between two and six years. As it takes about four years to complete a bachelor's degree, and about 30% of all international students are pursuing their bachelor's degrees, they spend about four years in the United States.

To better understand the structural elements of the system of education, it is critical to have a full idea of the experience of being a college student. College experiences encompass much more than pure academic learning. Pascarella and Terenzini (2005) name a number of areas that are affected in the process of a college student's transformation: cognitive skills, intellectual growth, psychosocial change, attitudes and values, moral development, educational attainment and persistence, career orientation, etc. Learner transformation and development is another theme shared by many educators (Cranton, 2006; Daloz, 1999; Sellers, Dochen, & Hodges, 2005; Guy, 1999; Smith, 1996). Learner transformation takes place in college at a high rate as students go through a developmental change forced by a college environment. College learning is defined by Brown and Duguid (2000) as "putting students in touch with particular communities" (p. 220). A college campus represents a community of college students at large which is very diverse and can be subdivided into multiple communities. When an international student arrives at a college campus in the United States he or she is being put in touch with a number of communities. Higher education institutions are technologically enhanced: the application process and class registration are done online, writing lab support and online tutoring are available, and students can even chat online with their academic advisors. Thus, an overview of various types of technology tools needs to be presented.

Information Communication Technology (ICT)

For the purpose of the literature review, the term Information Communication Technology (ICT) is used. The terms "Information Communication Technology (ICT)", "Computer Mediated Communication (CMC)", "educational technology" and "technology" are used interchangeably. The term *technology* is being used in the survey and interviews as it is easily understood by research participants.

It is important to notice that many studies on information communication technology and international education are often collaborative projects with participants in the U.S. and foreign countries. When the researcher attempted to find research literature on international students' use of technology mostly all the studies that she came across were partnership projects, where the use of technology is being studied from the perspective of its impact on learning. The value of these research findings should not to be underestimated as they help setting the background for this study and emphasize its importance.

ICT around the world.

A number of issues pertaining to the use of Information Communication Technology (ICT) have been explored in the selected literature review. Adria and Rose (2004) state that "information and communications technology form part of a response by universities to political changes, but they are also a structuring influence on institutions of higher education" (p. 54). Adria and Rose (2004) argue that, even though ICT is being used extensively, it is not fully adopted by the universities in all the processes of teaching and learning. They talk about the application of ICT in the intensive classroom delivery setting. The literature introduces the use of ICT in teaching and learning in distance education and open learning. Adria and Rose (2004) report on two international case studies on technology, processing and resistance. These authors state that, "ICT is now commonly used in universities and colleges to support many activities

associated with teaching and learning." (p. 53). In universities it is not just students who use different types of technology but also teachers. If teachers are keen on extensive use of technology, this sets a baseline for students' knowledge and skills of technology use. Barbas (2006) emphasizes that integration of ICT has a great impact on student- teachers to improve their pedagogical, individual, social and technological skills; the subjects of her project are in Portugal and Arizona, U.S. The impact of ICT on teachers was placed into four categories:

> (1) teachers conceived the information in a multimodal format through the integration of linear and nonlinear formats of information in their pedagogical training; (2) teachers underwent significant learning because they were put in the position of hypermedia product builders; (3) teachers acquired information/tools not only to search but also to build and analyze digital discourses; (4) teachers conducted research emphasizing various points of view. (p. 65)

As was already mentioned, teachers use technology extensively integrating it in teaching and learning processes. Thus, they set requirements for students and also demonstrate that technology literacy is an important skill to have.

In a number of cases the use of technology has been the only way to provide education. Berman (2008) states that ICT plays an important role in developing countries as well as improves educational and living standards of their people by means of distance education providing education to rural populations in India, Sri Lanka, and Bhutan. ICT was intensively used in Hong Kong during the 2003 Severe Acute Respiratory Syndrome epidemic (SARS), and educational systems were forced to use ICT, ranging from recorded teaching monologues to online activities such as WebQuests (Fox, 2007). ICT is being used together with distance education to increase rural teachers' learning opportunities in rural China (Robinson, 2008). Robinson (2008) makes a conclusion that distance education and ICT improve equity and quality of learning.

Often times ICT is perceived as the only means that can provide an opportunity for interaction. Hudson, Owen et al. (2006) explore international collaboration between students and tutors with the help of ICT. Technology allowed flexibility and provided time for the learning process to take place. This collaboration was among participants from Brussels, Linz, Austria and South Africa, Netherlands and the UK. All students in the study agreed that they belonged to a learning community and stated that it promoted their learning. Joining a community on a college campus might be quite stressful, however, an online community might be more comforting at the beginning, a safe environment to meet people and learn from them about college life.

Does every student benefit from using technology? Nachmias and Shany (2002) examine students' learning in virtual courses and the relationship between their performance and thinking styles based on a study of Israeli junior high school students. The results suggest that virtual courses provide opportunities for all learners, but the opportunities vary for every individual. In the study conducted, prior experience with ICT was found to be the major factor affecting the virtual learning. Some colleges in the United States do not allow their international students to take online classes, as they want them to participate fully in the U.S. college classroom experience. This varies from college to college, and depends on the academic level and program; sometimes academic advisors will grant permission to take an online class. Additionally, some colleges allow their international students to take an online class after they have been enrolled in, and attended college for one or two semesters, suggesting that by then international students would learn all necessary technology to be academically successful. This is an interesting assumption, as some educational systems are very technologically advanced, and students are very technologically savvy.

Knowledge and skill in technology use are becoming a necessity of everyday life; these skills might define a contemporary educated individual. Lima and Brown (2007) assert that Brazilian students "use information and communication technology in socially valued ways to be informed about what is happening in the world, to communicate with people all over the world and to promote social justice and inclusion" (p. 142). According to Lima and Brown (2007), the Internet and ICT are a "valuable channel for knowledge dissemination and opportunities for development and growth among nations in the world" (p. 146). With internationalization of the world one needs to become a competent global citizen and consequently have appropriate knowledge and skills; ICT can provide that opportunity. In the case of international students, technology helps them to learn about American culture prior to their arrival to the United States, keep in touch with family and stay up-to-date with the news in their home country. It is important to learn how international students experience technology as technology use can also hinder their learning. Importantly, technology use can also stop them from developing relationships and actively participating in communities on campus; there is a danger that technology might allow them to stay in touch with their distant friends and family too closely.

ICT can serve academic and non-academic needs of its users; it can be used inside and outside the classroom. How is the impact of technology use on learning measured? Technology is being integrated into the curriculum by faculty; it is also being used by students for purposes other than their studies. The literature covers the "What," the type/kind of technology, and the "How," how technology is being used. But literature does not necessarily cover or even measure the potential impact of the use of technology on students' learning (not just the learning supported in the academic setting). If a potential impact on learning is stated, it is only for the in-class use of technology. In 2003, the "ICT Curriculum Integration Performance Measurement Instrument" was developed from an extensive review of the contemporary international and

Australian research pertaining to the definition and measurement of ICT curriculum integration in classrooms (Proctor, Watson & Finger, 2003). The resultant 20-item, two-factor instrument, now called "Learning with ICT: Measuring ICT Use in the Curriculum," is both statistically and theoretically robust, and was based on theories and methodologies identified by the literature review. Again, this instrument might only yield results that are rather limiting, as it addresses only one aspect of the experiences one might have with technology and does not provide a holistic perspective of the impact of technology use on one's life. Thus, the impact of technology on an international student's life experiences cannot be measured with this tool.

As stated above, technology can be used for academic and non-academic purposes. Various tools can be used to serve the needs in class and outside the classroom; technology skills are transferable from one environment to another. Kozma (2003) examined how ICT was used to support innovative classroom practices in 28 countries. He examined the use of the most used ICT such as Web resources, e-mail, multimedia software, Web design tools, and tutorials. Kozma (2003) states that "the use of the ICT developed positive attitudes toward learning, [allowed students to acquire] new subject matter knowledge [and/or allowed students to acquire] collaborative skills."(p. 52). In Adelaide, Australia, the results of the use of the ICT in the classroom brought improvement in "the quality of students' thinking and problem-solving processes, students' critical engagement with and analysis of information being created and explored, the independent and collaborative skills of all learners, and supporting students in their learning how to learn" (p. 53). Another case, based in the U.S., demonstrates students' improvement in the following areas: technology literacy, collaboration, written communication, and oral communication. A case based in Hong Kong used ICT in the classroom to teach students "to handle the work of a financial organization, cooperate with other people as a team, search for, organize, and analyze information and present their findings" (Kozma, 2003, p. 53).

Thus, technology skills attained in the classroom might be able to serve other life needs of its users outside the classroom and allow them to become fully functional members of a technology-enhanced society.

Su (2008) examines the use of ICT in science courses and its impact on student performance. According to Su (2008), "the application of ICT multimedia for science teaching will facilitate students to acquire basic scientific knowledge and improve their performance. It helps students acquire a better understanding of the targeted science concepts and promotes a positive attitude toward science learning" (p. 1372). A question arises: do the technology skills in the classroom help students to be more comfortable in using technology for other purposes?

Kinuthia and Dagada (2008) explore the types of Information and Communication Technology (ICT) in use in higher education in South Africa. Specifically, they examine how e-learning is being used for teaching and learning purposes. According to the findings of the study, universities differ in their missions and approaches to e-learning. Kinuthia and Dagada (2008) state a number of barriers to e-learning that include but are not limited to large class sizes, limited bandwidth, time, and financial limitations (p. 623). As in any other school, students often enter a university with technology skills and try to find the use for those. Kinuthia and Dagada (2008) declare that "learners' enthusiasm fosters ICT integration in instruction" (p. 624). Students might be the ones who stand behind the change towards more technology use in college; there might be a mismatch between how students use technology outside school and in school. Students might become advocates for more advanced or a richer variety of technology use. It is important to understand that students' knowledge and skill in technology use are as diverse as students themselves.

According to Baird (2005) students today are growing up surrounded by the digital world, and as a result of this environment they are developing new ways of understanding,

learning and processing information. In the words of Baird (2005), "…as new types of social media are developed, teachers will need to find new and innovative ways to harness the power of these technologies to enhance their curriculum, and support differing learning styles" (para. 14). During the era when technology is becoming ubiquitous the diversity of students' knowledge and skill with technology is striking for its range. It would be an erroneous generalization to assume that every student is technologically savvy. There are a number of variables that relate to the comfort level with technology, such as demographic measures: ethnicity, gender, age, country of origin. Other measures like socio-economic status, access to technology, labor force status, educational functioning level, rural residency status, disability status, learner's interests, to name just a few, may also relate to technological proficiency.

Technology can support an individual's personal development and it can also support an educational system reform. For example, the Caribbean Anglophone countries (CARICOM) are reforming their education systems to meet the challenges of the present era with the rise of ICT and the rapid innovations of technology (Jules, 2008). However, the use of the ICT for reformation purposes is not always worth the cost. According to Sanchez and Salinas (2008), an ICT program was being implemented during 15 years into public education in Chile in four areas: "…infrastructure, digital literacy, conditions of learning, and school learning of major national and international tests…" (p. 1630). The results did not indicate any significant differences in terms of classroom learning and no additional competencies were attained by students. Yet again, the processes of technology use and its implementation into the educational processes are hard to measure; they could be measured in terms of the areas mentioned above, but again no holistic perspective is being described when these areas are the focus.

There are a number of technology tools that support learning and development of higher order thinking skills. Information Communication Technology (ICT) support students'

development by various means. Most commonly used tools that support these developmental processes are represented by various Web 2.0 tools. A review of selected Web 2.0 will be further presented in this chapter.

College student lifestyle.

International student college lifestyle comprises of a variety of experiences. To understand experiences of international students, it is important to gain a perspective on a college student life style. Academic requirements take the majority of a student's time, but a student's life is not limited only to school requirements (Tseng and Newton, 2002).

In terms of time spent by a student fulfilling academic requirement, a full-time semester work load defined by academic policies is 15 hours and 6 hours for the summer session for undergraduate students, and nine credit hours for a regular semester and five credit hours during the summer session for graduate students. A student needs to spend 32 hours doing homework for each credit hour as defined by academic policies. To fulfill academic requirements and knowing for fact that more often than not information including class syllabus, assignments, assigned readings, additional materials, quizzes, exams, and discussion board are online, students need to know how to use technology, feel comfortable using technology and be proficient in its use (Kvavik, Caruso, Morgan, & EDUCAUSE Center for Applied Research, 2005). There are 24 hours in a day, and we assume on average 8 hours are spent on sleep; the rest of the 16 hours a full-time student divides between school and social life. As we know, Web 2.0 tools are used for academic and non-academic purposes. As described earlier, school work requires the use of technology; it takes up a great amount of time on a daily basis. Moreover, technology fulfills other needs of a college student, especially in the case of international students.

Building a community and forming a new identity.

When attending college, students enter a new realm of life. Learning is not just an individualistic process; it is a social process. Students become a part of a learning community. According to symbolic interactionism, people's selves are social products. Denzin (1995) states that meanings are constructed within a social and a personal world. The concept of interaction between individuals and environments is presented by Daloz (1999) in the form of a general systems theory. Daloz (1999) believes that complex sets of contingencies variously affect a developing person. In our case, when international students arrive in the United States, they face a new environment; the interaction between an individual and environment is a dynamic process, when both respond to each other's behavior. And as a result, both actor and environment change and adapt to each other in complex ways that drive the growth and development of each independently, as well as both as a system (or unit). The environment has an impact on an individual. In a college's environment, computers and other technology came to be important tools in schools that help students understand the world around them (McFarlane, 2008); additionally, they allow students to become fully functional members of a technology-enhanced global society, a world with practically no limits and barriers where technology allows a real connection with almost any spot in this world. To better understand the experiences of international students with technology in college in the U.S. we need to know how they came to gain their technology skills and what meaning technology has in their lives.

Digital Divide.

International students' communities represent a kaleidoscope of languages and cultures, as well as socio-economic classes. An issue of diversity of learners is often addressed by universal computer access. The term "digital divide" is known by users in an online community.

Norris (2001) describes "digital divide" as a multidimensional phenomenon that encompasses *global* divide, *social* divide and *democratic* divide. In the words of Norris (2001):

> The *global divide* refers to the divergence of Internet access between industrialized and developing societies. The *social divide* concerns the gap between information rich and poor in each nation. And finally within the online community, the *democratic divide* signifies the difference between those who do, and do not, use the panoply of digital resources, to engage, mobilize, and participate in public life. (p. 4)

Digital divide encompasses issues pertaining to international college students, as this group is indeed very diverse. As described earlier, international students come to the United States from almost every country in the world; they are also diverse in their socio-economic status. The fact that the leading source of funding is personal and family funds (62.3 % of the total (Open Doors Report, 2008)) might be striking, as that can lead to a conclusion that more than half of international students belong to a high socio-economic class in their home countries, and thus might have access to technology and most likely have had extensive experiences with technology. The study will look into the reasons that might lead to positive and/or negative experiences with technology including access to technology.

Once international students arrive in the United States and take on the college journey, their lives change dramatically. They become members of a new culture, and nearly by default join a cyberculture. Norris (2001) questions the significance of cyberculture in relation to its impact on "leisure hours, community networks, and personal lifestyles" (p. 4). Cyberculture is widely spreading and impacting societies at large while globalization is supporting the process of technological development throughout the world. As Norris (2001) has noted, "The public has flooded online in comparable countries such as Canada, Sweden, and Australia" (p. 4). Does that mean that international students that arrive from these countries to study in the U.S. are prepared to meet technological requirements in college and use technology extensively for other, not school-related, purposes?

The United Nations has made it clear through policy development and its implementation that information communication technology (ICT) must promote development. In his Millennium Report, former UN Secretary General Kofi Lanan stressed the importance for developing countries to benefit from opportunities emerging from the digital revolution. He believed in bridging the digital divide between industrialized and developing countries, in key fields like health, education, income generation, gender equity, environment and humanitarian aid (United Nations Department of Public Information, 2000). Does this mean that international students from developing countries come to the United States to study being proficient users of technology?

Digital natives and digital immigrants.

Digital Natives and Digital Immigrants differ in their proficiency of use of the digital language. Prensky (2001) claims that digital natives are " 'native speakers' of the digital language of computers, video games and the Internet" (p.1). He describes digital immigrants as those who learned the digital language later in life, because circumstances required them to, or because they were mesmerized by technology and adopted "many or most aspects of the new technology…" (Prensky, p.2). The learning journey, or adaptation process, for digital immigrants varies; for some it is easier than for others. A number of factors might impact the degree of ease or difficulty. Zur and Zur (2011) state that the major difference between the two is that "…digital natives speak and breathe the language of computers and the culture of the web into which they were born, while digital immigrants will never deal with technology as naturally as those who grew up with it…" (para. 1). In addition to these two groupings, there are subgroups within each category. Three major groupings of digital immigrants are avoiders, reluctant adopters, and enthusiastic adopters; and three major groupings of digital natives are avoiders, minimalists, and enthusiastic participants (Zur & Zur, 2011). The authors believe that digital

immigrants differ in their attitudes and capacities in regard to digital technologies. All digital natives seem to find technology fun and enjoyable, they seem to have their preferred ways of communication (texting to emailing), and might be less formal in their writing, which might appear to be less professional for those who are not accustomed to that. It is important to distinguish these two major categories as it might shed light on the kind of tensions and difficulties an international student might experience depending on what group he or she represents.

Web 2.0.

Before the research topic on international students' experiences with technology is addressed, it is important to provide a detailed overview of a dynamic group of technology tools grouped together under the category of Web 2.0. Mason and Rennie (2008) provide a comprehensive overview of Web 2.0 tool and discuss a number of most commonly used ones: "blogs, wikis, podcasts, e-portfolios, social networking, social bookmarking, photo sharing, Second Life, online forums, video messaging, e-books, instant messaging, Skype, games, mashups, mobile learning, RSS feeds, YouTube and audiographics" (p. 61). Web 2.0 tools facilitate information sharing, communication, collaboration and serve the purpose of supporting learning activities. As the researcher asks in the survey about various tools used by international students it is important to draw a clear picture for those who might not be familiar with the technology being used.

Blogs.

Blogs (weblogs) are describes as "a type of webpage that is simple to create and disseminate and that is used as a form of online journal by millions of users" (Mason and Rennie, 2008, p. 62). Downes (2004) states that a blog reflects a personal style, and that this style may be reflected in "either the writing or the selection of links passed along to readers" (p. 18). Blogging

is not just about creating content but also reading and writing online. According to Downes (2004), "The process of reading online, engaging a community, and reflecting it online is a process of bringing life into learning" (p. 26). Clyde (2005) describes blogs' use for academic purposes, when they are used in education "as sources of information and provide professional development material for teachers," they are also used for curriculum-related activities, as well as to "provide information to parents and other members of the school community" (p. 44). The process of creating and maintaining weblogs can also serve a learning purpose in a classroom allowing students to engage in collaborative projects.

Wiki.

One of the vivid examples of technology use is a wiki, a tool that empowers collaborative learning by allowing users to work together in a joint intellectual effort to create an encyclopedic entry. In the words of Coffin and O'Halloran (2008),

> Contributors to Wikipedia are encouraged to adhere to debate guidelines which, in turn, promote the formulation of reasonably clear-cut claims, backed up by evidence, etc., by Wikipedia editors. The debate guidelines, in effect, provide teaching of argumentation for a specific purpose – the co-writing of a 'neutral' article…Wikipedia teaches skills of effective argumentation. (p. 225)

Coffin and O'Halloran (2008) use a Wikinquiry model that "teaches students critical assessment skills and allows them to develop new skills by emphasizing reading and writing" (p. 144).

Baker (2008) suggests a number of methods for creating class websites: blogs, groups and wikis. She states that they are self-developing and are very engaging, not that hard to understand and are great classroom resources. Lindsay and Davis (2007) use a wiki-centric approach to examine societal trends; according to the results of the study this project enhances student understanding. Winkler (2005) argues for no use of wikis as a research tool by stating that the tool is not as reliable as other more traditional resources such as scholastic

encyclopedias. But is that really a purpose of wikis? Shareski and Winkler (2005) argue for the use of Wikipedia as a valuable source and a model for the management of information.

Podcasts (audio/video podcasts).

Podcasts are defines as "an audio file which can be downloaded and listened to either on an iPod or MP3 player for mobile study or a computer or a laptop for location-based study" (Mason and Rennie, 2008, p. 69). They also describe different kinds of podcasts such as video podcast, a podcast that is visually enhanced, and a blogcast, that is a combination of a blog and a podcast.

King and Gura (2007) state that podcasting is revolutionizing the society at large. The processes of teaching and learning are affected too. They want to help educators become podcasting educators. Both teachers and students "become a part of a team whose work is heard and responded to by others by engaging in podcast creation" (p. viii).

Nie (2006) suggests the following reasons for using podcasts for learning and teaching purposes in higher education:

> Lecturer-generated pre-class listening materials containing news, review of journal articles, activities of the week, feedback and comments on assignment and activities, explanation of difficult terms, background information about the subject, questions students need to think about before class, etc.
> Student-generated podcasts based on the student's own summaries, reflections, comments, thoughts, and conclusions. The purpose is to share the student's own ideas with others via podcasting. (p. 2)

E-portfolio.

E-portfolios are used to create, develop and assess students' learning in the form of professional portfolios. One of the examples is Livetext Portfolios described as

> LiveText's flexible Accreditation Management System™ provides institutions with the most advanced, complete, and user-friendly web-based tools for developing, assessing, and measuring student learning and more. With LiveText's Accreditation Management System, institutions can provide its students, faculty, administration, and stakeholders the

> best assurance of its commitment to accountability, continuous improvement, and excellence in education. (Livetext, 2009)

E-portfolios are used for various purposes. Siemens (2004) suggests that portfolios are being used by students to demonstrate competence relative to learning objectives, or may be used by teachers as an assessment tool. Moreover, some schools use them to fulfill state certification requirements.

An E-Portfolio is not necessarily a certain software package. Barrett (2009) describes it as a combination of process (a series of activities) and product (the end result of the ePortfolio process). Siemens (2004) suggests a list of possible components of an e-portfolio. It may include: personal information, educational history, recognitions such as awards and certificates, reflective comments, coursework such as assignments, projects, instructor comments, previous employer comments, professional goals, plans, personal values and interests, presentations, papers, personal activities such as volunteer work and professional development. In addition, according to Siemens (2004) all artifacts in a portfolio should have a purpose such as demonstrating a skill, an attribute, and learning acquired from experience.

In the words of Gathercoal, Love, Bryde, and McKean (2002), "A well-designed curriculum [is] embedded in a webfolio system - one that conveys academic standards, contains appropriate resources, and provides vehicles for faculty mentoring-enables students' development, growth and showcase portfolios at once" (p. 36). Jafari (2006) presents e-portfolios as a revolutionary tool that can change the nature of learning and bridge the divide between the academic world and society at large. Stefani, Mason, and Pegler (2008) suggest using e-portfolios to link learners' minds in order for them to think together and learn cooperatively and constructively.

Social networking (Facebook, MySpace, Twitter).

Hoagland (2009) states that social networking is used to keep in contact with others as well as engage in a number of social activities and suggests that schools should develop their own social networking sites to allow students to connect with each other as well as with their teachers. Educators notice that social networking plays a major role in students' lives and they cannot ignore or disregard this fact. Teachers have started incorporating social networking tools into curriculum. Ms. Garcia, a teacher at Manual Arts High School in South Central Los Angeles when searching for new ways to use popular culture in her classroom, started using MySpace to connect with her students. Garcia (2008) believes that "communicating through a media that is so familiar to students encourages their in-classroom participation" (p. 28).

As Mason and Rennie (2008) have noted, social networking sites "offer an interactive, user-submitted networks of friends, personal profiles, blogs, groups, photos, music, and videos internationally" (p. 77). Some are more popular than others among different groups of users.

Bogatin (2007) informs that Facebook provides two types of information: personal information that one knowingly chooses to disclose and Web Site use information as users interact with the Web Site. Bugeja (2006) states that "Facebook is fascinating -- an interactive, image-laden directory featuring groups that share lifestyles or attitudes." According to Bugeja (2006), social networking affects all levels of academe:

1) Institutions seeking to build enrollment learn that "technology" rates higher than "rigor" or "reputation" in high-school focus groups. That may pressure provosts and deans to continue investing in technology rather than in tenure-track positions.

2) Professors and librarians encounter improper use of technology by students, and some of those cases go to judiciary officials enforcing the student code.

3) Career and academic advisers must deal with employers and parents who have screened Facebook and discovered what users have been up to in residence halls.

> 4) Finally, academics assessing learning outcomes often discover that technology is as much a distraction in the classroom as a tool. (para. 4)

Social bookmarking.

Social bookmarking allows users to store lists of Internet resources that they find interesting and useful (Mason & Rennie, 2008). Users can also define whether they want these lists to be public or private. One-word descriptors can be assigned to a bookmark, they are called tags. Bookmarking links people together as well as links people to resources.

One of the social bookmarking sites is Delicious (http://www.delicious.com). Delicious is a Social Bookmarking service that allows a person to save all their bookmarks online, share them with other people, and see what other people are bookmarking. It also means that you can see the most popular bookmarks being saved across many areas of interest. In addition, it provides search and tagging tools that can help you keep track of your entire bookmark collection and find "tasty" new bookmarks from other people (Delicious, 2009).

Hammond, Hannay, Lund, and Scott (2005) conclude that social networking tools usually have the following elements in varying degrees:

> personal user accounts (groups sometimes provided); mechanisms for entering links, titles and descriptions; browser bookmarklets to facilitate entry; classification by 'open' or 'free' tagging; search by tag or user (both combinations sometimes allowed); querying of links based on popularity, users, tags, etc.; RSS feeds; extensions such as browser plug-ins. (Conclusions section, para. 1)

Iskold (2006) states that the social bookmarking market is dominated by two major competitors: del.icio.us and StumbleUpon. These two leaders split the market. Iskold (2006) points out the difference stating that "del.icio.us builds a hierarchy for people to browse (it does related relationships, etc.), while StumbleUpon is more of a random discovery system".

Photo sharing.

Mason and Rennie (2008) define photo sharing as "publishing or transferring a user's digital photos online that enables the user to share photos with others, which can be done publicly or privately" (p. 84).

Flickr (2009) suggests a number of ways how Flickr can be used within a course or discipline: share photos within a class, school, department, faculty, college or university;

- set up a group for courses
- share photos with group members (architecture or visual arts groups can use the geo-tag feature to share images/locations)
- collect great web page designs
- work with international students (i.e., stimulating discussions on countries of origin, using photos and linking to real-life images)
- when traveling, share photos with family and classmates
- build community in distance education
- use Flickr for diagnostic and therapeutic purposes, as well as for diagnostic consultations
- relate photos to class assignments
- create hyperlinked diagrams with the notes tool
- create visual stories via imagery
- and use a built-in discussion tool. (Teaching and Learning Possibilities section, para. 1)

Grove (2006, October 11) compares Flickr and Google and analyses these two tools in terms of using them in an educational setting. He states that Google has more images but that Flickr's images are more realistic and that a growing number of third party applications are being added to this tool that makes it more advantageous and powerful for fulfilling an educational purpose.

SIESWE Learning Technology Team (January 25, 2007) describe how easy it is to use Flickr as a tool to socialize, share and build a community to share one's experiences. They also dwell on the features of Flickr which allow conversations to initiate around photos by tagging and leaving comments.

Baird (2005) names two main components of Flickr, which are online collaboration and community. Baird (2005) describes Flickr as a tool that is easy to use and "allows the student to keep his/her focus on acquiring new skills, building on existing knowledge while at the same time developing writing, software, and strengthening social ties within their learning circle" (para. 2) . According to Baird (2005), this powerful tool fosters interaction and communication between students, as well as becomes an important part in student motivation, retention and learning.

Multiple user virtual environments (Second Life).

Mason and Rennie (2008) define Second Life as "a user-defined world, owned by its residents, in which people explore, communicate and do business" (p. 87). They state that Second Life supports distance learning, computer-supported cooperative work, simulation, new media studies, as well as corporate training.

Second Life in Education (2009) states that Second Life

> can provide opportunities for rich sensory immersive experiences, authentic contexts and activities for experiential learning, simulation and role-play, modeling of complex scenarios, a platform for data visualization and opportunities for collaboration and co-creation that cannot be easily experienced using other platforms. (para. 1)

Second Life engages students in creating their own learning activities, experiences and environments, and it transforms students from being passive consumers of learning to active collaborators (Second Life in Education, 2009).

Robbins and Bell (2008) in their book *Second Life for Dummies* introduce a novice to a new world, and teach one how to build one's own social circle in Second Life and play an active role in this new and fascinating world.

Online forums.

Mason & Rennie (2008) state that online forums are referred to "computer conferences, web forums, message boards, discussion boards, (electronic) discussion groups, discussion forums, bulletin boards" (p. 90). Mason and Rennie (2008) describe the features of online forums as the following:

> Convenient in time and place, more equable, especially for quieter learners, they can be backtracked and reread, they allow for a considered response, and also allow more reflective students to participate, they allow a teacher to become a moderator and a facilitator, they provide a chance for an out of the classroom communication, which saves time spent on management and administration, as well as opportunity for information rehearsals and thoughts' formulation. (p. 92)

Online forums create a sense of community among users. Rovai (2002) claims that sense of learner community may be viewed as consisting of four related dimensions: spirit, trust, interaction, and commonality of learning expectations and goals; when combined, stronger feelings of community are expected to develop. These are important to develop especially in online forums where a sense of community might be missing because of the setting.

Dixon, Kuhlhorst, and Reiff (2006) declare that in a discussion forum an instructor can see exactly what each member has contributed and whether they have been engaged. In addition, in an online forum setting social messages help a group become cohesive, creating higher member satisfaction and the possibility of better products in a classroom. They believe that "the more information the entire group shares, the more likely they are to have the relevant information to create a good decision" (p. 14).

Video messaging.

Mason and Rennie (2008) find it difficult to describe video messaging in one term. They suggest the following components of an umbrella term "video messaging:" desktop videoconferencing, whiteboarding, instant messaging, Voice over IP (VOIP), and streaming. The

authors suggest that the best use for video messaging is in small group tutorials and seminar sessions. Students might be geographically spread or unable to join the real-time session. There are a number of software packages that support video messaging, like FlashMeeting, Netmeeting and Windows Messenger.

Blackwell (2003, October 21) asserts that instant video messaging and videoconferencing are now sharing similar features and are both great in quality and price. They suggest that real time is indeed more real, and fewer and fewer problems are out there, and many technology issues have been solved. Some products do not require any additional software for installation but Internet access (i.e., A/V Instant Communicator). Many programs support desktop-sharing, video conferencing, and collaboration for all Windows applications (i.e., VIA3, the e/pop Web Conferencing Server from WiredRed).

E-books.

Mason and Rennie (2008) describe e-books as "an electronic version of a conventional book that can be read on screen using a desktop computer, any portable device (e.g., laptop, PDA) or in some cases a dedicated e-book hardware device" (p. 98). The biggest advantage of this resource is that it allows the rapid circulation of highly specialized literature at low cost.

Project Gutenberg is the first producer of free electronic books (e-books) (Project Gutenberg, 2009). This site allows free downloads of popular books, it places thousands of books into the digital public access domain. The site has 28,000 free books available to download with over 100,000 titles available at Project Gutenberg Partners, Affiliates and Resources.

Rose and Meyer (2002) report that materials and media, like books and speech designed for the traditional classroom use, often come in one size and with one perspective for all, but unfortunately they do not fit everyone. The traditional media is not flexible and often creates

barriers to learning. More flexible media, such as e-books, have the potential to provide instruction that can reach more students and will most likely be more effective. Shiratuddin, Landoni, Gibb, and Hassan (2003) claim that e-books have the potential to enhance educator-student interaction. Students are interested in using e-book technology.

Instant messaging.

Mason and Rennie (2008) define instant messaging (IM) as "a simple form of synchronous online communication that allows two or more computer users to communicate across a network connection" (p. 101). The primary means of communication is text, but audio and video are supported by some instant messaging applications too. In the educational setting it is mainly being used to encourage collaboration and cooperation among faculty and students; it also can provide convenience in terms of location.

Craig (2003) compares writers' ability to use different tones and styles in writing to young people using IM and traditional language skills. He believes that diverse language skills increase a person's metalinguistic awareness. He suggests holding schools responsible for the decline in literacy and for not providing adequate education. He suggests improving the situation by teaching Standard English skills and not blaming IM for the decline in literacy, as there are many other possible causes for it. He believes that IM exposes literacy problems, but it does not create them.

Farmer (2003) raises a question of whether there is a future for IM as an educational collaborative tool or whether it will become a nightmare for faculty, as it requires a lot of time. Supposedly, many students have embraced this new piece of technology but not that many faculty members have. Farmer (2003) also points out the uses of IM in educational settings, stating that IM can be used for virtual office hours, remote guest speakers, collaborative group work, class discussions, lectures, mentoring, recruiting and admission, library consultations and

many others purposes. He concludes that IM in educational settings can provide social connection for distance and remote students, as well as collaborative opportunities. IM is actively used and accepted by millions of users; it allows users to connect from any place with Internet access.

Jeong (2007) suggests that IM has a very positive impact when used in an educational setting for both on-site and on-line courses. The availability of the instructor and his/her comfort level using IM play a major role in the success of IM communication (p. 36). IM allows for immediate, efficient, and timely communication.

Wymer (2006) experienced a number of problems when she started using IM with her class. Nevertheless, she supports the idea that a teacher needs to adapt his/her teaching style to include the technologies with which students feel comfortable using and which could possibly enhance student-teacher interaction.

Skype.

Skype is software that enables the world's conversations through free video and voice calls. Skype also supports instant messages and file sharing with other Skype users along with low-cost calls to landlines and mobiles. To use Skype one would need a broadband internet connection.

Mason and Rennie (2008) list a number of educational uses for Skype, such as:

- One-to-one support for remote graduate students
- Authentic interactions with native speakers for language teaching
- Integrating a multicultural perspective through global interaction
- Useful research tool for telephone interviews or feedback from students
- Possibility of keeping Skype office hours especially for remote students
- Opportunities for inviting guest expert speakers into an online course. (p. 106)

Schwartz, de Schutter, Fahrni, and Rudolph (2004) compare two competing products iVocalize, a browser -based audio-conferencing software, and Skype, a PC-to-PC Internet

telephone tool. As a result they emphasized the ease with which Skype may be used for simultaneous PC-to-PC communication among up to five users.

Elliott and Rishel (2007) conducted an exploratory survey on collaborative software in a graduate course on automatic identification and data capture. They compared the ratings of Skype instant messenger client, as opposed to other instant messenger clients and the degree of user satisfaction with Skype. They rated the use of Skype and compared it to WebCT, while also looking at how Skype is used as a phone, as well as a videoconferencing tool, and a teleconferencing tool. The findings show that the majority of students have adopted the tool, although some students did not use the tool that extensively; the author also suggested "using Skype as a one-on-one collaboration tool in class" (p. 161).

Games and simulations.

"Games and simulations allow students to develop their critical thinking skills by enabling them to manipulate and evaluate rather than replicate concepts" (Mason & Rennie, 2008, p. 110). Games and simulations are not new to education, but they have gained a new twist with the Web 2.0 tools as they become more accessible. Mason and Rennie (2008) list a number of strengths of games as well as simulations. They develop problem-solving skills, facilitate a discovery of alternative solutions, provide an opportunity to practice and interact in a simulated environment; in addition, games allow users to put on different hats, take on various identities and approach a task from a number of perspectives; they also allow the users to be engaged which is essential when a task is complex. Finally, games provide a learning opportunity to a number of learners through multiple modalities such as print, sound and image.

Mashups.

Mashups are defined by Mason and Rennie (2008) as "the creation of something new from parts of several separate sources in order to produce a single integrated whole" (p. 113).

Mashups usually combine a mixture of existing pieces from several sources such as websites or applications; during this process, according to Mason and Rennie (2008) a "customized, personalized or novel functionality" is being produced (p. 114). Some of the examples of mashups include Amazon, eBay, Google, etc. Brown (2007) claims that Web 2.0 tools enable learner-centered capabilities and describes mashups as a tool that enables "the ability to find content with the CMS 2.0 and repurpose it in new learning contexts" (p. 9). Its users might not be familiar with the term "mashups," as it is not often used in an online community; they might not know they are using mashups unless the term is being explained. They might be surprised to find out that this is the most commonly used Web 2.0 tool without its users' acknowledgement.

Mobile learning.

"Cell phones, personal digital assistants, MP3 players, portable game devices, handhelds, tablets, and laptops" represent mobile learning devices (Mason and Rennie, 2008, p.115). Now some devices such as an iPhone or an iTouch might offer all of the applications that several other devices might offer. Attewell and Savill-Smith (2004) state that mobile technologies engage young adults (aged 16–24) in learning activities; "they change their attitudes to learning and contribute towards improving their literacy, numeracy and life chances" (p. 3). Fisher, Higgins, and Loveless (2006) state that even teachers use "digital technologies for understanding, reflection, ingenuity and creativity, and, through these, support their own learning in new ways" (p. 4). Kukulska-Hulme and Traxler (2005) state that mobile learning technologies have been adopted by and significantly influenced higher education, schools and the community, training and updating and that they "impact teaching and learning, build connection between formal and informal learning, work and pleasure" (p. 5). Wagner (2005) claims that mobile technologies are not just evident but unavoidable in the field of learning and teaching. Mobile learning enables connectivity, connection and content-distribution capabilities.

RSS feeds.

Really Simple Syndication (RSS) is defined by Mason and Rennie (2008) as "a set of web feed formats used to publish frequently updated content such as blog and wiki entries, news headlines and podcasts" (p. 121). RSS feeds are also often referred to Rich Site Summary, Really Simple Syndication, Remote Site Summary, or RDF Site Summary, as they either provide a summary of the content or full text (Ashwin, Pitts & Ramsden, n.d.). In other terms, it is a way to receive personalized news, organized in a simple way. RSS feeds help a user to make sense out of a vast amount of information that is accessible via the limitless, and often overwhelming, resources that is the Internet. RSS feeds allow sharing information from many sources and gathering and evaluating most recently published information (D'Souza, 2006).

YouTube.

YouTube is a site founded in 2005 allowing users to share videos online. User can upload and share video clips on www.YouTube.com and across the Internet through websites, mobile devices, blogs, and email (http://www.youtube.com/). Imaginative Education Research Group (2008) uses YouTube as a way to share educational videos with teachers looking for innovative ideas to incorporate in their teaching. Some of the topics include using the limits of experience and the extremes of reality, personalizing objects to make them meaningful to young students, and story structuring lessons and units to make them emotionally meaningful. Conway (2006) claims that YouTube can enhance college experiences by providing video to enhance their textbooks, in-class documentaries and course lectures. He uses YouTube in his own classroom to enhance his students' experiences in his Latin American Culture and Civilization class; this tool according to Conway (2006), engages students with original documents and makes it possible for the students to experience the content visually.

Mason and Rennie (2008) claim that "…nowadays the number of networks, services and devices is practically countless" (p. 117). Technology enters all aspects of our lives: personal and professional, technological tools save time and enable unlimited opportunities. Technology can serve our organizational, administrative and supportive needs.

A selected literature review provides multiple examples of various types of Web 2.0 tools and their use for various purposes. This overview of Web 2.0 tools examines how technology might impact its user's life and allows us to further examine how it might impact an international students' life.

Course management system (CMS).

In addition to the use of Web 2.0 tools, students are required to use a course management system. Course management systems became an important, integrated part of academic systems in higher education (Morgan, 2003). Course management systems are used as platforms for communication, collaboration, and information exchange; they are essentially software systems designed to serve the educational needs for teaching and learning of faculty and students in the higher education setting. The most common course management systems are WebCT, Blackboard, Learning Space, and eCollege (Morgan, 2003). Pollack (2003) reports that over 95% of higher education institutions use a course management system. Nijhuis and Collis (2003) state that instructors use a CMS to accomplish content-specific tasks, and requirements and management tasks such as "planning, organizing, structuring, tracking, reporting, communicating arrangements and expectations, and many other activities that take time and require orderliness on the part of the instructor" (p.193).

As there are differences noted between "digital immigrants" and "digital natives," the principles of technology use can also be applied to how faculty use a CMS. West, Waddoups and Graham (2007) define three degrees of CMS use by faculty: 1) embracing the tool and being

dependent on it, 2) using only some features of the CMS, and 3) discontinuing the tool and finding an alternative. The degree or extent of use by a faculty member might impact the degree of use by a student. However, a student generally takes more than one class, and thus most likely will be exposed to more than one style of faculty CMS use.

As users' experiences with Web 2.0 tools vary, probably due to intrinsic factors (such as personal interest), users' experiences with a CMS might vary, primarily due to extrinsic factors such as the fact that a school uses or doesn't use a CMS. Ertmer, Gopalakrishnan, and Ross (2001) name extrinsic barriers, "…lack of resources, adequate training, technical support, and time" (para. 2), while naming beliefs and vision of technology integration, as well as views about teaching, learning, and knowledge as intrinsic factors. Thus, a user might be able to control some factors, while others might be out of his or her reach.

Comfort with technology.

Colleges require students to use a course management system for school related purposes. Also, Students might be required to use other computer or web technologies outside a course management system. Lee and Witta (2001) state that a certain level of comfort with technology is required for a student to engage in online learning processes. Students need to be able to participate in instructional activities, access instructional resources, interact with instructors and classmates, and use various computer software and programs. An advanced comfort level might support students' college experiences. Loyd and Gressard (1984) believe that learners who lack required technical skills might be at risk of suffering from computer anxiety. Those who lack technological knowledge and skill might feel uncomfortable using technology, have a hard time meeting academic requirements and experience a difficult time in college.

Summary of the Chapter

Chapter Two has provided an overview of the literature on international students, higher education in the U.S. and information communication technology (ICT). The researcher was unable to find literature that would address all of these areas and would describe the experiences of international college students with technology in the United States. Research on the international student use of technology is scarce. The selected literature review reveals a gap in studies on international students' use of technology over the past decade and demonstrates the need for further research. This study uses the three areas to examine the use of technology by international students by determining which demographics of international students predict the comfort level with technology, evaluating the frequency of trends of ICT usage, and further explores the experiences in more depth. The research methodology will be described in the following chapter.

CHAPTER THREE: METHODS

In this chapter, the researcher presents the research methodology used for the study and describes the following elements: research design, rationale and assumptions for mixed methods design and a detailed description of the two phases of the study including: population and sample, measures, data collection procedures, data analysis, methods for testing trustworthiness, and limitation.

Background

The literature review in Chapter 2 provided sufficient evidence for the need for this study. For many years, international students have been under the magnifying glass of researchers as the numbers of international students studying in the Unites States increased every year. However, researchers' primary interest in studying international students have been in cultural and social relations and other related areas of international students' experiences. American universities are trying to stay current with the recent developments of technology and its intelligent use in the higher education setting to help sustain ranked positions or move up in the rankings. The arrival of the information society and globalization is forcing institutions to learn about their students, provide appropriate service to them, and implement recruitment plans to increase enrollment of international students (see page 27 in this dissertation). Research literature provides limited evidence of international students' experiences with technology in college.

This research study intends to answer the following research questions:

1. How do the demographics of international students predict their comfort level with technology?
2. What experiences do international students have with technology while in college in the United States? More specifically,

   a. What Information Communication Technology (ICT) do international students use in college in the United States and for what purposes?
   b. What positive and/or negative experiences international students have with technology in college?
3. How do international college students experience ICT in the United States? More specifically, what contributes to international college students' experiences with technology?

Organization of the Study

The study consists of two stages: Phase One and Phase Two. Each phase of the study will be described separately. Phase One primarily answers the following research questions: How do the demographics of international students predict their comfort level with technology? What experiences do international students have with technology while in college in the United States? More specifically, what Information Communication Technology (ICT) do international students use in college in the United States and for what purposes? What positive and/or negative experiences international students have with technology in college? Phase Two addresses the following research question: How do international college students experience ICT in the United States? More specifically, what contributes to international college students' experiences with technology? Phase One data allowed the researcher to identify information rich cases, and discover themes for generating interview questions for Phase Two to assist in further exploring these information rich cases.

A description of population and sample, measure, data collection procedures, description of setting, data analysis, methods for testing trustworthiness, and limitations for each phase follows.

Rationale and Assumptions for Mixed Methods Design

Creswell (2005) defines a mixed methods design as "a procedure for collecting, analyzing, and mixing both quantitative and qualitative data in a single study to understand a research problem" (p. 510). A mixed methods design builds on the strengths of both quantitative and qualitative data. Tashakkori and Teddlie (2003) state that "there are a number of terms that are being used to describe this methods design approach such as multi-methodology, integrating, synthesis, quantitative and qualitative methods, multi-method, but the recent writings use the term *mixed methods*" (p. 45).

Sequential Explanatory Design

According to Creswell (2005) the use of a mixed methods design is very powerful in "building from one phase of research to another" (p. 510). The researcher followed up the first predominantly quantitative data collection with qualitative data collection in order to gain more information on selected cases, which according to Creswell (2005) is one of the reasons to engage in a mixed methods study. Thus, an explanatory mixed methods design was used in the study. Creswell (2005), states, "an explanatory mixed methods design consists of first collecting the quantitative data and then collecting qualitative data to help explain or elaborate on the quantitative results" (p. 515). The model was adapted to include qualitative data collection in the first predominantly quantitative data collection stage. In this first phase, the researcher primarily collected quantitative data but also included some open-ended questions to collect qualitative (see the *Measure* section for Phase One in this dissertation on page 73 for more details).

Creswell (2005) argues that qualitative data, "such as open-ended interviews that provide actual words of people in the study, offer many different perspectives on the study topic and provide a complex picture of the situation" (p. 510). The second phase of the study is qualitative. The qualitative data allows the researcher to gain an in-depth view of the research topic.

The researcher used a sequential explanatory design. Figure 9 is a graphical representation of a sequential explanatory design (Creswell, 2005) modified to accommodate this study. A discussion of the mixed methods research approach and its implementation in this study follows.

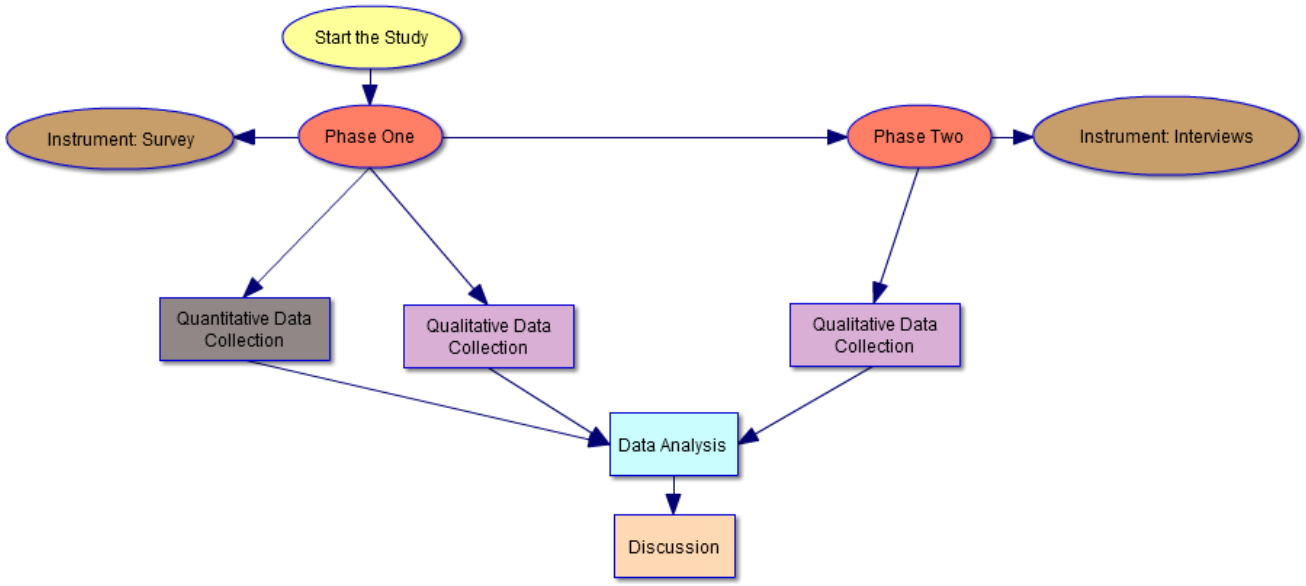


Figure 9. *Visualization of the Sequential Explanatory Design*

The distinguishing qualities of this model are the following:

The design of the study is a mixed study design; it is a sequential explanatory design with a concurrent nested strategy, which is characterized by Creswell (2005) as "its use of one data collection phase, during which both quantitative and qualitative data are collected simultaneously" (p. 214-218). In Phase One, a limited integration of the two types of data occurs at the data collection stage; a predominant method guides this part of the project. The researcher collects primarily quantitative data giving less priority to qualitative data, which is embedded or nested in the first-phase of the study. The researcher predominantly has closed-ended questions (quantitative) but also has open-ended questions (qualitative). Creswell (2005) stated, "this

nesting may mean that the embedded method addresses a different question than the dominant method or seeks information from different levels" (p. 218). The concurrent nested model was used to serve the purpose of enriching the description of the sample participants to help identify participants for the second phase of the study. In Phase Two, the researcher collects qualitative data by means of face-to-face interviews.

Therefore, the study was divided into two phases: Phase One and Phase Two. The findings from both phases were synthesized into a single discussion section. Since the study used a mixed methods design, the researcher was able to answer "What" (quantitative) and "Why" (qualitative) research questions. This design allowed the researcher to enhance the findings of Phase One by following up with Phase Two. In Phase One, the researcher became familiar with the types of ICT being used in college by international students using descriptive statistics, and then using stepwise regression analysis to determine which demographics of international students predict their comfort level with technology. Research participants were invited to describe their positive and/or negative experiences with technology in an open-ended section of the survey. In Phase Two, the researcher was able to follow up on these findings and gain a deeper perspective on international students' experiences with technology through interviews.

A mixed method design poses a number of challenges. Creswell (2005) names a few: a need for an extensive data collection, time intensive nature of analyzing both quantitative and qualitative data, both numeric data and text, and familiarity and expertise of a researcher with both forms of research. The researcher faced all of these challenges.

Rationale and Assumptions for Phase Two of the Study

The researcher uses qualitative research methods in Phase Two of the study.

There are five types of qualitative research methods that are commonly used in education: "basic or generic qualitative study, ethnography, phenomenology, grounded theory,

and case study" (Merriam, 1998, p. 11). Merriam (1998) states that all of them have "…the goal of eliciting understanding and meaning, the researcher as primary instrument of data collection and analysis, the use of fieldwork, an inductive orientation to analysis, and findings that are richly descriptive" (p. 11). Nevertheless they are distinguished from each other, and have their own characteristics that are intrinsic just to them. In this section, it will be explained what method was chosen and why, and a rationale for why other methods have not been chosen for the study is provided.

Phenomenology.

The researcher considered using phenomenology as the research design for Phase Two of the study. According to Merriam (1998) it has an "emphasis on experience and interpretation", and "the focus would be on the essence or structure of an experience (phenomenon)" (p. 15). Shank (2006) confirms that when he states that "when we do a phenomenological study, we attempt to "get inside" the meanings and the world of that person" or a group (p. 89). The researcher focuses on the concept or phenomenon of information communication experiences and intends to provide a description, interpretation and understanding of international students' experiences with technology. The intent of this study is to interpret the interpretations of the participants' views on their positive and/or negative experiences with technology. As Smith (2008) has noted, "…approach is phenomenological in that it involves detailed examination of the participant's lived experience; it attempts to explore personal experience and is concerned with an individual's personal perception…"(p. 54). Even though this is one of the purposes of this study, the current research goes beyond pure examination of participants' lived experiences, and thus was not chosen as the research method for this study.

Case study.

Case study is another research design that was considered for the study. Stake (2005) finds case studies to be commonly used in qualitative inquiry. Stake (2005) defines a case study "not as a methodological choice but rather a choice of what is to be studied" (p. 443). Merriam (1998) states that "…case study design is employed to gain an in-depth understanding of the situation and meaning for those involved" (p. 19). The interest is in process rather than outcomes, in context rather than a specific variable, in discovery rather than confirmation. Insights gleaned from case studies can directly influence policy, practice, and future research. Stake (2005) identifies three types of case studies: an intrinsic case study, an instrumental case study, and a multiple or collective case study. The intent of the current study is to provide insight into the specifics of experiences of international students in two colleges in the Midwest using ICT in college in the United States; and to draw generalizations to a larger group of international students in the United States. Stake (2005) uses the term instrumental case study "to provide insight into an issue or to draw a generalization" (p. 445), which are the two major characteristics of this study. According to Stake (2005), in an instrumental case study, the case itself is of a secondary interest; the researcher is interested in both the particular and the general, mainly because the case helps the researcher to advance her understanding of an issue. The researcher's intent is to build a comprehensive picture of an issue by utilizing multiple-cases. According to Stake (2005), a number of cases might be studied to investigate a phenomenon. Stake (2005) states that "individual cases in the collection may or may not be known in advance to manifest some common characteristics" (p. 447). They may be similar or dissimilar with redundancy and variety. They are chosen because it is believed that understanding them will lead to better understanding, perhaps better theorizing, about a still larger collection of cases. Smith (1978) differentiates a single unit or bounded system in case studies which are unique to this research

design. Berg (2007) states that "…extremely rich, detailed, and in-depth information characterize the type of information gathered in a case study. By concentrating on a single phenomenon, individual, community, or institution, the researcher aims to uncover the manifest interaction of significant factor characteristics of this phenomenon, individual, community, or institution" (p. 283-284). Moreover, basic or generic qualitative study design and case study are not exclusive; both are being used in this research study.

Grounded theory.

Grounded theory was another qualitative research design that was considered for Phase Two of the study. As Merriam (1998) states that "…analysis assumes an inductive stance and strives to derive meaning from the data" (p. 17). The researcher is using elements of the grounded theory design (i.e. in the data analysis, such as open and axial coding). Grounded theory seemed to serve the purpose of the study. Shank (2006) defines grounded theory as "…a method of building theory from the ground up" (p. 129). According to Creswell (2005) grounded theory is used "to generate a general explanation (called a grounded theory) that explains a process, action or interaction among people" and also the researcher who"…constructs predictive statements about the experiences of individuals" (p. 53). Merriam (1998) states that, "…the end result of this type of qualitative research is a theory that emerges from, or is "grounded" in the data hence, grounded theory" (p.18). The researcher is using theoretical sampling that is particular for grounded theory, "when grounded theorists theoretically sample to best develop a theory" (Creswell, 2005, p. 405). One of the characteristics of theoretical sampling is the selection of participants who are information rich sources of data (Shank, 2006). This process of data collection is controlled by the emergent theory, whether substantive or formal. Glaser (1978) states that in the initial stages of a study researchers will "go to the groups which they believe will maximize the possibilities of obtaining data and leads for more data on their

question" (p. 37). They will also begin by talking "to the most knowledgeable people to get a line on relevancies and leads to track down more data and where and how to locate oneself for a rich supply of data" (p. 45). For more details on sampling please see the section *Population and Sample: Sampling Procedures* for Phase Two of the study on page 76 in this document. The intent of this study is to describe and interpret as well as understand the experiences of international students, the participants who were theoretically chosen. Even though the researcher is using elements of grounded theory such as theoretical sampling, axial coding and line by line analysis, and collects the data until the point of saturation is reached, the researcher did not make a final decision to use grounded theory as the primary research methodology. There is a probability that a theory might be developed during the process of data collection and analysis.

Ethnography.

Ethnography was also considered by the researcher as a possible research design for this study as it is studying human society and culture according to Merriam (1998). The study is looking at a particular culture, the culture of international college students. Spradley (1979) as cited by Berg (2007, p. 171) defines ethnography as "… the work of describing a culture…the essential core of this activity aims to understand another way of life from the native point of view" (p. 3). However, the researcher is not looking to develop understanding of international students' interactions by becoming a part of the group and trying to see life from their point of view. According to Shank (2006) "…in ethnographic research, you participate over an extended period of time, in the lives of the people you are studying. You do this to try to see the world from their cultural perspectives and to understand the meanings in their rituals and cultural artifacts and activities" (p. 61). Creswell (2005) again reemphasizes the idea that ethnographic studies are best suited for the purpose of "studying one group of individuals, in examining them

in the setting where they live and work, and in developing a portrait of how they interact" (p. 53). The researcher in this study is not developing a portrait of how international students interact but rather how they go through a particular life experience. Thus, ethnography was not used as a research design for this study. Even though the researcher is using one commonly used procedure in the ethnographic research methodology such as an in-depth interviewing, the researcher's interest is not in immersing herself fully into the life history of a research participant, the researcher's interest is in the experiences of a research participant with technology in college. The researcher chooses to use in-depth interviewing to collect background information that will assist in understanding how research participants arrived in their current situation because cultural background and upbringing might play a major role and might have an impact on an international student's experience in the future.

Basic or generic qualitative study design.

Given what was said about each research design, the researcher uses basic or generic qualitative study design in this study. Merriam (1998) defines this design in the following words: "… the term basic or generic qualitative study refers to studies that exemplify the characteristics of qualitative research…many qualitative studies in education do not focus on culture or build a grounded theory; nor are they intensive case studies or a single unit or bounded system" (p. 10). Rather, researchers who conduct these studies, which are probably the most common form of qualitative research in education, "simply seek to describe and understand a phenomenon, a process or the perspectives and worldviews of the people involved" (Merriam, 1998, p. 11).

The methodology includes "description, interpretation, and understanding; identifies recurrent patterns in the form of themes or categories, which are the major characteristics of the basic or generic qualitative study" (Merriam, p. 11-12). The study covers a phenomenon and uses data that are a participant's firsthand experience of a phenomenon as in phenomenology; the

study provides an intensive, holistic description and analysis of a single unit and a bounded system, a group of international students in two institutions in the Midwest; in addition, there is a possibility that the study will build a substantive theory regarding some aspect of practice and will be "grounded" in the real world as in grounded theory, and the researcher uses multiple cases to investigate a phenomenon as in case studies, as well as in-depth interviewing to collect data in Phase Two of the study as in ethnography.

More often than not qualitative studies are Basic or Generic Qualitative Studies. Purely one approach is in the minority of studies. Caelli, Ray, and Mill (2003) have observed a growth in the number of qualitative studies that have no guiding set of philosophic assumptions in the form of one of the established qualitative methodologies but rather a combination of elements from several research designs.

In this study the researcher is not focusing the study through the lens of one known methodology but rather combines several methodologies or approaches of research design. The researcher combines the best elements of several established methodologies at various stages to address the research problem in the best ways possible. The researcher identified research methodology of Phase Two of the study as a Basic or Generic Qualitative Study Design.

Phase One: Quantitative Study

This phase assessed which demographics of international students predicted their comfort level with technology and provided descriptive statistics and frequencies of trends of ICT usage.

The following research questions were addressed in this phase of the study:

1. How do the demographics of international students predict their comfort level with technology?

2. What experiences do international students have with technology while in college in the United States? More specifically
    a. What Information Communication Technology (ICT) do international students use in college in the United States and for what purposes?
    b. What positive and/or negative experiences international students have with technology in college?

Population and sample: sampling procedures.

In the words of Merriam (2000), "…a sample is a strategically and systematically identified group of people or events that meets the criterion of representativeness for a particular study" (p. 57). Over 671,616 international students attended colleges in the United States during the 2008-2009 academic year, of which approximately 13,000 students attended colleges in the state of Missouri (Open Doors, 2008). Missouri is ranked 16 out of 50 as having the largest college enrollment of international students (Open Doors, 2010). Two medium-sized four-year institutions, one public and one private, with enrollment of about 16,000 and 14,000 students respectively, located in an urban setting in the Midwest, were selected from the list of the institutions with the highest number of international students within the last 5 years in the state of Missouri (Open Doors, 2010). The researcher contacted the directors of the international student offices at the two institutions and upon their agreement selected the institutions as the research sites for the study. Al-Sharideh and Goe (1998) point out, "…at many American universities, a number of foreign nations and cultures are typically represented by a sizable cohort of students" (p. 700).

Neither of the selected research sites represent one of the top 25 institutions hosting international students in the U.S. (Open Doors, 2010). One the research sites represents one of 143 institutions that hosts between 500 and 1000 international students (Open Doors, 2010); the

other research site represents one of 38 institutions that host between 1500 and 2000 international students (Open Doors, 2010). International students on both research sites represent about 100 countries. International student population in Missouri is representative of the national distribution in terms of the top places of origin (Open Doors, 2010). All international students (undergraduate, graduate, postgraduate, as well as non-degree seeking) who were enrolled in the fall semester of 2009 were considered for the study: 1179 international students on one research site and 855 on another research site.

Measure.

During Phase One, the researcher collected data by means of an online survey. The online survey was created using SurveyMonkey, an intelligent survey software that enables researchers to create professional online surveys. This tool allowed the researcher to design the online survey, collect responses, and to complete a preliminary analysis of the results. As the survey was constructed by the researcher for the purposes of this study, it was based on the literature review and previous research studies (in the context of course assignments) conducted by the researcher on topics related to international students' experiences with technology or ICT. The researcher created the survey, administered it, and collected the results online.

To address *validity* of the survey, the researcher used content validity. Two faculty members reviewed the survey for comprehension and content coverage; five international students took the survey, providing feedback on its structure and complexity. The faculty members are experts in the field of technology and have had experience constructing and conducting research on technology use.

To address *reliability* of the survey, the researcher used test-retest reliability. Five international students, enrolled at the two schools where the study was conducted, took the survey. Four weeks later the students took the survey again. The researcher compared the results

of the correlation coefficient from the first administration to the second administration, and found no significant differences in responses.

The researcher also used an alternate-form reliability check by using differently worded items to measure the same attribute (questions 20 and 30; 21 and 27; 22, 23 and 24). The researcher also changed the order of the response alternatives, forcing respondents to read the response alternatives carefully, thus reducing practice effect (questions 26, 28 and 23, 24, and 21 and 27). Correlation coefficients comparing individuals' scores on the two parallel forms showed no statistically significant differences.

To address the reliability of the design of the study, the researcher provides a detailed description, so that others can replicate the design. First of all, it is important to acknowledge that the researcher has had an established professional relationship with the directors and staff of each university's International Student and Scholar Services Offices. Thus, the researcher was certain that the directors would agree to send out an initial email inviting international students to participate in the study, as well as a reminder email which was sent four weeks after the first email.

The instrument included a total of 30 questions, both closed and open-ended. The questions focused on demographic data (15 questions), types of ICT used for academic and non-academic purposes (4 questions with multiple sub-questions), and reasons for using ICT (7 questions). In addition, it prompted participants to provide a detailed description of their experiences with technology (1 question). See Appendix D for a copy of the survey.

Demographic measures covered the following areas: information on school, academic level, gender, age, housing situation, primary source of school financing, country of origin, academic program, relationship status, time spent in current school, time spent in the United States, comfort level communicating in English, and frequency of communication in English.

The majority of questions on technology use are rated on a variety of Likert-type scales ranging from 1 (Never) to 5 (All the time/regularly); or 1(Strongly Disagree) to 5 (Strongly Agree); or 1 (Least Important) to 5 (Most Important).

The researcher obtained approval from the Institutional Review Board (IRB) to conduct the study at both universities. A copy of the formal approval is included in Appendix F and G.

Once a participant clicked on a survey link in an email, he or she was redirected to the cover page of an online survey. An informed consent for participation in research activities was embedded in the survey. The consent form stated that by hitting "Next" on this screen, the participant consented to the use of questionnaire responses by the researcher with the understanding, that all responses remain anonymous and that the researcher would do everything possible to protect the participant's privacy. There was no way to track an email address to personal information on a participant. Also, a research participant was not asked to provide his or her name, and thus the confidentiality of subjects was protected.

The first page of the survey contained a brief explanation of the study, gave instructions on how to complete the survey, provided information on privacy protection for participants, described the amount of time needed to complete the survey, and provided an option to exit the survey at any time without penalty. The survey also provided the researcher's contact information if a participant had any questions or concerns regarding participation in the study. The last section of the survey asked if the participant would be interested in participating in a follow-up interview regarding this research topic, and gave the option to leave contact information such as an email address and/or a phone number. See Appendix A for a sample email from the International Student Office to international students that accompanied the survey.

Data collection procedures.

Data collection was conducted from September through December 2009. The researcher contacted the directors of the international student and scholar services office at each university via email briefly introducing the study and requesting a meeting. The two directors responded to the first initial email contact and meeting times were set. During the meetings, the directors asked for details about the study and agreed to send an email with a survey link on behalf of the international student office. An email with a comprehensive description of the study and a survey link was sent to the two directors of the international student offices. An international student officer forwarded that email through a distribution list; the researcher did not have access to international students' data. After the initial email was sent inviting international students to participate in the study, another email was sent four weeks after the first email as a reminder. The data set yielded 262 completed surveys. All responses were collected and classified with specific group codes.

Description of setting.

The setting for this phase was an online environment, where the participants could access and complete the survey at their convenience and upon their availability. Due to the nature of the study, as it examined experiences with technology, participants found themselves in a familiar online setting.

Data analysis.

Descriptive statistics and stepwise multiple regression were used to analyze data collected during Phase One. Descriptive statistics are used to present frequency of trends of ICT use by international students. The stepwise regression analysis used comfort level with technology as the dependent variable, the independent variables included students' gender, age, academic level, academic major, country of origin, number of hours per week spent using

technology for academic and non academic purposes. Stepwise regression analysis was completed using SPSS 18.0 for Windows, software for statistical data analysis. An open-ended question on positive and/or negative experiences with technology was used to determine the scope for Phase Two of the study. Microanalysis was used to interpret the data collected by this question (Strauss & Corbin, 1998). For more details please refer to section *Data Analysis* in Phase Two in this dissertation on page 81.

Phase Two: Qualitative Study

This phase intended to explore further the experiences of international students using technology by means of face-to-face interviews to investigate experiences of information rich cases identified in Phase One in more depth.

Phase Two addresses the following research question: How do international college students experience ICT in the United States? More specifically, what contributes to international college students' experiences with technology?

Population and sample: sampling procedures.

The sample of this phase of the study was selected in accordance with the findings in Phase One of the study. The most appropriate sampling strategy is non-probabilistic, the most common form of which is called purposive (Chein, 1981; Patton, 2002). Purposive sampling is based on the assumption that the investigator wants to discover, understand, and gain insight into a phenomenon and therefore must select a sample from which the most can be learned. The goal of purposive sampling is to select cases that are likely to be information rich with respect to the purposes of the study (Gall, Gall, & Borg, 2003). The researcher identified the research sample as a criterion sampling (Patton, 2002). The researcher followed the following sampling criteria: school site (private or public), gender (male, female), academic level (graduate, undergraduate),

country of origin and comfort level with technology (professional, very comfortable, comfortable, somewhat comfortable, and not comfortable), breadth and depth of responses to open-ended questions in the survey, the availability of an international student during the timeframe required to conduct the study as well as the willingness to dedicate their time and effort to the study. These criteria allowed the researcher to define and create an international student prototype that can define a typical international student. 122 students out of 262 who filled out the survey indicated their interest in participating in the second phase of the study. The researcher used the sampling criteria described and sorted the list of possible research participants by adding each criteria one at a time to the sorting level in the order the criteria is listed with a purpose of selecting information rich cases, that were defined by their richness of their comments to an open ended question. The researcher used the multilevel sorting function in Microsoft Office Excel.

The researcher did not make a final decision as to how many people to include in the sample before the second phase of the study was started. The researcher used a strategy that is common for grounded theory when the data is collected until a point of saturation or redundancy is reached as suggested by Lincoln and Guba (1985). One of the characteristics of theoretical sampling is the selection of participants who are information rich sources of data (Shank, 2006). The approximate numbers were suggested before the data collection started: a minimum of 5 participants from each research site, a maximum of 10 from each research site. At the end, 18 subjects were involved in this phase of the study, representing 15 countries.

Measure.

Open-ended, semi-structured interviews were the primary means of data collection. Interviews allowed the researcher to gain a more in-depth understanding of selected cases in the study. Seidman (2006) states that, “interviewing allows us to put behavior in context and

provides access to understanding action" (p. 10). The most common form of an interview is a person-to-person encounter in which one person elicits information from another (Merriam, 1998). The main purpose of an interview is to obtain a special kind of information. As noted by Seidman (2006), "interviewing provides access to the context of people's behavior and thereby provides a way for researchers to understand the meaning of that behavior" (p. 10). The researcher wanted to find out what is "in and on someone else's mind" (Patton, 2002, p. 278). The researcher used semi-structured interview questions, defined by Merriam (1998) as "a mix of more and less-structured questions" (p. 73). If specific information is desired from all respondents then there will be a highly-structured section in an interview. "But the largest part of the interview is guided by a list of questions or issues to be explored, and neither the exact wording nor the order of the questions is determined ahead of time" (Merriam, 1998, p. 74). The researcher decided not to choose either a highly structured (standardized) or an unstructured (informal) type of interview, as those were found to be at two extreme ends of a continuum. One kind does not allow the interviewer to even access participants' perspectives and understandings and the other may not allow the time to explore an issue in full (Merriam, 1998). Therefore, the researcher chose open-ended, informal, semi-structured interviews for data collection.

One of the most common types of questions that have been used to stimulate the responses from an informant was an open-ended question. Flick (1998) states, "…More or less open-ended questions are brought to the interview situation in the form of an interview guide" (p. 94). The researcher developed an interview guide (see the next paragraph for more details on the interview guide).

The protocol was developed to address international students' experiences with ICT, and, as such, it established the context of their experiences. As a foundation, they were asked to describe their first exposure to technology, how they got started using technology. Building on

this, it guided them to reconstruct their current use of technology in detail such as daily routine, daily use. Going further in depth, it engaged them in reflecting on the meaning of their experiences with technology: they were asked about the role technology plays in their lives, how they understand technology in their lives, as well as their projection for their future use of technology. A copy of the interview guide is included as Appendix E.

The researcher decided not to conduct pilot interviews, since the researcher is familiar with the topic and had past experiences interviewing international students on related topics.

The researcher used the three interview series approach originally designed by Dolbeare and Schuman (Schuman, 1982). Later on this technique was adapted to be used in phenomenological research and was called in-depth, phenomenological based interviewing by Seidman in 1991. The first interview establishes the context of a participant's experience; the second interview reconstructs the experience of a participant in the context; and the third interview engages a participant in reflective activities of the meaning of the experiences (Schuman, 1982). The researcher adapted this interviewing technique and developed an interview guide including all the three phases in one interview to meet the time restrictions and keep an interview at an hour in length.

Two types of *validity* were addressed in Phase Two of the study: *Internal Validity* and *External Validity.*

Internal Validity is concerned with issues pertaining to the congruency of findings with reality (Merriam & Simpson, 2000). Merriam and Simpson (2000) suggest using a number of strategies to ensure internal validity including: triangulation, member checks, peer or colleague examination, statement of researcher's experiences and biases, and submersion or engagement in the research situation. The researcher also states her own experiences, assumptions and biases that will illuminate her interpretations of the reality of findings. The researcher also used a

peer/colleague examination technique, by having an independent reader review the research process and findings of the study.

External Validity is concerned with the generalizability of findings from one study to other situations, and from a sample to a population. The researcher ensured generalizability by selecting a wide range of diverse cases. According to Merriam (2000), a reader of the study will define how generalizable or applicable the findings of this study can be to other situations. Merriam (2000) suggests a number of strategies to address the concerns of external validity, such as rich description, multisite designs, modal comparison, and random sampling. In particular, the researcher used modal comparison by describing how typical a selected sample is as described above, as well as how typical a track of study of international students is in terms of their college experiences.

Reliability is concerned with the consistency of findings (Merriam & Simpson, 2000), "whether the results are consistent with the data collected" (p. 102). Merriam and Simpson (2000) suggested a number of strategies to address the concerns of reliability: triangulation, peer/colleague examination, audit trail, as initially suggested by Guba and Lincoln in 1981. Merriam (1998, p. 207) noted, "in order for an audit to take place, the investigator must describe in detail how data were collected, how categories were derived, and how decisions were made throughout the inquiry" (as cited in Merriam, 2000, p. 102). Malterud (2001) underscored the need for one as she writes:

> Declaring that qualitative analysis was done, or stating that categories emerged when the material had been read by one or more persons, is not sufficient to explain how and why patterns were noticed ... the reader needs to know the principles and choices underlying pattern recognition and category foundation. (p. 486)

To address reliability for Phase Two of the study, the researcher provided an audit trail to ensure the consistency of collected data by giving full detailed description of procedures for data

collection, provide an explanatory description of the process of category development, as well as the process of decision making throughout the study.

The researcher was able to secure room reservations to conduct interviews in main student buildings at both campus sites. Thus, the interviewees were familiar with the setting and, as they were students, it was easy and convenient for them to get to the site for an interview.

This research study required open communication between the researcher and the interviewees. It is important for a researcher to establish a respectful, open relationship with a research participant in order to establish a level of trust.

Data collection procedures.

The researcher followed the protocol of the interview guide. Participants were asked questions about their education related to technology use prior to their arrival to the United States, their family competency and proficiency with technology, their current use of technology and the meaning it has for them. The researcher made each participant aware that they could refuse to answer any question that caused discomfort. The participant's identity was kept confidential at all times and no personal information was released. Each interview lasted for approximately sixty minutes with two exceptions that lasted for about an hour and a half.

Managing and recording data.

The researcher audio-recorded all interviews. She used a laptop with an external microphone. The Audacity program was used to record interviews. Recorded data was exported to MP3 format, then Express Scribe software was used to slow down the speed of recordings. Windows Speech Recognition was used to transcribe the data verbatim.

The researcher recorded interviews data in such a manner that human subjects could not be identified, directly or through identifiers linked to the subjects, the researcher change each participant's real name to a pseudonym when reporting data, and will destroy all the records after

the study was completed. Any disclosure of the human subjects' responses outside the research reasonably will not place the subjects at risk of criminal or civil liability or could not be damaging to the subjects' financial standing, employability, or reputation. There were no anticipated risks associated with this research.

Baez (2002) examined the dilemma of confidentiality that is meant to protect the privacy of the individual and protect that individual from harm. The consent form was created on the basis of a standardized consent form and was edited to appropriately fit the study. Both the participant and researcher signed an informed consent form for participation in research activities. A copy of the consent form is included as Appendix C. It explained that participation in this research was voluntary, and that the decision whether to participate would not affect a participant's current or future relations with a university. When all interview responses were collected, they were coded to secure the anonymity of all subjects.

Data transcription.

The researcher transcribed all interviews. Before transcribing the data, the researcher defined the common rules of transcription to ensure consistency of data recordings. For example, (pause) stands for the hesitation or pausing during an interview to think. The researcher numbered section lines in the interviews in Atlas.ti for further easy access and data reference, which was very useful during the analysis stage. Also, the researcher defined a consistent use for naming the interviewers by assigning a pseudonym name to each interview.

Description of setting.

The setting for Phase Two is a traditional setting. The researcher conducted face-to-face interviews. Merriam (1998) states that, "a person-to-person encounter is the most common form of interview in which one person elicits information from another" (p. 7). Research interviews were conducted in conference rooms in a student center building at both research sites, at the

convenience of both a participant and the researcher. A secure room was requested in advance, where audio equipment was set up for each interview.

Data analysis.

The researcher used elements of the grounded theory design for data analysis (open, axial coding, and constant comparison). Shank (2006) defines grounded theory as "…a method of building theory from the ground up" (p. 129). According to Creswell (2005), grounded theory is used "to generate a general explanation (called grounded theory) that explains a process, action or interaction among people . . . and constructs predictive statements about the experiences of individuals" (p. 53). The researcher used data analysis techniques common for developing grounded theory. Two basic types of coding were used by the researcher for the fundamental analytic process: open and axial coding. "Open coding is the interpretive process by which data are broken analytically…events/actions/interactions are compared with others for similarities and differences" (Corbin & Strauss, 1990, p.12). During this process, conceptual labels are given, that are then grouped to form categories/sub-categories. "In axial coding, categories are related to their subcategories, and the relationships tested against data" (Corbin & Strauss, 1990, p.12). During this process, categories are related to other categories and sub-categories are identified, then relationships are tested against data. Constant comparison is used in both analysis phases.

The researcher developed a code book with categories, sub-categories, properties and dimensions. The code book can be found in Appendix K.

Audit trail.

To establish the rigor of research, memos captured the process of data analysis, thus documenting all critical steps. This way, memos contribute to establishing an audit trail. Two types of memos (theoretical and procedural) were generated. A theoretical memo documents general ideas about a category or property and potential relationships between categories, ideas

for grouping, and ideas for merging units. An example of a theoretical memo can be found in Appendix I. A procedural memo documents how the researcher approached the process, made decisions about coding, and dealt with technical issues. An example of a procedural memo can be found in Appendix J.

Open coding and constant comparison.

In the first step of data analysis, open coding began with the first interview as the researcher listened for words and phrases line by line that might begin to answer the research questions. As outlined before, the research questions intended to be answered in the second part of the study are: *How do international college students experience ICT in the United States? More specifically, what contributes to international college students' experiences with technology?*

In addition, the researcher also wanted to address the following research question of Phase One of the study: *How do the demographics of international students predict their comfort level with technology?* The researcher wanted to explore what can predict international students' comfort level with technology, beyond demographics. Meaningful units of data were sought in each transcript and consistently compared searching for grouping patterns. Lincoln and Guba identify units as "the smallest piece" of heuristic stand-alone information (1985, p.345). Meaningful units were coded, then the codes were grouped, their relationships were identified and in order to identify patterns. Hundreds of initial codes were grouped by similarities, or dispersed by dissimilarities, reflecting empirical indicators and dozens of concepts emerged. When initial concepts were developed, the researcher kept record of them. For a complete list of initial concepts see Appendix L. Some of the examples of initial concepts reflecting particular responses pertinent to factors that might impact international students' experiences with technology began to emerge, including connectivity, communication, rules, policies, cost, learning, use/misuse of technology, multitasking, fear, need to know, time, etc.

Through the process of constant comparison these provisional concepts developed into categories as a result of conducting open coding. Not all concepts became categories (Corbin & Strauss, 1990). To give an example for the process of category building, some respondents noted that they had family members helping them learn, saying that their father, uncle, sister or brother was there for them teaching them about technology. Others mentioned that they had teachers supporting them in school, but no family members helping them learn. Through constant comparison, the researcher started to group cases with support from family and friends and labeled it "personal support," and also cases when teachers supported or did not support a student and labeled it "school support." To give another example, the researcher noted that some respondents were not actively learning technology but, rather, were trying to use it as little as possible, almost avoiding using it. The researcher chose to label this group "avoiders". Then there were other respondents who used technology when it was required, the researcher gave them the label "reluctant adopters/minimalists." In contrast, the third group of instances seemed to represent users of technology who tried to learn as much as possible. They took the initiative to learn more advanced functions, the latest software, and the most advanced programs. The researcher labeled them "enthusiastic adapters/participants." An additional illustration of grouping concepts through constant comparison were the respondents that seemed to learn technology at a very young age, were surrounded by technology and learned how to use it in a natural setting. The researcher grouped them and labeled them "digital natives." Another group was essentially different. They seemed to learn technology much later in life, the process of learning was not easy for them, and some learned technology in a formal setting. The researcher labeled this group "digital immigrants."

As noted earlier, through constant comparison some initial concepts developed into categories. In the process of developing categories, properties and dimensions were identified.

For example, in the language of grounded theory the range from "avoiders to enthusiastic adopters/participants" became the dimension of a property that was labeled "openness to learning." This property, again, turned out to be one of several properties of a category labeled "individual openness." At a later stage of analysis, this category developed into a sub-category of the category labeled "prior learning/experience". Other sub-categories developed under this category include "personal support" and "supportive environment." Other categories that were further developed are "access," "need to learn," "prior learning/experience," and "adaptation." In chapter four, these final categories will be described in full detail.

It is important to note that open and axial coding is not necessarily sequential. When categories emerge, the researcher starts to relate them to each other. During this process, in the words of Strauss & Corbin (1998), "analysis becomes more focused on filling those categories and verifying relationships" (p.70). According to grounded theory meanings are constructed by relating categories to subcategories and identifying where they stand in relation to each other through the coding paradigm of conditions, context, strategies and consequences.

Axial coding and constant comparison.

When conducting axial coding, researchers reassemble data that was fractured during the process of open coding. Strauss and Corbin (1998) define axial coding as "the process of relating categories to their subcategories, termed 'axial' because coding occurs around the axis of a category, linking categories at the level of properties and dimensions" (p. 123). In axial coding, the researcher tested relationships between categories. Regarding the category "access", for example, the researcher identified that access might *define and influence* the ways an international student uses technology; access *affects* that student's learning, use of technology, and further development of technological knowledge and skill; access *defines* the degree of adaptation. As a result of developing relationships between and among categories, initially some

categories were reinterpreted as subcategories (i.e., “cost” and “accessibility” became a subcategory of “access”).

Visual maps.

One of the approaches to organize developing concepts and codes is to use diagrams, a visual map. The researcher created visual maps at different stages of data analysis. Three variations of the visual map were developed during the process. The first visual map (map 1) represents the beginning of analysis, when the researcher used constant comparison to group codes and concepts and was reducing the number of concepts. The second and third visual maps (map 2 and map 3) represent the later stages of the analysis (axial coding). Visual maps can be found in Appendix M with hyperlinks to full quality versions.

The researcher used Atlas.ti, qualitative data analysis (QDA) software in the process of data analysis. Some of the functions include data managing, coding, writing memos and comments, and creating visual outputs.

CHAPTER FOUR: RESULTS

This chapter presents the findings of the study. The study examined experiences of international students' use of technology while in college in the United States. The chapter is organized in terms of the three specific research questions posed in Chapter 1. The study was divided into two phases (Phase One and Phase Two); the results for each phase are presented separately. The section on Phase One reports on how the demographics of international students predict their comfort level with technology, and provides an overview of international students' experiences in using technology while in college in the United States. More specifically, this section also reports the types and purposes of use of Information Communication Technology (ICT) by international students in college in the United States. This section also addresses positive and/or negative experiences of international students with technology in college. The section on Phase Two then examines experiences of international students with technology in more detail. Additionally, the Phase Two section explores what contributes to international college students' positive and/or negative experiences with technology.

Phase One Results

The data collection for the study took place between September 2009 and December 2009. International students completed 262 surveys. The demographics of research participants showed that 58.1% participants were from a private university and 41.9% were from a public university. Graduate students made up 57.9%, and undergraduate students made up 38.3%. Gender distribution was almost equal (52.1% female and 47.9% male). Age of research participants varied: ages 16-20 (19.2%), ages 21-25 (41.8%), ages 26-30 (26.1 %), ages 31-35 (8.8 %), ages 36-40 (3.8%), and ages 41-45 (0.4 %). Research participants represented 65 countries around the world. This section address the following areas: 1) the impact of

demographics on the comfort level with technology; 2) the ICT used in college including purposes for its use; 3) the time spent using ICT for academic and non-academic purposes; 4) positive and negative experiences with technology.

Impact of demographics on the comfort level with technology.

The researcher measured the comfort level of technology use as an indication of adaptation to a new technologically-enhanced environment. Frequency data showed that 14.3% of international students use technology professionally, 57% feel very comfortable using technology, 24.2% feel comfortable, 4% are somewhat comfortable, and 0.4% indicated not being comfortable using technology. Given the high comfort rating in using technology, the researcher wanted to explore which variables help explain the comfort using technology rate.

The researcher used stepwise regression to determine the extent to which student demographics predicted the comfort level with technology. This type of regression allowed looking at multiple independent variables that could help to understand the comfort level rating and find which variables predict the comfort level with technology. All potential independent variables were included in the model: student's gender, age, academic level, academic major, country of origin, and number of hours per week spent using technology for academic and non–academic purposes.

The stepwise regression model showed that the demographic variables were significant predictors of total comfort level with technology, F (1, 220) = 15.068, $p < .01$. The $R^2 = .064$ and the adjusted $R^2 = .060$ indicating that the demographic variables as a total model explained 6% of the variance in the total comfort level with technology score. Table 1 shows the stepwise regression model for student demographics and total comfort level with technology score. Only one beta coefficient, hours a week spent for school related purposes, was statistically significant. The beta coefficient portrays the difference in a dependent variable, comfort level with

technology associated with an increase (or decrease) of one standard deviation in an independent variable, hours a week spent for school related purposes, when controlling for the effects of the other independent variables (Vogt, 1999).

Table 1: *Stepwise Regression Analysis Predicting Comfort Level with Technology Score from Hours a Week Spent for School Related Purposes*

	B	*SEB*	*t*	*β*	R^2	ΔR^2
Model 1					.064	.060
Q18TechFORschool	.145	.037	3.882	.253*		

*$p < .01$

The regression analysis did not explain a great amount of variance, which invites future research to explore further what explains the high comfort level with technology rating.

ICT Used in College and Purposes for Its Use.

With regard to learning experiences with ICT, international students were requested to indicate, on the basis of their past experiences, how they learned most of their technology skills. The frequencies on how respondents reported learning technology are presented in Figure 10.

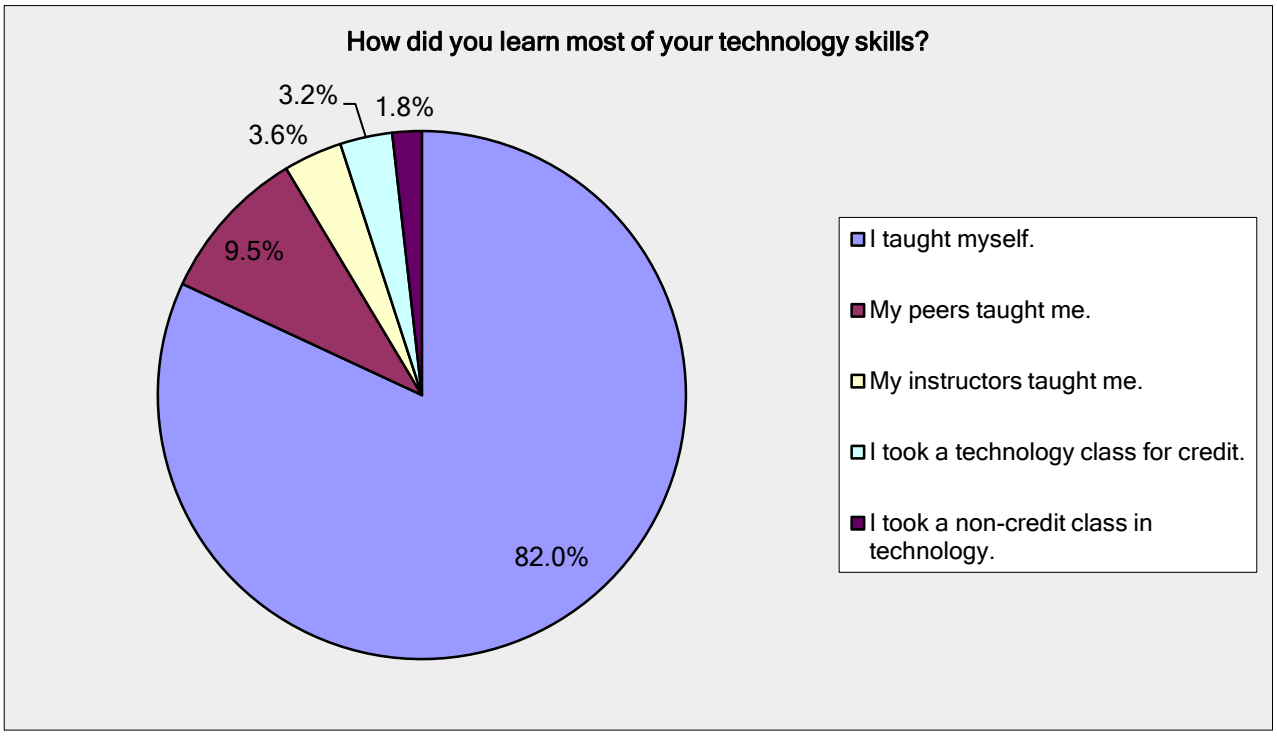


Figure 10. *Learning Experiences with Technology*

The data show that the majority (82%) of international students claim that they have learned technology primarily on their own. This might be an indication that international students are self-driven, independent learners, or technology itself supports independent learning, being intuitive and easy to comprehend. The researcher further explores learning experiences with technology in Phase Two of the study by asking participants to describe their learning of technology.

Time spent using ICT for academic and non-academic purposes.

With regard to time spent using technology, international students were requested to indicate, on the basis of their regular school year, the number of hours they spend a week using technology for academic and non-academic purposes. Participant responses are presented in Figure 11.

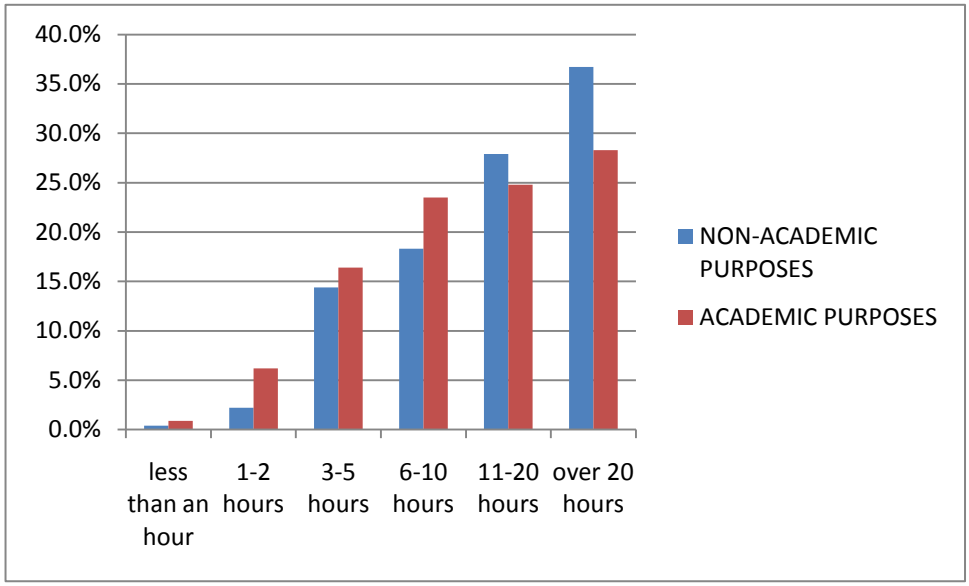


Figure 11. *Comparison of Hours Spent Weekly for Academic and Non-Academic Purposes by International Students in College in the United States.*

From the results that appear in Figure 11, a number of main observations may be derived. First, the number of hours spent using technology for academic and non-academic purposes are close to each other. Overall, there seems to be a trend that students who spend more than 10 hours a week using technology tend to spend more time on non-academic purposes than on academic work; and students who spend less than 10 hours a week using technology tend to focus their time on academic work. Table 2 presents frequency data on the hours spent for academic and non-academic purposes.

Table 2: *Hours Spent Weekly for Academic and Non-Academic Purposes by International Students in College in the United States.*

	Hours a Week for **Non-Academic** Purposes	Hours a Week for **Academic** Purposes
Less than an hour	0.4%	0.9%
1-2 hours	2.2%	6.2%
3-5 hours	14.4%	16.4%

6-10 hours	18.3%	23.5%
11-20 hours	27.9%	24.8%
Over 20 hours	36.7%	28.3%

Types of ICT.

Participants were asked to rate the use of various ICT applications from twenty-one categories. The top four categories with a 50% or more as used often or all the time: Social Networking (Facebook, MySpace) (78 %); Instant Messenger (58 %); Video Clips/ YouTube (57 %); and Skype (51 %). The lowest category was Second Life (4%). See Appendix G for a detailed table showing the results of all ratings. The data demonstrate that international students use technology for socializing, communication and entertainment, based on the type of technology used, i.e. social networking, video sharing and Internet telephony network. These results are supported by the findings described in the purposes of ICT use section that follows.

Purposes for ICT use.

With regard to the use of technology to engage in an assortment of activities, international students were requested to rank the following activities: school work, communication with family/friends, retrieving information/learning, entertainment/watching TV, listening to music, employment, and other, using the scale 1(most important) to 5 (least important).

The frequency results represented by Figure 12 show the purpose for ICT use ratings according to their importance (rated *important and most important*). Results presented in Figure 12 support the findings presented in Table 3 (please see page 93). In Table 3, interaction with family and friends was ranked at 83%. The results presented in Figure 12, communication (with family and friends) is also highly ranked (89.95%). In Table 3 the next highly ranked items were

interaction with instructors (59%), interaction with a mentor (41%), and interaction with classmates (40%), which are all school-related activities that support the findings presented in Figure 12. School work activities are ranked at 84.66% as well as retrieving information/ learning at 72.11%. International students find the use of technology very important for job search or work purposes (54.89%). This might be explained by the fact that technology is entering job markets where work as well as communication with current and/or perspective employees is supported with technology. The findings mentioned in the previous section on the use of technology for entertainment purposes (Video Clips and YouTube (57 %)) are supported in this section, with the results that 45.79% of the respondents ranked the use of technology for entertainment/watching TV, listening to music as "most important" and "important". The gradual decrease in the importance of the use of technology from communication with family/friends, to schoolwork and information retrieval, to work-related activities, to entertainment is perhaps a natural consequence of setting life priorities. The data demonstrate that international students seem to give priority to relationships (with family and friends), then career and purpose (academic and professional work including learning), and lastly to fun and satisfaction/entertainment.

With regard to the purpose of technology use, international students were requested to indicate, by ranking the following 7 items: interaction with family and friends in my home country, interaction with instructors, interaction with my mentor, interaction with my classmates, interaction with non-classmates in my school, interaction with friends in the U.S., and interaction with family in the U.S., using the scale with anchors 1-most important to 7-least important.

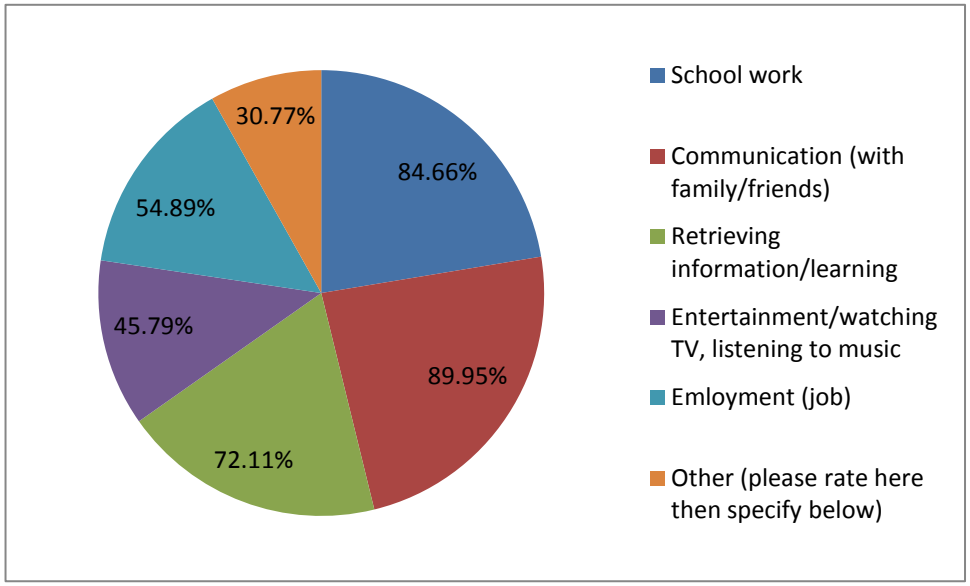


Figure 12. *Use of Technology for Various Purposes*

Frequency data for importance of technology used for social interaction that received rankings as "most important" and "very important" is shown in Table 3.

Table 3: *Importance of Technology Use for Social Interaction*

Social interaction situation	"Most important" and "very important"
Interact with family and friends in my home country	83%
Interact with instructors	59%
Interact with my mentor	41%
Interact with my classmates	40%
Interact with non-classmates in my school	25%
Interact with friends in the U.S.	47%
Interact with family in the U.S.	28%

The data show that international students communicate with their family and friends (83%). Perhaps as they move to a new country they look for a support system and technology

allows them to fulfill their need to connect and communicate with their family. International students come to the U.S. to pursue their educational goals; thus, interaction with instructors (59%), mentors (41%), and classmates (40%) presented by the data can be explained by the fact that international students attend college and fulfill academic requirements.

With regard to the use of technology to engage in an assortment of activities, international students were requested to indicate how often they engage in the activities listed. For a detailed table showing frequencies rated *often and all the time* related to technology use see Appendix H. The top six categories that received rankings above 80% are using the Internet to conduct research for course assignments (82.06%), listening to music (83.18%), using word processing (85.20%), keeping in touch with family/friends (Facebook, MySpace) (90.05%), browsing the Internet (91.44%), and emailing family/friends (91.86%). The results reveal three dominant purposes for technology use: communication, academic and professional work, and entertainment.

Positive and negative experiences with technology.

Research participants were invited to describe their positive and/or negative experiences with technology in an open-ended section of the survey. The overall experiences with technology were positive (98.4%); the negative experiences were expressed by a small minority (1.6%).

Positive experiences with technology.

The results in this section suggest that international students value technology and that technology plays an important role in every aspect of their lives (academic, professional, and personal).

Academically and professionally, international students enter the university with an expectation to use technology for their school work and in their jobs on a daily basis. International students feel that technology allows them to become independent learners; it

provides an opportunity for professional and personal growth by offering immediate and easy access to information and resources at their convenience.

With respect to personal needs outside school and work, technology is present in daily activities of international students. International students use technology to accomplish daily tasks such as paying bills, buying things online, watching TV, listening to music, etc. Socially, international students believe that technology allows them to feel supported and connected to the world, by providing an opportunity to communicate with their family and friends in their home country and stay up-to-date with the news.

International students indicate on many occasions that it would be hard for them to function without technology as technology makes their life more efficient and is a necessity for them. They refer to technology as the best invention in life for it allows them to be independent in their thinking and behavior in every aspect of their lives. Overall, international students express positive experiences with technology.

Negative experiences with technology.

International students framed their responses of their negative experiences with technology around the following concerns: malfunctioning of technology and misuse of technology. Describing malfunctioning of technology, international students provided examples of programs and/or software failing to function properly. In regard to misuse of technology, international students felt that technology could negatively impact their lives by providing a medium for interaction/communication and could be used for significant amounts of time resulting in less physical activity, decreased face-to-face communication, as well as distracting them from school and work related responsibilities.

Some international students framed negative experiences around the lack of technological knowledge and skill. By not being prepared to use certain software and/or hardware international

students felt uncomfortable and felt the need to learn technology to adapt to the college environment in the U.S. Although many international students expressed their negative concerns about their experiences with technology, overall they claimed that the positive experience outweighs the negative issues.

Summary of Phase One Results

The results show that: 1) the majority of international students feel comfortable using technology (95.5%); 2) hours a week spent using technology for school-related purposes predict international students' comfort level with technology; 3) international students learn on their own how to use technology (82%); 4) international students spend almost equal amounts of time using technology for academic and non-academic purposes; 5) students who spend more than 10 hours a week using technology spend more time using technology for non-academic work than those who spend fewer hours using technology; 6) international students use a wide range of programs/applications/software for school work, job searches, communication and entertainment; 7) international students use technology to fulfill communication needs with family and friends, instructors, mentors, advisors and classmates; and 8) international students believe that there are few negative aspects of using technology.

The results of Phase One prompted the researcher to further investigate the experiences of international students with technology. The data generated a number of questions that needed to be addressed, as some results were not expected. A high number of respondents indicated that they feel comfortable using technology (95.5%) and that they learn technology on their own (82%); where a normal distribution would be expected, the data was skewed and raises doubts. Only one independent variable was found to be a predictor of comfort level with technology (hours a week spent using technology for school related purposes), and age was not found to be statistically significant. The researcher was not satisfied with the overall response to the research

question. It was important to know what the learning process is and which other factors might contribute to the development of a comfort level with technology. The researcher followed up quantitative data results with qualitative data collection in order to gain more in-depth information which, according to Creswell (2005), is one of the reasons to engage in a mixed-methods study. Interview questions addressed how a user developed his or her technological knowledge and skill, and what contributed to this development. This led the researcher to ask questions about first exposure to technology, and further experiences with technology prior to a student's arrival to the U.S. Thus, the researcher structured the interview by establishing the context of an international student's technological experiences, then asked about current experiences with technology in the U.S. and about the process of reaching a comfort level, and finally asking participants to reflect on their positive and/or negative experiences.

Phase Two Results

In Phase Two of the study, the researcher addressed the following research question: How do international college students experience ICT in the United States? More specifically, what contributes to international college students' experiences with technology?

First, the researcher will provide a brief description of the research participants. From the overall study completed, a total of twenty students were contacted via email, based on their interest in participating in the second part of the study. A total of eighteen international students were interviewed (the other two declined due to scheduling constraints). The sample consisted of eight students from the public university and ten from the private university; seven were undergraduate students and eleven were graduate students; eight were male and ten were female. Participants' ages ranged from 16 to 40 years old and represented the 16 countries of Armenia,

Brazil, Chile, China (2), France, India, Kazakhstan, Kyrgyzstan, Nigeria, Oman, Peru (2), Philippines, South Korea, Taiwan, Ukraine, and Vietnam.

Table 4 presents the demographic characteristics of the sample of the study.

The findings from this phase of the study provide enough evidence to answer the research question asked. In the end, an increasingly robust understanding of international students' experiences with technology emerged.

Table 4: *Demographic Characteristics of International Students' Sample*

	Name	**Gender**	**Country of Origin**	**Academic Level**	**Age Group**	**Length of Stay in the U.S. (as of October 2009)**	**Comfort Level with Technology**	**Major**	**School**
1	Nathalie	Female	France	Graduate	21-25	2 years	Very comfortable	Finance	Public
2	Liah	Female	Chile	Graduate	21-25	0 years (3 months)	Comfortable	Ecology, Evolution & Systematics	Public
3	Lima	Male	Peru	Undergraduate	21-25	4 years; 2 months	Very comfortable	Mathematics and Computer Science	Public
4	Lana	Female	Armenia	Graduate	31-35	7 years	Professional	Political Science	Public
5	Muhhamed	Male	Oman	Graduate	26-30	1 year; 2 months	Comfortable	Education	Public
6	Raj	Male	India	Graduate	21-25	0 years (2 months)	Professional	Finance	Private
7	Marcela	Female	Brazil	Graduate	36-40	2 years; 2 months	Professional	Occup. Therapy & Neurology	Private
8	Katia	Female	Kazakhstan	Graduate	26-30	0 years (11 months)	Comfortable	Marketing	Public
9	Will	Male	Peru	Undergraduate	16-20	1 year; 2 months	Comfortable	International Business	Public
10	Martin	Male	Nigeria	Graduate	26-30	1 year; 2 months	Comfortable	Social Work	Public
11	Marina	Female	Ukraine	Graduate	21-25	0 years (2 months)	Comfortable	Comparative Literature	Private
12	Rasa	Female	Kyrgyzstan	Graduate	21-25	1 year; 2 months	Comfortable	Social Work	Private
13	Minh	Male	Taiwan	Graduate	26-30	1 year; 2 months	Comfortable	Political Science	Private
14	Keeta	Female	Vietnam	Undergraduate	16-20	2 years; 1 month	Comfortable	International Business	Public
15	Dan	Male	China	Undergraduate	16-20	1 year; 3 months	Very comfortable	Latin American Studies	Private
16	Alex	Male	Philippines	Undergraduate	16-20	2 years; 2 months	Professional	Business	Private
17	Kim	Female	South Korea	Undergraduate	21-25	0 years (4 months)	Somewhat Comfortable	Business	Private
18	Maya	Female	China	Graduate	21-26	0 years (2 months)	Very Comfortable	Finance	Private

Positive and negative experiences with technology.

The researcher explored positive and negative experiences with technology to enrich the findings of Phase One of the study using a sequential explanatory design with a concurrent nested strategy. The researcher followed up the research question of Phase One of the study: *What positive and/or negative experiences do international students have with technology in college?* In Phase Two, the researcher was able to gain a deeper perspective on international students' experiences with technology by asking each respondent to reflect on positive and negative aspects of technology use.

Positive experiences with technology.

When reflecting on positive experiences, the respondents brought up the following points of view: technology allows them to be more efficient, save time and money, and do new things that one can do only using technology.

All research participants seem to use technology in every aspect of their lives. They seem to seek access to a computer and/or the Internet. Maya states that, "WiFi is almost everywhere, I can use my computer anywhere I want…"(section 14). For Maya, Internet access is very important. She continues on the role technology plays in her life, "…I cannot live without technology, for like a week or couple of days I still will be fine, but after certain amount of time I definitely would say I want to be connected, I want to use technology again because I feel connected to the outside of my world, to people" (section 114).

Technology may allow students to save time, according to Maya and Martin. Also, having unlimited access to WiFi allows Maya to be more efficient and productive throughout the day. Being able to respond immediately to emails saves her time at the end of the day. Maya puts emphasis on time-saving, "…everything could be more efficient…teachers use projectors and computer in class, they can save a lot of time by not writing on the blackboard…" (section 27).

Maya speaks about her time-management that is supported by technology, as well as school work that included teacher integration of technology into their teaching.

Martin's life in Nigeria changed with the use of a cell-phone. He could connect with people fast and cheap, thus saving time and money. Martin also reflects on other uses of technology in his life beyond a computer and a cell-phone. He says that the use of a microwave and metro/subway allows him to save a lot of time every day in the U.S.

Technology might attract a user as it allows one to do things that are only possible while using technology. Maya was very curious to learn technology and explore the opportunities it might offer. She says,

> …it was something very new to me. I was totally attracted to this new kind of thing. Like something new that you never did before, on the Internet with different types of software. I began to use Microsoft, programs like Excel, Word, PowerPoint to make something that really looks fancy, which cannot be done by hands… (section 27)

Dan shares a similar experience; he says he learned how to type because he was fascinated with the process of entering Chinese characters. He did not know how to write the characters and enjoyed typing them as it seemed to be easy.

The respondents brought up a number of things technology allows them to do while making some final comments about their positive experience with technology. These include: becoming more efficient, saving time and money, and doing something they would not be able to without technology.

Negative experiences with technology.

The respondents mention the following factors as the main negative aspects of technology: dependence on technology, decrease of face-to-face interaction, and technology as a distraction. Will uses a lot of electronic devices and says, "... as years went by, there was technology that was coming up and I was learning more of it. Because now I have an iPod, I

have two cell phones, I have a laptop. You really get to depend on technology…" (section 8). Will talks about his use of technology in a negative manner. He seems to enjoy using a lot of different types of technological devices, but he expresses his concern about the fact that when he does not have technology around him he feels lost.

Nathalie brings up another disadvantage of using technology. She believes that, due to the use of technology, there is a decrease in face-to-face interaction between a teacher and a student. For Nathalie real time interaction is important. She does not like using Facebook or watching TV as she believes that these activities are substitutes to reality. In addition, she feels she becomes dependent on technology. Nathalie says,

> …I began to use Facebook a lot, and it became really addictive, in fact. I definitely think it is addictive, and then you want to check the message, if someone sent to a message, then you start looking for videos, you start looking at pictures, you start reading news, I definitely think it's like looking at your mail, it is really easy to lose your time… (section 22).

Nathalie finds technology to be a distraction from doing work or anything else that might be important. She thinks that she might lose time when she uses technology a lot browsing the Internet or a social network site. Maya supports Nathalie's comment about technology being a distraction. Maya feels that, when she did not have an Internet connection at her house for a month, she spent more time with her family instead of spending two to three hours online. Technology might be so engaging that it becomes a distraction if one misuses it, or is poorly organized.

Marcela sounds like she was really overwhelmed with the high volume of emails she received everyday once she started college in the U.S. She says, "...it became a real distraction to me..." (section 87). She feels she spent a lot of time reading emails, instead of concentrating on school assignments.

The respondents indicated a number of negative aspects of technology use, including overuse of technology and misuse of technology which might lead to decrease of face-to-face communication, addiction to technology, and technology becoming a distraction and keeping a technology user off-focus. Interestingly, these differ from the negative comments collected in the survey.

International students named a number of positive and negative aspects of technology use as described above. In conclusion, it seems that positives outweigh the negatives.

Main categories.

The data demonstrated that international students' experiences with technology vary while in college in the U.S. The researcher identified the following categories when assessing what contributes to international students' experiences with technology: "access," "the need to learn technology," "prior learning/experiences," and "adaptation to college life."

The type of access (full access, limited, or no access) might define the gap between the existing technological knowledge and skill and the required knowledge and skill. This gap requires a user to adapt, to bridge the gap. Adaptation is approached in the context of technological adaptation to college in the U.S. Acquisition and development of new technological skills does not happen without a reason. Often it was triggered by a need to learn; that could be caused by an internal or external factor and may be or may not be supported. The identified categories that contribute to international students' positive and negative experiences with technology are further described.

Access.

Access refers to access to hardware and/or software, as well as Internet access. Access might define and influence the ways one uses technology. Limited access or no access might restrict and set boundaries that could prevent a user from developing his or her knowledge and

skill and thus limit his or her opportunities for personal and/or professional development. Some external factors that might not be necessarily controlled by a user might define the type of access a user will have, such as the digital divide (i.e., living in an industrialized or developing society, or belonging to the information rich or poor in a nation).

Access was mentioned by each research participant at one point or another of the interview. The participants describe different degrees of access: full/unlimited access, limited, or no access. The degree of access might hinder or enhance that individual's learning. Access might provide an opportunity and/or cause a dilemma depending on the context and/or environment of one's experiences. When describing access, the respondents brought up cost and rules of use as factors that might contribute to the type of access a user might have. The participants' experiences in their home countries prior to their arrival to the U.S. varied dramatically in terms of access (hardware and/or software, and/or Internet access). Some of the respondents indicated that they were exposed to technology at a very young age and had technology around them either in their home or at school; others had no access to technology while growing up and have only been exposed to technology later in life, often in school. Sometimes that exposure occurred in elementary or middle school, but more often in high school, or in college either in their home country or in the U.S.

Types of access while in the home country.

All the respondents had used technology prior to their arrival to the U.S. Some students used it extensively, while others did not. Having limited or no access to technology might have a dramatic impact on a student's life. Context and the environment might have a direct impact on one's experiences with technology. Muhhamed initially had limited access to technology in his home country, Oman. He relates it to the fact that he grew up in the countryside where, according to him, he had very limited access to technology. Muhhamed states that prior to his

arrival to the U.S., "…I used to hear about different technologies but not touching it with my hands; I just started to use it when I joined the university..." (section 10). Muhhamed stated that the access situation changed once he moved to the capital city and started college. He had access to technology and was encouraged to use it.

Marina, from Ukraine, had a similar experience where she had limited access to technology. She started using a computer when she first attended a Jewish community center on Sundays when she was in high school, where she learned how to type. Later, when she became an alumna of an exchange program, she was given the privilege of using a computer center where she could use the Internet for free for about an hour a week. Therefore, access can be gained by joining a group that might have the resources.

Martin, from Nigeria, also had very limited access to technology. He used a desktop computer for the first time when he was a senior in college in his home country. Outside school Martin used the Internet in an Internet café. Neither Muhhamed, or Marina, or Martin had a computer at home, but after gaining access each started to use a computer and/or the Internet.

Minh, from Taiwan, shares similar experiences with limited access to technology. Minh started using a computer for the first time in high school. His parents bought a computer for him so he could do his homework at home and not at school. Minh claims the importance of technology access and its impact: "…Having a computer made me learn things quickly…" (Minh, section 32).

Katia, from Kazakhstan, also had limited access while growing up. Reflecting on the importance of access to technology when she came to the U.S., Katia says, "…technology became a big part of my life…when I do not have the Internet at home, it becomes just a nightmare..."(section 105). Katia uses free wireless at a coffee shop when the Internet in her apartment is not working.

It is important to note that the participants who first had no access or limited access to technology and/or the Internet tried to gain it, and those who did not have Internet access in their homes reached out to places where they could use it.

Cost.

The majority of participants reported one access barrier to technology being the cost. This included the cost of a technology device or the cost of Internet access. Cost might or might not have an impact on the access of a user as a user might have access to a community center equipped with computers (i.e., a Jewish community center mentioned by Marina or a university computer lab in Muhhamed's case, giving a user a chance to easily gain access. Cost can refer to the cost of technology hardware/software, as well as Internet access. While Martin did not have a computer at home, he could purchase Internet access at the Internet café. Cost and affordability might be interconnected. Marina could not afford to buy a computer when she lived in a dormitory in college, and her access to technology use was limited. Later, after she worked in the U.S. on a work and study exchange program, she earned the money and bought a laptop since she could afford it then. Marina makes an assumption that most Ukrainian students can afford to buy a laptop "these days", (referring to fall of 2009), for two reasons: 1) technology is changing very rapidly and the cost of it is decreasing, and 2) students can afford to buy a laptop as many students have part-time or full-time jobs.

Marcela describes the cost of DVDs, "…I think that was in 1991…they had a DVD here, in the U.S., and they had a DVD there in Brazil. It was really expensive [to buy a DVD] but still my school could afford it…" (Marcela, section 63).

Lima, from Peru, had access to technology growing up. He finds cost to be a barrier. Referring to his present experiences with technology, he says, "…I don't play video games as I don't really have much money to buy games…" (Lima , section 16).

Liah, from Chile, also refers to the cost and affordability. She says,

> … my brother had a computer at that time it was not really common, because the computer at that time was really expensive, it was in the 80s, but then later in the 90s computers were not that expensive about $1000 or $1100, more or less. So my father bought a computer, and we got a free printer with it. But it wasn't common to have a computer with a printer in the house. I think in that time only 20% of my classmates had a computer at home. But then in 2000-2001 more or less 60% had a computer and a printer, and then the Internet became more common. Then about five years ago [2004-2005] there was a boom of the Internet in Chile, it was so incredible; and the prices were so cheap. (Liah, section 29)

Katia refers to the cost of technology when she was in elementary school, "…I also remember times when we didn't have a computer at home. I would go somewhere to my dad's work, to my uncle's work and play [video games] there… because it was a luxury…" (Katia, section 13). Katia refers to the cost of technology hardware, telling how it was expensive to purchase a personal computer, but she could access one for free. She speaks about the cost of technology when she had a job already. Katia wanted to buy an iPod, but it was expensive for her. When Katia's co-worker found a sale, she bought an iPod as she could afford it.

Lima believes that in Peru people do not use cell phones as much as people use them in the U.S. for two reasons. First, people are afraid someone will steal their cell-phones, and they will be expensive to replace. Second, he refers to the maintenance of a cell-phone, "…It is more expensive to have a cell phone back home, that's why many people don't really use it that much. Here it is about $19 to have an all access basic plan; back home it is probably about $200 or more…" (Lima, section 69).

Martin also refers to the cost and affordability. He says that it was expensive for him to use a cell phone in his home country, Nigeria, when he was a college student and did not make any money; his parents paid his telephone bills. Martin uses his cell phone a lot more in the U.S. even though it is more expensive to have a cell phone in the U.S. However, he has a job and makes money; therefore he can pay his own bills now.

Lana's professional life has been affected by the high cost of technology. She says,

> …It is difficult… here in college you pay a little at the beginning of the semester and then you can print as much as you want, you scan things, you can fax things easily…But in Armenia, first of all, you're lucky if you have a computer and the Internet is expensive…So every time I go back for research, field research in Armenia, I don't manage to do what I have planned most of all due to the high cost of technology and access to it…(section 114)

Cost and affordability might have some effect on the access and the use of technology. However, the respondents indicate that the cost and affordability might also be affected by the following factors: rapid technology development and decrease of the cost, or simply life changes (i.e., getting a job) that might allow one to afford to buy a computer.

Support and environment.

Some respondents clearly indicated that their parent or school teacher supported them in their learning of technology, although not everybody had the same support. Having an adult who can guide a child or a teenager while she or he explores knowing that, if something goes wrong, she or he can always ask for help, changes one's experiences. Being in an environment that is conducive to learning technology might also contribute to one's experiences with technology. It is interesting to observe how some might take an initiative to learn technology and others might not; some might take an initiative on their own to learn, and others might be supported by family during their learning journey. Lima's father enrolled him in computer training classes to help Lima learn about programming, for example. An environment that allows easy access can motivate some learners to learn more about technology, and help them learn; for others the environment is not enough. They need support as their learning process might not be so easy for them. In the case of Marina, when she went to a community center to use the Internet for the first time, she could not understand how to use it. She needed someone to guide her on how to use the Internet. When she was 16, her mother bought a computer, but they mostly used it to watch

movies. Marina had no support from an adult who could support her learning. No one really taught Marina how to use a computer, so trial and error was the way she learned. She says, "…I am from that generation that did not start using computers early…"(Marina, section 16). Without support from her family, and not using technology for school purposes like Marcela, Lima, Will or Raj, as described further, Marina found it difficult to learn how to use technology.

Marcela also had a computer at home, like Marina, but the environment she was in was more conducive to learning technology. Marcela describes that having access to a computer at home allowed her to become more proficient with technology. She says,

> …I think my family helped me a lot because we had a computer at home…we could go to the university to learn, and come back home and practice. I think it was everything, the fact that we had it both at home and school, and we could go to the lab and practice, and ask questions. We had that lab experience in technology… (section 63)

She does not specifically state whether her family taught her how to use a computer, but she believes her family supported her by purchasing a computer. It seems like the college environment, and its demands, required her to use a computer:

> …We had a computer at home when I was in high school, we had technology at school, and we had computer classes. But we didn't have to do assignments on a computer. So it was just a learning experience on how to manage computers, how to do little simple programs. We had software learning, how to do a simple computer order, we learned about KB, bits. We learned basic skills. But when I went to college I actually had to use a computer, because it was just fast and easy to do an assignment, to type and everything. That was in Brazil, I went to college in Brazil… (section 11)

Then Marcela describes how school requirements made her learn to use technology,

> …In college we had to do some assignments, 20-30 page assignments, and we had to type them on the computer rather than do them by hand. Some teachers would say you could write them by hand if you want… but it will kill you. So everybody would try to use computers or pay someone to do the typing… (section 27)

Even though at first it seems that Marcela had support, and that the environment was conducive to learning, this might be true only to some extent. She does not say anything about support from her family, except for the fact that they bought a computer; nor does she discuss support from her

teachers, except for a requirement they had for turning in typewritten work. Marcela does not mention anything in terms of technology use in college, except for typing assignments. The college environment does not seem to support students' development of technological knowledge and skill beyond a basic level.

Lima, who is a digital native, shares his experience of using technology in high school: "…At my school they allowed us to use the computers…teachers encouraged us to be creative...that's how I started using the Internet…" (section 16). Lima's school environment allowed him, and inspired him, to use computers.

Keeta first used a computer when she was in 5th or 6th grade. Her dad just bought a desktop computer for their home. At the very beginning, she did not know how to use it. She did not even know how to turn it off, and neither did her father, so they had to call their uncle, someone they knew to help them. No one was there to teach her how to use a computer. Keeta had access to a computer, but did not have a support system to scaffold her learning process.

Often times the interviewees talk about the environment and how it affected them in terms of technology use. Kim started to use computers when she was very young, seven or eight. She says,

> I do not have any difficulty in using the Internet or cell phones. That might be because of the country, where I grew up [South Korea], we have a lot of resources. There are a lot of opportunities to learn something, they teach a lot of courses. If something is wrong I can just google it, and find instructions on how to do things, I can just follow those instructions. This is kind of an irony, but I can ask, I can get help from technology to know about technology… (section 125)

Evidently, Kim is conscious of the environment that she thinks supported her in becoming an independent learner of technology use.

Alex relates a similar story, where he sees the environment being the defining factor for his experiences. Even though he was born in the Philippines, his family moved a lot around the

world, and he used to go to international schools. He says that schools were "...very Americanized, lots of American teachers, textbooks were all from the United States..."(section 18). Alex describes how he had to learn how to operate and use certain programs in order to do work in every new environment as his family moved from the Philippines, to Saudi Arabia, to Indonesia, to Japan, "…So the thing is with all the schools that I went to, they all have their default word processing suite, for example…you had to learn how to do [use] it, or I guess you wouldn't be able to do your work. So a lot of it was intuitive, because any of the word processing programs basically are the same. You can type, you can copy, you can paste…" (section 30). Obviously, Alex's school environment was a lot more conducive to learning technology in comparison with Marcela's.

Nathalie, from France, describes her experiences with technology:

> … I think I was about 13 years old…that was the time that everyone had a cell phone. That's when the Internet started to develop; I think I was about 16 to 17. We already had a computer at high school, we were using them but not so much. We didn't use the computer for many things. We didn't really have the computer but both of my parents had a company related to computer business, my mother worked for a photo composition, and my father actually worked for photo composition of the newspaper. I had a computer at home since I was very young but I never used it. I never actually learned how to use it. I remember the black screen with the green on it… (section 6)

Nathalie says she started using a computer a lot more when she started college in Paris. She says that all her knowledge of using a cell phone, video games, the Internet got connected and made sense then. Nathalie says that she started using technology more because she had better access to it at the university. Evidently, she had the support from her family, but the home environment did not require her to learn technology until she started college, and the nature of her technology learning was more geared toward education.

Initially Muhhamed did not have any support or environment that could allow him to learn about technology. He says,

> …I am from Oman. I'm from the countryside area… you could understand that we don't have all the technological stuff in that area. The first encounter with technology, especially when it comes to computers, was when I joined the university, which is in the capital area. So there was the first time where I got to know more about computers, Internet, so on…I just started to use it when I joined the university… (section 4)

Later on he describes how he started to use computers more and more. Being in college allowed Muhhamed to learn more and more about technology, he states,

> …especially for me, coming from the countryside with no knowledge about technology, there was something fascinating. I decided to pursue my knowledge about technology. And the more I got to encounter with technology at that time I started to learn more about those programs, designing Photoshop. At first I focused on the basic things like Microsoft word, PowerPoint, excel… (section 4)

At the university he had a few teachers who introduced him to technology, "…There was one teacher, and she was really good in terms of technology. She introduced us to more technology programs, more software. They used a lot of projectors…" (section 4). Muhhamed seems to have the right support and environment once he started college that allowed him to expand his knowledge and develop his skills in technology use.

Evidently, support from family and school, as well as an environment conducive to learning technology allowed the respondents to develop their expertise in technology use. If either the support system or the environment was not initially there, and once a respondent started college, the situation changed because of the nature of college experiences. Students started to use technology not necessarily very extensively, but at least at the very basic level.

Digital natives and digital immigrants.

Being born and surrounded by technology, as well as having other people around who use technology, might affect the way one will use technology. The respondents can be easily identified as digital natives or digital immigrants depending on the type of technology and frequency of its use. The following section will describe the experiences of participants that represent both groups.

Will, from Peru, first started using technology when he was about 9 years old by playing video games. He had a computer while he was growing up; his father and teachers in school helped him learn how to use a computer. His father tried to teach him about technology as he wanted his son to follow in his steps and become an engineer. Will says,

> …my teachers were saying that this was the future and that we have to learn it, that we have to use it, that we never should stop learning, because it will constantly be changing. And my dad was like that too… (section 4)

Will had access to technology and but also the support system to help him learn the technology. Will also believes that he was born in the era of a technology boom in Peru.

Lima, also from Peru, shares a similar experience. His father is an engineer who works with computers, and he taught Lima how to use a computer. Lima always had a computer at home. Also, when he went to school, his teachers allowed students to use computers. He typed papers for his classes, and then printed them and turned them in. That is how he developed some of his computer skills. He played video games when he was younger, just like Will. He was always up-to-date with the Internet and technology. Lima believes that may be the reason he chose computer science as his major in college.

Alex thinks that he has been using a computer all his life. He says, "…I don't recall any time in my life other than before I was five when I did not use a computer. I basically grew up with the computers, I guess…" (Alex, section 18).

Those who do not use a computer from an early young age and learn it later in life as adults are considered to be "digital immigrants", and their experience differs dramatically from that of the "digital natives" who speak the language of computers as a native language. Some participants bring up the time as something that explains their experience, by saying that, when they were growing up, technology was just developing and was not very user friendly.

Marcela, from Brazil, describes her journey by saying how she was learning *about* technology. She says, "...it was just a learning experience on *how to manage* computers....how to do a simple computer order, we learned about KB, bits..., I did not really have a lot of hands on experience with technology" (section 11). Later Marcela learned how to use a computer. She says, "…back in 1990 or even in 1980s….in Brazil at that time we started using computers. The next generation after me actually used a lot of computers. But my generation only used computers in college… we didn't have to do assignments on a computer…" (Marcela, section 11).

She compares her experience growing up to her brother's. She says,

> …My brother for example, he is 24 years old, he was using computers since he was little. So he grew up using computers. We are 12 years apart. He is a younger brother, I am 36. I remember in primary school he already used a computer to look for information on the Internet. When I was in primary and secondary school I used encyclopedias, we used to use books to look for information. But for him it was much easier, of course, he just could use the Internet, he could easily find information, and he could print it out. It was a completely different experience for him, I believe, because he had everything ready… (Marcela, section 11)

Marcela also describes how, when she was 12 or 13 years old, she took a short training class on blind typing on a typewriter and then, later in life, when she started using a computer she transferred her skill from typewriter to computer. Marcela would probably be a typical digital immigrant who learns technology skills later in life, and her brother would be a digital native: someone who uses technology from a very early age.

Kim, from South Korea, (age group 21 to 25), says that her younger sister and brother, who are four and six years younger than her, use technology differently. She says that even though she taught them a few things at the beginning, overall Kim believes that they are advanced users of technology, being better than she is at many things. She explains:

> …because I think young people learn new things pretty quickly, and they're more exposed to more technology, to more technological environment…because they learned it

> in the primary school or in the middle school. Nowadays they use more technology when teaching a new generation... (Kim, section 129)

It seems like, when Kim was in primary and middle school, she did not use a lot of technology.

Katia's experience with technology is somewhat different. She started with video games when she was very young. Katia had a computer at home. When she was about 14 or 15 she took a private computer training class on Microsoft Office. In high school she had a class on "informatics", a class on how to manage a computer. She says that she did not really use a computer a lot until she started college. When Katia started college, she used a computer for her school work. She had some practice with the Microsoft Office software and gradually she developed computer literacy skills. She says that during her Master's program in college she used other programs like SPSS and Photoshop. Katia says that she has always been around technology; she has used graphical programs and the Internet. She says, "…I just learned, it was the usual gradual process, when you are growing up you get a lot more stuff to learn and to practice..."(section 5).

Finally, Katia took some formal training classes, and it seems like she used technology a lot more in the later stage of her life. Formal education supported her learning of technology.

The difference between the digital natives and digital immigrants is in the way they used technology while growing up. Digital immigrants learned the digital language later in life, like Marcela or Kim, and digital natives spoke the language growing up, like Marcela's brother, Alex, Lima and Will. The distinction between the two might not be clear for all cases. Katia, for instance, seems to be a mix of the two: she did not use computers in elementary or middle school, and she seems to claim that her technology knowledge developed later in life with time. Hence, early experiences with technology might contribute to later positive and/or negative experiences of a user.

Comparison of access and use of technology in the U.S. and in the home country.

The majority of research participants reported some major differences in technology use in their home country and the U.S. in terms of Internet access and the quality of the Internet connection, terms of technology use, the quality of technology (how advanced it is), and the availability of resources and support.

Muhhamed believes that in America the technology hardware is better and much more easily accessible. He describes how, in the U.S., unlimited and open access to technology changes perceptions and attitudes towards technology. He compares the U.S. and his home country, Oman. Muhhamed says,

> …Here [U.S.] it was a different experience, it was a huge difference. They have available facilities, computer labs, computers are everywhere, even other devices, like… iPhones the latest models of the phones…like Sony Ericson, like the iPod…and other kind of small computers…I felt like people here use technology more when I compare it to back home…the idea of computer labs here is different; you have people who take care of a computer lab like a computer lab assistant...computers themselves, they are much better than the ones that we have back home…and the use of the wireless Internet, I heard about it but I have never used it before. So here it is a very common thing, in the United States and I like it very much…you can move around easily, you don't have to stick in one place. So I really enjoyed that using it here in America… (section 20)

Muhhamed brings up the quality and the availability of the most recent technologies in the U.S., as well as the different customer care in computer labs, where lab assistants are available to assist a user, and the wireless access that is a lot more common in the U.S. Muhhamed seems to make the statements about the U.S. in contrast to the state of affairs in Oman.

Raj, also like Muhhamed, describes the use of technology in the U.S. in contrast to his home country, India: "…the Internet was integrated into everything in the U.S….everything was online, even shopping, which was not common in India…" (section 7). Raj seems to ascribe the extent of the use of technology in America to sectors of daily life as a major difference in the use of technology between India and the U.S.

Maya, from China, relates to Muhhamed's statement. She believes that the difference in technology use between her home country, China, and the U.S. is mainly in the quality of technology. She thinks that it is better in the U.S. According to Maya, the service support seems to be better too. She says,

> …the main difference between the two is that there is more advanced software here compared to home. So comparing my knowledge, I have more updated knowledge now, like knowledge of technology tools, different programs. I do not think that at home we use WIFI a lot, as here we do… (section 150)

Lima, from Peru, supports Maya's thought about the use of WIFI, by saying that in America wireless Internet access is commonly used in many places, that the quality of it is good everywhere in the U.S., and that one can get connected almost anytime. He believes that in Peru this is not the case, even though for him there is no difference. He says, "…if I go back home, in my hometown, or my home I think I will be just fine..." since he has Internet access in his home (section 65). Lima's case may be an exception, as he is from the capital and his family is keen on using technology. Will, also from Peru with a similar background, states he finds no major differences, indicating that Internet access is the same as in the U.S. Lima believes that the access to the Internet in Peru is not the same everywhere, that the capital city and his family might be different, while from the words of Will one might assume that the use of technology in Peru is very similar to the U.S.

Keeta, from Vietnam, thinks that the Internet connection is not very good in her home country. She says, "…Sometimes I click on the web cam so my mom can see me, but I think the signal is really bad back home..." (section 36).

Katia says that she had a computer at home. She mainly used it for school-related tasks and doing her assignments, but for high speed internet she went to an Internet café. She says,

> ...at home…we just had dial up, and it was really hard to connect to the Internet, the phone line was really crappy…I wasn't really using my computer at home for Internet

> because the connection was really bad. For the Internet I used to go to the Internet club in the city or at school. Internet cafes, you go there for fun, you go there and you download music, check your e-mail, to create a profile on that dating site... (section 41)

Comparing Internet speeds in the U.S. to those in her home country, Kazakhstan, she was really surprised with the speed of the Internet in the U.S. and its capacity, she states,

> …I could download movies; I could download songs, with such a faster pace than what I could do at home. At home I didn't download movies, because it would take forever. And you know you had to pay for each hour, you don't want to do that. But when I came to the U.S., I had such a great choice of opportunities, I could download movies, and I could listen to songs. I could send e-cards to my friends, because I miss home, and I want to keep in touch with everyone. I also used cooking websites, searching for recipes… (section 53)

Thus, Katia in Kazakhstan could use high-speed internet, but it was only accessible in certain specialized places, like the Internet café, which might not be the case for the U.S.

Martin, from Nigeria, says that he uses technology a lot more in college in the U.S. than he did in his home country. He says, "…Because back home what made us not to use technology more often was the power source. When there is no light you cannot access the technology…" (section 69). Martin clarifies that in different cities in Nigeria power shortages vary, but in the U.S. the electric power is constant, so he uses technology from the moment he wakes up until the time he goes to bed. Martin's case might different from others who might be coming from more developed countries.

Nathalie, from France, believes that in her country technology is underused. She states,

> …I definitely think that in France they don't use enough of technology [as of Fall 2009]. I definitely think it is important…I guess like for most of the students, most of the people here [in the U.S.], for most of the information people would not go to the library they would go to the Internet, search some web sites. I mean, there are lots of libraries online… (section 30)

But then she seems to change her point of view by saying that nowadays (referring to 2009) more people use technology in France, and that there has been a shift in the technology use. She states,

> …This last year when I went back to France [2008], my parents bought a laptop. Everybody really began to use it even in Europe. In France last week they were talking about buying laptops for 10,000 students, I don't remember in which state. It is very important, even in France; they just begin to understand how important it is… (section 70)

Thus Nathalie believes that during the time she was raised in her country, France, the use of technology was not so common. She adds that her experience with technology was not very frequent; in high school she learned how to type. Nathalie would use a computer two or three times a semester to type a final paper. In class teachers did not use any technology, and students took notes by hand. There was no course content management system like the one she uses in college in the U.S. The way technology is used has changed with time and, as of 2009, technology is being used a lot more in her country, according to Nathalie.

Marcela brings up another issue: a cultural attitude. She believes that people in Brazil do not like change, that life is very slow in Brazil, and that Brazilian people take a lot of time adjusting to change. According to Marcela, people who never attended school, or were not particularly interested in technology, would not take advantage of learning about technological changes. Marcela says she has friends her age who do not know how to type on a computer. She believes there are strong individual differences and talks about her family:

> …My father actually is turning 70, and they [parents] always use the computer, and they always had it. Obviously, they are more motivated. He uses a lot of technology, and he communicates with us [children] a lot. We use skype, we use gmail. I think most parents of their age would not use computers. Some would say that it's something weird… (section 39)

Therefore, Marcela brings up an interesting point about age and technology use, stating that in her country older people would not use technology in general, but she seems to believe that there could be exceptions like her family.

Muhhamed describes a change in the attitude towards technology in his country, Oman. He is registering a historical event enforced by the government: a technological movement and rapid development of technology implementation strategies. Muhhamed also says:

> ...people started to realize that they had to integrate technology, in terms of the Internet speed. People at the college decided to increase the speed of the Internet, and buy more laptops, and have more computers. They [college/ university professors/ staff/ administration] decided to have one more computer lab... (section 12)

Furthermore, Muhhamed states that his college, as a government institution, felt pressed to abide with the world rules of technology; as a result, an additional computer lab for the English department was established: "...People [college/university/ professors/ staff/ administration] thought that we'll be behind if we do nothing, so at least let's have another computer lab..." (section 12).

Nathalie from France and Muhhamed from Oman seem to reflect on the use of technology when they were growing up, and how it has changed since then towards more technology use.

Marina believes that access to technology and online resources, or databases, is very different in Ukraine, her home country. She says,

> …it is a drastic change in terms of what can you can do here and what you could do at home in Ukraine. The thing that I like about an American University is that you can get access to what you need. You do not have this problem of not getting access to information, or of not making something on time because you didn't have access to get to information… here [in the U.S.], you always have the opportunity to access the sources, and the articles you need. You can always request them on other systems, like a library…So there is always a way… So I think when I'm back to my home country, I will feel some frustration about not getting access to the resources. I had high speed Internet back home…but not the access to the database systems… (section 76)

Thus, Marina brings up a point of database system use that is not very common in Ukraine. She describes access to resources that technology might provide, and how open access, in contrast, is used in colleges in the U.S.

Minh, from Taiwan, names two major differences, in terms of computer use, between his home country and the U.S., "…one is that…most of the Americans use the Mac System, and in Taiwan there are very few people who use that system. The second is, in the academic world ...they use LaTex, R-a statistical software …" (Minh , section 12). Minh also states that, in the U.S., the university provides a lot of resources like databases. According to him, "...in Taiwan the university doesn't buy many database systems…"(Minh, section 20). He believes, "...for academic purposes Americans use the latest programs, software." Thus, a variety of programs/software used in college in the U.S. is much richer, according to Minh. Both Marina and Minh agree on the fact that colleges in the U.S. have more resources, like electronic database systems, which are not available in their home countries (Ukraine and Taiwan), or possibly to which a student does not have access.

Kim speaks on the same issue, but with a different experience. She says that at the university she attended in Seoul, Korea, students use a lot of technologies, including online/electronic library databases. Kim believes that in her university, in Korea, the use of computers is the same as in the university she is attending in the U.S. In Korea, Kim used a similar online course management system as she uses here in the U.S.

Several differences between the use of technology in a home country and the U.S. are brought up by some participants. Major differences are in the use of wireless Internet, the variety of software/programs/ hardware, the extent to which technology is used in various aspects of life (outside college environment and within it too), and how common technology is used. There are some respondents who claim that there are no differences, saying that they use technology in a similar fashion as they did in their country, and that resources, access, and overall use are not different at all.

Restrictive rules of technology use.

Some respondents that earlier indicated to have had limited access to technology, and to have used technology in school computer labs, had to follow required rules of use. Mainly, the students could not use computers for non- academic purposes.

Marina says that, in her home country Ukraine, access to the Internet at the university was very limited. There was a computer lab, but students had to follow a lot of rules. Marina could not even check her email as it was considered to be a distraction from school work. Some web pages such as social networking sites were blocked also.

Dan, from China, says that his school back home had computers, and every student had access to a computer; however, there were rules, policies and regulations that students had to abide by. Dan states,

> …I think here [in the U.S.] it is a lot more access here, especially in college. Back in high school, the school used to block us after midnight. And then during the day the Internet would be really slow. Back home, in China, there is a censorship, I cannot really use YouTube, or read some news, unless you know how to use the proxies and get around. (section 115)

It seems like students were not free to use technology as they wanted; instead, they were limited in their actions and restricted as to what information they could access.

Rasa, from Kyrgyzstan, used a computer for the first time in high school. She says, "…I was actually using the computer according to the rule of the school and of the class…" (section 4). Rasa was not allowed to come into a computer lab and use a computer; it was designated only for classroom use, with a teacher instructing students what they should do.

Katia, from Kazakhstan, shares a similar experience. In her school, the computer in a computer lab had to be used only for school-related activities such as working on class assignments.

Due to school rules and regulations, students could not use technology without restraint. They had to use computers in a way that was required by their teachers or school administrators. Rules and limitations of technology use might have a direct impact the further experiences of users in their futures.

Need to learn technology.

It seems like life demands and requirements impact the ways participants used technology prior to their arrival to the U.S. The respondents often refer to their school work and how school required them to learn how to use technology.

Maya had her first experience with technology in high school. Teachers used digital projectors, and the Internet in the classroom, and they taught students how to use technology for completing their assignments. Maya says: "…Well, I think I started to use the Internet when I was in junior school which was in 2000 …we started to use the Internet more and more in our classes and also sometimes during lectures…" (section 11).

Minh also learned technology in high school, when he took a computer class. His teacher taught them how to use a computer. His classes were not very frequent, so he says they did not learn a lot. Then, later in life, when Minh started college, he took another computer class where he learned programs such as Microsoft Office and some specific statistical packages, like SPSS.

Liah was no exception. When she started college, she had to use a lot of technology. Namely, she used to type school papers, and also used SPSS. Liah also says, "…especially at the university, I had to use a lot of word and PowerPoint to do the presentations…" (section 29).

When Keeta was in high school, she took a computer class where she learned Microsoft Office. She says all her knowledge was fragmented: "…we didn't really have very compact lessons from A to Z. It was like a bit of this and a bit of that…" (section 8). Keeta does not feel she had profound training in computer use in school before she came to the U.S. Keeta says she

did not use a computer on a regular basis, and there was no immediate need for her to learn more than she already knew.

Rasa was exposed to computers when she was in high-school, but used them only during class time in computer classes once a week. Rasa was not required to use computers in college in Kyrgyzstan; she used to write school papers by hand. In college, computer classes were not a part of the curriculum; as a result, she did not really use computers a lot. There was no need or requirement for her to develop her knowledge or skill in computer use. It was personal interest that motivated Rasa to enroll in a private school for computer studies, because she thought she might need computer skills later in life.

Alex says that in school he was exposed to a lot of technology. He recalls that his teacher was using a digital projector during a spelling test in the 4th grade. The same teacher also taught the students how to use a zooming function on a projector. Alex used other programs like Apple Works, and the word processor in school as a requirement to complete homework.

Marcela started using computers in high school. The computer class she took was not very interesting, as they did not use computers all the time. In college, she used a computer a lot, mainly for typing. Students had to type 20-30 page papers, but some instructors allowed students to turn in hand-written assignments. According to Marcela, there was no need or requirement from her college instructors to use technology except for typing; thus, she did not learn a lot about computers in college in Brazil.

When Katia started college in Kazakhstan, her college admission requirements included compulsory intensive English and computer classes. These computer classes were harder than the ones she had voluntarily taken when she was in high school since they covered more programs and more advanced use of technology. The university required newly admitted

students to develop technology knowledge and skill so that they could be prepared to use technology for completing course work.

Dan had a computer class in high school. He says, "…Actually, in school we had a typing class. We just learned how to type in there…"(section 11). Hence, Dan's school curriculum did not support students in developing technology knowledge and skill.

Evidently, some respondents claim that they learned technology in school (elementary through high school and/or college). They learned it when they were assigned homework that required the use of technology, as well as when their teachers used technology in class, and concurrently taught students how to use technology. In some instances, respondents claim that they did not learn technology, despite the fact that they had computer classes, because the curriculum in those classes did not require a lot of hands-on work. School requirements and use of technology by teachers might affect students' development of technology knowledge. Some respondents voluntarily enrolled in computer training courses, and some were required to do so upon admission to college. Consequently, the need to use technology might contribute to learning it.

Entertainment and technology: video games.

As described in the section above some respondents learned technology because he or she was required to in school and often times was taught in school how to use technology. Some students indicated that they did not learn technology because they were not required to do so. In some instances technology use was optional, in others it is was not used at all. Prior to technology experience in school, many participants associate their first technology experience with video games, as their interests might have attracted them to games at a young age.

Dan, from China, had his first experience with technology at the age of six. He had an old computer and he used to play video games on it. He says he grew up playing Nintendo and Super Nintendo.

Raj, from India, grew up with computers due to the nature of his parents' computer shop business. He recalls how he first started using computers: "…So I started with something basic, like playing games all the way through probably fourth or fifth grade" (Raj, section 14).

Keeta, from Vietnam, describes how she also started using a computer playing video games, and then started doing other things on a computer: "…When I got to grade seven, I think, I started to learn how to use Microsoft Office. Before that I just played games..." (section 4).

Alex, from the Philippines, also describes how he was using technology when he was very young:

> ...I think for the first time I started using technology was when I was in the kindergarten, when I was about five…I was playing the game called Richard Scary, that was like an educational game, because it takes you through different applications and you learn how to type, as you progress you learn how to use other things, like some short cuts on the keyboard and the home key…I used [played] it at home and also in the classroom… (section 6).

When Katia's father bought a computer, she used it to play games. She says,

> …my uncle showed it to me, to me and my family, and I started playing. We were competing…we were all trying to set the records…we were playing the games on the personal computer, like Pokemon, Prince, the cards, Solitaire, the standard package, and also some other games that people would bring me…(Katia, section 9)

It is interesting to see how technology was used mostly for playing games. While some use technology for pleasure and entertainment purposes, others use, as in the case of Alex, for educational purposes. This can probably be rationalized by the fact that the respondents were in elementary, middle or high school when they first were exposed to technology, and did not have other interests or requirements that would make them use other types of technology for different purposes.

Learning technology.

In most cases, after a teacher, a friend, a parent, or a classmate showed or demonstrated how to do something on a computer, like using a program, the participants, as students, explored it further more thoroughly on their own. Sometimes the respondents indicate that they used the Internet to research a tool or a topic further by going to various online forums. Therefore, a learner would use technology to learn more about technology. Other times, participants would look up information in a resource/handbook, or would use tutorial materials available at a university library or a computer lab. Three major sub-categories of the types of learning emerged: learning independently, being taught by others, and formal learning (computer training courses).

Marcela learned on her own by exploring, reading instructions from a user's manual or asking a friend for help. Marcela describes her learning strategy of technology,

> …I feel more comfortable, because I know how to do this or that. That happened to me several times when I would know that I need the basic skill, but I wouldn't know all the advanced options, but because I have been exposed to it, I would not really be freaked out, I would not be afraid to try and play with some of the advanced functions. If someone would sit down with me and show me how to do something I would be very eager to learn. I think it really helps if you play with the computer a little bit by yourself, because then you would really know where things are. Because then you really feel that you know something about the computer … (section 136)

Marcela seems to learn technology mostly on her own by using a number of learning strategies. She states,

> …I always want to learn new things. And the way I learn new things I usually do it by exploring, first time when I got the cell phone in Japan I was just trying to figure out in my own…if I could not really get it, I would just simply look through a manual…The same thing about the use of Word and Excel. I never really had to use a manual for those. I really would just go and see and try out things. Or sometimes I would ask someone…a friend. I would play with a computer, just to try to figure out how to do something, to see what will change if I click on something, just by playing around, and exploring… (section 136)

Katia supports the same idea. After being exposed to a specific program, she went to explore on her own. Katia says,

> …I just learned by myself how to play video games, by trying to figure it out by myself. But first, my uncle showed it to me…He showed me the basic operations, which buttons I need to use for different actions, and then I just started learning to play… (section 13)

As mentioned above, independent learning is often supported by others. Katia describes her experience in one of her classes: "…One of the guys was really good with a program, he showed us a few things…Then I was just practicing it. Plus the professor during the class, taught us as well..." (section 117).

Katia further describes how she would learn technology:

> …I read a manual and my friends at work helped me to register my iPod. So whenever I didn't know how to use a certain program, or a gadget I would usually approach my coworkers, or friends, and they usually would tell me. You always have some tech guys in your company, or among your circle of your friends, who know everything about technology. And you just approach them, and they tell you how to use it… (section 73)

Katia and Marcela's approaches to learning technology are similar and not uncommon. They use the resources available to them. After a program/software or a new tool is introduced to them, they practice using it and learn more advanced functions, read a manual, or ask a co-worker or a friend to explain something they do not understand. This is a common strategy that might be a logical approach to learning something new.

Lana, from Armenia, describes her learning journey. She states,

> …Like 80% of the things I have learned I have learned by myself. And actually I wouldn't advise the same kind of process to other people. Because I know I would have learned much more if I have asked. Even right now, let's say I want to learn Excel, I don't know Excel much. I would advise people to ask for help rather than figure it out themselves. For me it is my nature I cannot ask, for me it seems I'm bothering. But it seems that there are services at the university, and a couple of times I have registered but unfortunately I didn't go for the training…I know that I would have benefited much more if I went for those trainings. (section 16)

Lana supports the approach that Katia and Marcela take to learning technology, but her personality does not allow her to feel comfortable asking for help. Thus, she ends up struggling when trying to learn technology on her own.

An interesting perspective is brought up by Will. Similarly to Lana, he does not ask for help because he does not feel comfortable asking strangers for help, and he does not have any friends to ask. Will says,

> …I usually just look around, and figured out by myself. Because all the people that I knew, who came here [to the U.S.] they were new too, so they didn't know either, so I figured it [technology] out by myself. So when I went to the classroom and I was introduced to MyGateway [course management system] I just went online and I just played with it and saw grades, and what I could do there. I think I just got that, I got it right away. I think it was pretty easy actually… (section 20)

Will says he went to seek help at the help desk office only once to set up his username for the course management system. Like Lana, Will does not ask for help, but he does not seem to have hard time learning and seems to enjoy the process.

Lima shares Will's experience upon his arrival to the U.S. Lima says, "…I figured it [technology] out myself. I had to, because I didn't really know that many people when I first got here [U.S.]…when I met more people, I already knew how to use MyGateway [course management system]…" (section 12).

Lima, also like Will and in contrast to Lana, does not seem to experience any difficulties learning technology even though he is alone on his learning journey.

When Keeta's father bought a computer, she did not know how to use it, neither did her father. Her uncle who knew a lot about computers lived far away and could not help her. Keeta had to learn how to use it on her own.

In many cases, respondents seem to have learned technology on their own because they might not have had an easily accessible support system to help them. As a result, they were

forced to figure things out on their own. Some seemed to experience difficulty learning on their own, and it took them a long time to learn; others seem to be comfortable and learn quickly.

Katia says that she had to learn how to do computer maintenance of her laptop on her own upon her arrival to the U.S. Similarly to Lima, Will and Keeta, she had no one to count on to help her fix her computer, in contrast to having a family friend who fixed her computer when she was in her home country Kazakhstan. She felt she became more responsible and *had* to learn how to do many things on her own.

In contrast to Marcela, Lima prefers to learn technology by himself. He believes that it is his independent nature to learn things on his own. Lima says,

> …Other than school I pretty much taught myself how to do everything else, like driving, like playing guitar, a lot of computer stuff I also learned by myself. I'm just used to it, I learn things by myself…I usually figure out things by exploring and trying, click on something and see what happens. Manuals are boring. Sometimes I had to go through a tutorial, but I usually skip through a lot of it and I go to that part that I need, I usually go straight to the point…(section110-112)

The fact that Lima wants to get to the core of an explanation, and does not want to spend a lot of time reading a manual or watching a tutorial, might contribute to him being an independent learner.

Marina shares Lima's thoughts on manuals. She received a few manuals on technology use from her school, but she did not read them. She prefers asking for help to reading a 300 page manual, explaining that, "...I just begin to explore. I don't really think it was actually hard to do (section 28). Similarly to Lima and Will, Marina does not find it hard to learn on her own even though, like Marcela, she would seek help from others.

Kim claims that her generation does not like reading instructional manuals, and that she would be more inclined to ask her friends for help, saying she, "…would just try to figure it [understand how to use technology]…clicking on things and seeing what happens" (section 17).

The majority of the respondents seem not to use instructional manuals, finding them too long to read. They find a quicker way to find an answer to their specific question by asking an available and accessible friend, or someone who is more knowledgeable than they are; or, by using technology to learn about it. They use a search engine, read topic-specific forums or use the help function.

Alex supports this idea by saying,

> …If I need to learn something new I would first try to figure it out through the help button, or I would search on the Internet. And I would ask how do I do this? I would experiment and try something out, and see if it works. If it doesn't work, I would ask someone, someone who has a better appreciation for it, someone who is more of an expert than me. So that could be another student… I never really use a manual, but there is help specific to the program. So what I would do I would type something, and I would go and search through the help function… (section 122-142)

He also learned how to use technology with the help of his teachers. Alex's teacher taught him design and layout skills in the 4th grade. Alex reflects on his learning, "…it was a combination of experimenting on my own once they allowed me access to it and also being taught a few things. A lot of my learning has been self-driven, I guess, just because I want to learn things, just because I can" (section 42).

Marcela seems to be very eager to learn new things too. She says, "…If someone would sit down with me and show me how to do something [in terms of technology] I would be very eager to learn. I think it really helps if you play with a computer a little bit by yourself, because then you would really know where things are…" (section 136). Being able to explore a computer and practice a newly-acquired skill seems to support Marcela's independent learning. However, Marcela would also ask someone to teach her how to use a computer.

Martin is a self-driven learner; he has used a training simulation, a tutorial, to learn software he was using in school. During that process he learned how to use a program, and used

more advanced functions of that program. Martin feels more comfortable using a program after he uses a program-specific tutorial.

Frequent use is another important notion that many students brought up. Noting that using a program or software on a regular basis helps one to become more proficient and comfortable. Martin agrees with Marcela's earlier statement and says, "…you have to remember that you have to use it [a certain program] constantly, because if you do not use it constantly you tend to forget the program…" (section 129). Marina supports the same idea by stating, "…I asked the girl who works in the department, she is an assistant… She showed me how to scan, and then when I forgot how to do it … she showed it to me again and again…" (section 32).

Liah states she learned technology on her own. Liah says,

> …I learned how to use a laptop, and no one really taught me, because I just had a computer, and I learned by myself…to use the Power Point, I learned how to do it in high school because I had to present. No one would really push you to use a computer, but for me it was pretty easy… (section 29)

Access to technology motivated Liah to take initiative and explore the possibilities the Internet can provide. She had free Internet and she could go online any time. Liah says, "...I could use the Internet any time I wanted..." (section 17). She seems to take responsibility for her learning, and take an opportunity when it presents itself.

As evident from participants' responses, the majority learn technology on their own. These responses support the survey data results: 82% of the respondents indicated that they learn technology on their own. Interview findings uncovered the contributing factors to this statement. The respondents learn on their own due to the following: 1) because they can, 2) because they find it easy to learn on their own, 3) they have no one to help them learn and they might not feel comfortable asking strangers for help (possibly due to the nature of international students' experiences of not having any friends in college upon his/her arrival to the U.S.), and 4) because

they can use various sources that might help them learn such as help functions, manuals, and the Internet. The respondents are sometimes inclined to ask a friend, a teacher, a classmate or anyone else who can help them learn. The survey data results demonstrate that the respondents learned technology with the help of their peers (9.5% of the respondents) and their teachers (3.6% of the respondents). Some respondents seem to be independent in their learning and prefer to learn technology on their own, as they can pace their learning process and do not seem to experience any difficulties throughout the process.

Adaptation to technology use in U.S. colleges.

Another category that emerged from the data that substantially contributes to international students' positive and negative experiences with technology is adaptation. Depending on their experience with technology prior to their arrival to the U.S., some respondents felt a gap between their existing technological knowledge and skill, and that required by the university. This required the user to adapt and to bridge the gap. For some respondents bridging the gap was a natural, gradual process; they did not seem to experience any discomfort, and thus associating their experience with technology as positive. For others, this process might not have been as easy, and they experienced some difficulties adapting and learning new skills, associating their experience with technology as negative.

Some respondents, finding no difference between their technology use in their home country and in the U.S., did not have to make any big changes and learn new technology use upon their arrival to the U.S. Maya, from China, and Minh, from Taiwan, seem to find no difference between their use of technology in the U.S. and in their home countries. Minh believes that before he used the Internet in China for the same purposes as he uses it in the U.S.: reading news online, watching videos, and watching TV shows. Instead of watching American TV

shows, Minh watches Taiwanese TV shows. Liah's experience is similar; she says she keeps using her laptop as she did at home in Chile for many years.

Technology was extensively used in Will's high school. He says,

> …I think we used a lot of technology in high school. Some of the classes would have a projector; each class would have a computer. If you wanted to use a projector or play video or show whatever you want you could do it. In computer classes the technology was there for us, for the students' use. But in the regular classes it was used by the teachers. Back home teachers don't really use a lot of technology; there are some of them who use it a lot. For example, I had a literature class back home and the teacher used the notes that she showed us on the screen, and then she would read them through and would explain in detail. And then I had a geography class which was in English actually, and our professor used a lot of technology, like 3D presentations… (section 40)

As evident from Will's response, there seem to be no major difference between his use of technology in Peru and the U.S. Will reflected on his experience in Peru, and then added that his description seems to also represent how his instructors use technology in college in the U.S.

Katia relates to Will's experiences in college. In her college in Kazakhstan, technology was used in similar ways as in her college in the U.S. According to Katia, students were required to use PowerPoint for their presentations, and to type all school projects. One minor difference was in the use of an online course management system in the U.S. in contrast to a network shared drive in college in Kazakhstan which served a similar purpose of sharing digital files with students. Katia did not have any surprises upon her arrival to the U.S., as she was taught in a technologically-enhanced environment in her home country college. The variety of programs used in college in the U.S. are much richer, according Katia, but she did not seem to experience any difficulties learning them as they were gradually introduced in different classes.

Keeta shares Katia's experience to some extent. She did use some programs in college in her home country, Vietnam, but felt overwhelmed with technology use for all her school work in the U.S. She shares some difficulties she experienced:

> …When I came to the United States, they used a computer a lot of time…every homework was supposed to be submitted through the Internet. That was really new to me. There were times that I missed my homework; I didn't submit it on time. I didn't read all the instructions from A to Z. I would just read the part of the instructions and I would do it right away. And then I would forget to submit it on time through the Internet. It was quite embarrassing… (section 8)

Keeta seems to experience some confusion because of the extensive use of technology in all her coursework, but with time she learns the rules and requirements. She begins to pay more attention and in the end has no difficulties using technology.

Alex, who came to the U.S. in 2006, comments on his adaptation, "…I don't think that I really had much of the technological transition…" (section 58). The U.S. did not feel like a new place to Alex, and he did not think of it as a new country. Alex, originally from the Philippines, attended international schools all his life and grew up with many Americans. He believes that he used technology in the same ways that people use it in the U.S. Alex even says that in Japan the technology he used was a lot more advanced than in the U.S.

Many respondents indicate that they probably learned more about technology upon their arrival to the U.S. because they started college and school required them to gain technological knowledge and skill in order to be academically successful. Learning technology was a part of the school curriculum. Maya, from China, states that she learned more advanced software that is required for classes as she is enrolled in a Master's program. Maya believes that in China she did not learn this software because she was not taking graduate level classes.

The nature of the college experience is in students' acquisition of new knowledge and skills. Technology is integrated into the curriculum as well. As students take classes, they need to adapt to new ways of technology use, and thus adapt to the digital learning environment.

Liah had to learn new software specific to her field of work, biology, once she started college in the U.S. Liah's prior knowledge and experience is different from her classmates',

since she is a veterinarian. Liah says, "…my background is so different from my other classmates. Because some of my classmates already knew different programs, the ones that I didn't know. Like they knew some programs for the data analysis and a lot of formulas that I don't really know ..." (section 29). Liah learned technology to be academically successful. She would not be able to do her coursework without knowing how to use the required software/program.

Rasa did not use computers a lot in college in Kyrgystan. Students were allowed to submit papers written by hand and used computers only in computer classes where they learned basic skills, like typing. Rasa had to learn how to use her time wisely with 24 hour Internet access, which she never had prior to her arrival to the U.S. She recalls, "…when I first came to the United States, because Internet was there all the time, while I was doing my homework I was using social network sites, I was spending lots, lots of time on the computer and Internet not doing work…" (Rasa, section 32). Rasa had some technology skill upon her arrival to the U.S. She says, "…I was really happy that I took my computer classes when I was in Kyrgyzstan…that prepared me somewhat to the educational system in the U.S. that requires the use of computers…" (section 4). Rasa believes that college system in the U.S. requires students to use a lot of technology. She believes that she had to learn new technology to adapt to the system. She says, "…in college in the U.S. you have to submit your papers typed, you cannot turn them in hand written, thus you need to know how to do that and adjust to the requirements..." (section 20). In addition, Rasa used to hand-write papers first, and then typed them in college in Kyrgyzstan. After being in the U.S. for about a year, Rasa could not start writing a school paper without a computer in front of her. Rasa seems to naturally adapt to the extensive use of technology in college in the U.S.

Keeta also gradually adapted to the frequent use of computers for her school work. She started to use a course management system, as well as submit all class assignments online, and use her school email to communicate with her instructors and classmates in college in the U.S. Keeta does not express any major difficulties with her transition. Keeta learned and used Facebook when she lived in her home country but, "…when I came here [the U.S.] I started using it a lot more. Because I think here [in the U.S.] a lot of people use it…" (section 16). Keeta felt she needed to adapt to the way people, above all her college friends, communicate and use social networking sites.

Marina's adaptation to the college use of technology was not as easy. It took Marina some time to learn how to use an online library system and online databases. Marina's learning was supported by computer and lab assistants, as well as some of her new friends who could help her. Thus, after about a semester, Marina felt comfortable using an online library and its databases.

For Dan from China the adaption was not very easy in terms of his coursework. Some major differences were in using formatting styles like APA, MLA, and Chicago. His adaptation was more geared to general college level expectations and requirements than to technology use. He seems not to have any difficulties with the latter, saying "…I can figure out technology pretty quickly…" (section 51).

Lana, from Armenia, did not feel comfortable using basic technology upon her arrival to the U.S. She says, "…So when I came here, to the United States, I still had difficulties, and I wouldn't check my email quickly…I wouldn't even learn all this technology if I didn't come to the United States…" (section 4). Lana admits that she was prepared to face the technologically enhanced college environment upon her arrival. She acknowledges the fact that college requirements made her adapt and learn technology.

Martin states that he had a lot of difficulties adapting because of no prior experience with technology. He says,

> …I have been exposed to a computer only for two or three weeks just before coming to the U.S. Here in the U.S. I found out that everything: typing an assignment, doing homework you had to do everything on the computer. So that was a really big shock to me. When I first started typing I was very slow I was typing one key after another. And whenever I had difficulties on getting to know how to save a file or how to attach a file I would always ask my friends… (section 5)

After developing some basic computer skills, Martin seems to be confident and wants to learn more. Martin gradually adapted to the new ways of technology use, took the initiative to expedite the process, and was rather proactive in his approach. He says,

> …I always had an interest in technology. First when I came [to the U.S.] I really wanted to work for the computer lab, but when they gave me the form to fill in, the application form for the job I felt I was a falling short for most of the things that they needed. I fell short of most of the basic skills that they needed for me to have. They asked me if I could work with some programs, SPSS, Adobe, Photoshop, and some others. But I did not have any knowledge of them; once I started my schoolwork I found out that those programs were part of our schoolwork, of our research, of our studies. And then I would ask questions in class about the programs and they would tell me what I might need to use them for. I started to get used to them very fast, after the first semester I learned which ones to use for what. The first semester I had a job at the library. That's where I was exposed to many programs and that's where I would learn how to use different programs for different purposes. I tried to learn them by myself but also my friends helped me learn. My classmates, my group members… I also asked questions… (section 45)

Martin used all resources available to him to learn, and even found a job at the university that did not require technical knowledge but allowed him to learn it. Sometimes Martin felt lost as he was new to almost all the technology that was required in every class in college. He believes that he will be a life-long learner, as technology keeps developing and helps him be up-to-date.

Nathalie felt overwhelmed by the amount of information she could access online upon her arrival to the U.S. She believes that it took her about a year to fully adjust to using the

school's website and a course management system. In addition, she was missing some basic computer skills. Nathalie says,

> …I was not able to type. In terms of learning how to use the computer, I learned little by little, some friends showed me how to do certain things…for many of the assignments I had to use the computer…I *had to* do the research on the Internet…even for Facebook it took me about six months for me to understand how it really works… (section 22)

Nathalie seems to gradually adapt to the use of technology in college, but it was not easy for her and it took time. She elaborates on the hardships she had:

> …In a way it is really hard to adapt to the American technologically enhanced environment, because in a way here everyone assumes that you know how to use technology. Because everyone here [in the U.S.] when I arrived, knew how to type, knew how to use MyGateway [course management system], knew how to use technology…I did not…I was really scared, and I felt ashamed to ask somebody to explain me the basic things…the other thing was that they did not really get what I could not understand too. Because sometimes they would assume that I know certain things that I do not. So the transition is really hard, because when you arrive as an international student, no one came and explained to me how it works, they [international student orientation assistants] just showed that there is MyGateway, and they just told me to go and use it. I had to deal by myself with the technology… After you ask the question and you try to do it, you just try to understand, it was kind of hard, I had to do it all by myself… (section 110)

Therefore, Nathalie's adaption to the use of technology was difficult, as she was missing some basic skills of technology use and either did not feel comfortable seeking the help that could assist her, or could not communicate her needs. She felt alone and unsupported.

Minh's experience was different from Nathalie's. He describes his adaptation to the new technological environment upon his arrival to the U.S., "…I think at the beginning it was difficult, definitely. But I don't think it took that long to learn, maybe like one month. And after that I felt more comfortable…" (section 76). The adaptation might have been easier for Minh, as he already had some basic computer skills. There might have been just a few new things for Minh, and it took him almost no time to learn them.

Upon his arrival from Peru, Will learned how to register for classes online. That seems to be the only difference in the use of technology for him. Thus, he did not really have to adapt to

any new ways of technology use in college. At the same time, Will brings up an interesting perspective on the impact of technology on his life abroad. He says,

> …I think technology helped me to adapt because I could still keep in touch with my family, all my friends, and talk to them and tell them how I'm doing. I could have them help me understand why some stuff happens, like life happens. That helps a lot. If I was here by myself without this communication that would be different I guess. They have been always in my life so I have to tell them how I'm doing. I get in touch with them often, every day, or they message me. Or they call me. Here I have made a lot of friends, and it is all nice, and stuff but it is not the same… (section 68)

Will was the only respondent who brought up the fact that technology might help an international student adapt to a new culture, by allowing the student to sustain communication with family and friends in their home country.

Overall, the majority of respondents indicated that they had no difficulties adapting to the use of technology in the U.S., mainly because they used technology prior to their arrival to the U.S. Some minor differences were noted in the use of an online course management system and the extent of technology integration into course work, such as submitting assignments primarily online. Some respondents struggled in adapting to new ways of technology use, mainly because of lack of prior experience with technology. Those respondents who at least had basic computer skills seemed to learn new technology programs/software/applications easily. A few respondents (Lana, Martin and Nathalie) did not have basic computer skills upon their arrival, and seem to have a hard time learning new technologies. Martin, however, took a lot less time to become proficient; he seemed to wisely and proactively use the resources around him to support his learning. Some respondents indicated that they did not need to adapt because nothing was different for them in terms of technology use. Two respondents (Dan and Will) made comments that were substantially different from the others. They spoke of their adaptation to college requirements and culture.

Summary of Phase Two Results

Through the interviews with 18 international college students, the researcher was able to gain a better understanding of college experiences with technology. Like any American student, these students pursue their educational goals in a highly technological setting. Similar to their U.S. citizen peers, they might encounter analogous difficulties adjusting to technology use. Problems such as lack of formal computer training, no access to technology, the high cost of technology, limited exposure, and outdated technology tools were the items most often articulated by the students interviewed. Notwithstanding these factors, these students continued to be hard-working and self-sufficient. They learned the ICT tools required by their schools and learned many tools that supported their study abroad experiences. For some of the participants, learning ICT tools can be compared to riding a roller-coaster, where the time is short and participants have to hold their breath and learn the rules while riding very fast. Learning technological tools was another realm of knowledge and skills international students had to grasp. Not only do international students face limitations of English language proficiency, but they also have to face the newness of American culture, a new educational system, and separation from their family, friends and country. In addition to all these challenges, international students also have to learn new technological tools that are required for their school work. It might seem like this is an additional burden put on their shoulders. As some of the participants indicated, learning new ICT tools or daily technology use is very time consuming, and can distract them from their primary daily academic tasks. But later they add that, if they take the time to learn some of the technology tools, then these tools allow them to be more productive, accomplish more tasks, save time, and in general do things that, without technology, they would simply be unable to accomplish. Thus, ICT tools can, in fact, support and provide significant assistance when dealing with many of the issues international students face. The amount of time

international students indicated they spent using ICT, and the variety of tools they use, support the idea that, once international students are familiar with technology, they use it daily.

The data shows that the majority of the research participants come from various cultures and families that value education. Some participants' families believe in supporting their children's development when it comes to learning technology, and/or enrolling their children in technology education classes; and are able to provide their children with such an opportunity. Participants' experiences with technology vary; some have been exposed to technology in their early ages, some have not. Early exposure to technology might help users adapt to the use of technology later in college in the U.S. Students that come to the U.S. unprepared in terms of their technological knowledge and skills quickly realize that work is needed for them to learn and acquire that knowledge and skills. Digital natives find no need to adapt as most likely they have been using the same tools for similar purposes in their home country, or in other countries they have lived in prior to their arrival to the U.S. In contrast, digital immigrants might experience a number of difficulties during their adaptation processes to the use of technology in college. Digital immigrants' experiences vary and some experience more difficulties than others.

CHAPTER FIVE: DISCUSSION

Introduction

This chapter presents a summary of the study and important conclusions drawn from the data presented in Chapter 4. It provides a discussion of implications for action and recommendations for further research.

Overview of the problem.

This study investigated experiences of international students using technology while in college in the United States. Colleges are constantly using new technologies that require faculty, staff and students to learn and adapt to the use of these new technology tools. Both the quality and essence of student college experiences are shaped by these new adaptations. International students use ICT for both academic and non-academic purposes. The majority of existing research studies are limited in their discussion on the use of technology to partnership and/or collaborative projects where the use of technology is being studied from the perspective of its impact on learning.

Purpose statement and research questions.

The purpose of this study was to investigate the experiences of international students using the Internet and other electronic technologies that aid in their college experiences. Answers to the following research questions were sought in this study:

1. How do the demographics of international students predict their comfort level with technology?
2. What experiences do international students have with technology while in college in the United States? More specifically,
    a. What Information Communication Technology (ICT) do international students use in college in the United States and for what purposes?

   b. What positive and/or negative experiences international students have with technology in college?

3. How do international college students experience ICT in the United States? More specifically, what contributes to international college students' experiences with technology?

The study focused on the experiences of international students with ICT that fulfill academic and non-academic needs while in college life in the United States.

Review of the methodology.

This study surveyed international students at two four-year institutions regarding their experiences with technology while in college in the United States, and evaluated the frequency of trends in their Information Communication Technology usage by means of descriptive statistics. A sequential mixed methods design (Creswell, 2003) was utilized. Stepwise multiple regression analysis was used to determine which demographics of international students predict their comfort level with technology. The study explored further the experiences of international students using technology, by means of face-to-face interviews to investigate results in more depth. The researcher used a basic (generic) qualitative study design with elements of grounded theory for data analysis.

Limitations.

A number of limitations were identified in relation to the instrument of data collection of Phase One, an online survey. The fact that the survey was distributed online might have had an impact on the response rate. More importantly, an online survey in particular might have been appealing for students who use technology often and might be relatively comfortable using technology (which might have also led to the skewed data on the comfort level with technology indicated earlier). The distribution of the survey online, as well as in a paper version, could have

increased the response rate. In addition, the list of survey questions could have been modified and expanded. For example, the researcher asked respondents to indicate lengths of stay in the U.S., and in college in the U.S. Asking a question about the length of stay outside the country of origin might have provided additional information. One respondent, in particular, has lived in approximately 5 countries since he moved from his country of origin prior to his arrival to the U.S. His exposure to different cultures most likely had an effect on his experiences with technology. Also, the researcher asked the respondents to indicate comfort level with technology, thus only the current level (as of Fall 2009) with technology was recorded. Asking respondents to report on their comfort level with technology upon their arrival to the U.S. would have added valuable knowledge about changes in the comfort level over time.

Another limitation of this study is in the low level of variation in age of the sample. The age of research participants varied as follows: ages 16-20 (19.2%), ages 21-25 (41.8%), ages 26-30 (26.1 %), ages 31-35 (8.8 %), ages 36-40 (3.8%), and ages 41-45 (0.4 %). The age group 16-30 represents 87.1% of the sample. However, this might be an indication that international students' average age actually is between 16 and 30 and explain why age was not one of the variables that was statistically significant in predicting international students' comfort level with technology.

Another limitation of this study might be in the sample. This is potentially problematic because the results of the study might not be generalizable to international students nationwide. Further research could target a sample of universities that would be more representative of the international student population nationwide.

Another limitation of the study is in the rapid development of new technologies globally that might lead to different trends and patterns of technology use. It can also lead to the decrease of technology cost (both hardware/software and Internet access) which again might result in a

higher frequency of technology use by students prior to their arrival to the U.S. Changes in international students' demographic characteristics (i.e., age) might also have an impact on the use of technology. For example, new generations are more likely to be exposed to technology and have the conditions and environment that supports learning and use of technology. In contrast, previous generations were less likely to learn technology due to lack of access, supportive environment and other factors.

The study would be enriched if it was a longitudinal study and involved repeated observations of international students. The researcher would recommend that data is collected on experiences of newly admitted international students at the beginning of the first semester, two semesters later, and then at the end of the program. This would capture the progress of the development and growth of technology knowledge and skill.

Major findings of phase one.

The majority, 95.5%, of international students indicated they are comfortable using technology. These results are an interesting indicator for their experiences with technology. As this is self-reported data, these statements are made on their current use of technology and can be interpreted in various ways. One student might use an application, a program or software, and feel very comfortable, while another student might use several technologies and not feel very comfortable. Only one participant responded that he or she did not feel comfortable using technology, accounting for only 4% of all responses. Thus, the conclusion may be made that most international students feel comfortable using technology.

To further explore the relationship between student demographics and student comfort level with technology, a stepwise regression analysis was run to determine if student demographics were significant predictors of a student's comfort level with technology. Students' gender, age, academic level, academic major, country of origin, number of hours per week spent

using technology for academic and non-academic purposes served as the predictor variables for the model. Only "the number of hours spent a week for school" out of the seven demographic variables, was a significant predictor of comfort level with technology. The results of this analysis showed that student demographics predicted only 6% of the variance in the "total comfort level with technology" scores.

Participants of this study face distinctly different socialization experiences. For instance, as some of the results suggest, "using technology for communication purposes" is ranked the highest (89.95%) as "most important" and "important." Having to face separation from their families and friends, international students find a support system using technology which allows them to communicate and reconnect with the ones who are left in their home country. Interaction with family and friends in their home country was ranked "important" or "very important" by 83% of the respondents. Not only do respondents reconnect with their homes using technology, but technology also supports their communication within the U.S. Many participants ranked their communication with the following individuals as important or very important: interact with instructors (59%), interact with friends in the U.S. (47%), interact with my mentor (41%), interact with my classmates (40%), interact with family in the U.S. (28%), and interact with non-classmates in my school (25%). Le and Gardner (2010) suggest that, for an international graduate student, the socialization processes have three levels, including socialization to academia, to the profession, and overall to the American culture. The data demonstrate that international students indeed socialize at various levels.

Learning of ICT.

Respondents reported that they learned technology on their own (82.0%), which might not be a surprise. Brown (2000) states that the learning process of the new generation is quite different from the one of the previous generations. He says that young people try things out by

themselves: "…They want to turn the thing on, get in there, muck around, and see what works." (p.14). Brown believes that young people of the new generation would go online and research how other people dealt with a similar problem or a situation. He describes the learning process as the following:

> Learning becomes situated in action; it becomes as much social as cognitive, it is concrete rather than abstract, and it becomes intertwined with judgment and exploration. As such, the Web becomes not only an informational and social resource but a *learning medium* where understandings are socially constructed and shared. In that medium, learning becomes a part of action and knowledge creation. (p.14)

Some of international students' comments dwell on exploratory type learning experiences such as searching, browsing the Internet, and finding information online regarding the use of technology. Brown (2000) makes a point about the shift in digital learning environments where learning is discovery-based, with all the information available online. The participants describe how they use technology to learn about technology, thus technology itself promotes and supports further learning.

Some respondents reported that their peers taught them how to use technology (9.5%). In their comments, international students stated that their learning of technology was a combination of learning on their own, and collaborative learning where their friends taught them by showing them things on a computer. They describe how their friends and/or peers showed them how to do something, and then later they explored further on their own by trying it out.

Pelgrum says, "There are notions that students should be trained to learn more autonomously and to get access to and digest information more independently than has been the case so far" (2001, p. 165). Pelgrum (2001) claims that ICT facilitates and supports active learning by providing easy access to information. Respondents reported that after their peers exposed them to a new technology, and 'gave them access' to see a new tool, then they learned how to use it.

Time spent using ICT for academic and non-academic purposes.

Overall, there seems to be a trend that students who spend more than 10 hours a week using technology tend to spend more time on non-academic purposes than on academic work; and students who spend less than 10 hours a week using technology tend to focus their time on academic work. Brown (2000) says that modern society "…create[s] a new kind of information fabric in which learning, working, and playing co-mingle" (p. 12). The data show an interesting trend: a shift from using technology for academic work to non-academic work occurs with the increase of hours spent using technology. Collins and Halverson note that, "…technology allows people to take education out of schools where they can take ownership for their learning, where they can find freedom in the content, means and context of their learning" (2009, p.32). This may explain why there is a shift in the higher end in using technology from academic work to non-academic work.

Technology takes on a very important role for international students in their academic life. Along with the burden of responsibility to be academically successful, international students have a natural drive to succeed due to personal and familial expectations for themselves. The Council of Graduate Schools (2008), for example, states that international students complete a Ph.D. program at a significantly higher rate than domestic students, with the cumulative ten-year completion rate for international students being 67%, thirteen percentage points higher than for domestic students (p.3). This could be another explanation for why there is a shift from academic to non-academic use of technology, assuming that international students take ownership for their own learning as stated above.

Types of ICT and purposes for its use.

From the results that appear in Appendix G (Frequency of the ICT Use), a number of main observations may be derived. First, international students use technology for

communication purposes very often; furthermore, the most frequently used applications are Social Networking: Facebook, and MySpace (78 %). Do international students establish their social networking accounts while they are in their home countries or upon their arrival to the U.S.? Is it easy for them to learn how to use social networking technology? The fact that 78% of the respondents use Social Networking "often" and/or "all the time" might indicate that it is a common activity for them to engage in and interact with. The use of instant messaging is the second highest ranked category (58 %).

As the data in Appendix H demonstrate, international students use a wide range of ICT frequently. The fact that so many tools have been highly ranked might indicate that international students are constantly using multiple technologies. Brown (2000) describes today's youth as being able to do several things simultaneously: listen to music, talk on the cell phone, and use the computer at the same time. Brown (2000) describes digital learning and dimensional shifts that distinguish a traditional learner from a digital learner. The first shift is a literacy shift where literacy becomes the ability to read not only text, but image and screen. The new literacy entails the ability to "navigate through confusing, complex information spaces and feel comfortable doing so. Navigation may well be the main form of literacy for the 21st Century" (p.14). The next shift has to do with reasoning and judgment, introducing the concept of Bricolage, studied by Claude Lévi-Strauss, when one is able to find something and use it to build something he or she finds important. Thus, international students might indeed represent the digital learner who is using multiple technologies on a regular basis.

The data showed that the three most highly ranked social/communicative activities for international students are interaction with family and friends in their home country (83 %), interaction with their instructors (59 %), and interaction with friends in the U.S. (47 %). The probable reason for these results may be the nature of study-abroad experience. Living in a

foreign country, international students might seek support and thus communicate with their families and friends in their home countries. International students also want to establish social networks here in the U.S., and thus they start using technology to communicate with friends in the U.S.

As previously mentioned, the gradual decrease in the importance of the use of technology from communication with family/friends, to schoolwork and information retrieval, to work related activities, to entertainment can be noticed. Some might argue that it might be perhaps a natural consequence of setting life priorities. The data demonstrate that international students seem to give priority to relationships (with family and friends), then career and purpose (academic and professional work including learning), and then lastly to fun and satisfaction/entertainment.

Positive and negative experiences.

Describing their positive experiences, international students emphasized that freedom and opportunities that technology gave them and allowed them to pursue. They described easy, immediate, low-cost access to the information and resources that technological tools provide. Immediate and easy access to technology, and/or consequently to information and resources, is highly valued by most international students. Respondents believe that technology might solve the issue of problematic and troublesome access to information and resources. They could not imagine their lives without technology, and they depend on technology in their daily lives. They describe how they use technology for everything. It is interesting to observe how international students perceive this constant use of technology as a positive experience.

In terms of negative experiences, international students associate negative experiences with technology malfunctioning, or as an easy distraction from their studies. Not a single participant indicated that they did not like using technology, or that it was potentially harmful.

These findings might not be a surprise, as international students discovered multiple opportunities for technology to fulfill their college needs living abroad.

Major findings of phase two.

As the data demonstrate, international students' experiences with technology vary dramatically. Access is one of the central themes that explains the positive and/or negative experiences international students have with technology. The data demonstrated that among those who had access to technology prior to their arrival to the U.S., some had a support system to help them learn technology, while others had enrolled in a computer training program either prior to college or while in college in their home country. These students seem to be more apt with their technological knowledge, and seemed to be very comfortable using technology upon their arrival to the U.S. For those who had no prior computer classes or no formal or informal education on computer use, it was rather difficult to adapt to technology use in the U.S.

Limited or no access to technology growing up.

Limited or no access to technology can be explained by a number of reasons. Growing up in a rural or urban area can define whether you have access to technology or not. In the case of Muhhamed, his life changed completely, in terms of access to technology, once he moved to the city. It might not be just the city itself, but other factors that influenced his technology use-such as the educational environment. At the time he started going to a college where he could use technology, his teachers introduced him to technology, and his friends helped him to learn about it. A similar case of using technology resources in the educational environment is presented by Marcela, who used university video library facilities. In another case, Marina attended an educational community center, using its facility once a week and using another educational center where she can access the Internet for one hour a week for free. An educational center can provide a student with some access, providing a chance to use technology for educational

purposes. Martin's experience is similar to Marina's; he found access to technology in an Internet café. For students who do not have access at home, it was important to have access to technology and the Internet. Minh makes a very explicit statement that access to technology allowed him to learn how to use it.

Technology might be more accessible to those who live in the city, or to those who go to college, because of the richness of resources in those settings. It almost sounds like a social divide as defined by Norris (2001), who describes the gap between information rich and poor in a nation.

It is interesting to observe that regardless of prior access to technology, international students expect to have constant unlimited access to technology in college in the U.S. and when they do not they are disappointed and feel that their needs are not met.

Access and cost.

The cost of a computer or Internet access can be a barrier that can prevent use of technology. It seems that when students do not have the money to purchase a computer, they find a way to use one. Then, when they can, they eventually purchase a computer or another device. Technology is expensive. Participants make references to the differences between access to ICT in a home country and the U.S. This topic was raised for each mentioned case: however, is it about the country itself, or about a socio-economic status? Does the participant belong to a lower social class that traditionally has less, or limited, resources?

Access to technology and video games.

Growing up with technology often times means growing up playing video games, for the majority of participants. Video games can serve different purposes; they can be entertaining or educational. Playing games can lead to other uses of technology later on. Raj and Alex make it explicit that playing games helped them gain other technology skills.

Digital natives and digital immigrants.

Prensky (2001) defines digital natives as "'native speakers' of the digital language of computers, video games and the Internet" (p.1). Will grew up playing video games, using the Internet and computers, as well as Lima. They had computers around them all the time and their family and teachers were using technology. Digital immigrants acquire technological skills later in life. In the case of Marcela, she learned how to type on a type-writer when she was growing up, and later in college she transferred those skills to a computer keyboard. Kim and Marcela compare their experiences to their younger sibling's experiences growing up; they believe that the younger generation grew up with technology around them, frequently using it for information retrieval at a very young age.

We might notice a trend here, in which older students claim that technology was just developing when they were growing up, and it was expensive. Thus, access to technology was not ubiquitous. But later, for those who are younger most likely become digital natives; supported at home by their families and at school by their teachers, when they were growing up, they had technology easily accessible at a much lower cost.

Access and learning: support and environment.

Support and environment shape the way one will experience technology. One can be supported by family and school by being encouraged to explore and learn. Easy access to technology and the fact that one can use a computer at any time can be very helpful when one decides to explore technology. School requirements might have a direct impact on the use and further development of one's technology skills. Two types of digital divide are present in the data reported by research participants: global and social (Norris, 2001). Digital divide might be an overarching theme that could explain positive and/or negative experiences with technology as it directly relates to access.

Access and use in the U.S. and in a home country.

One of the major differences mentioned by many respondents is in the ease of access and the use of the Internet. For all respondents, WiFi is commonly used in the U.S. on a regular basis. This use was not so common for the majority of respondents in their home countries, especially for those users who reflect on the use of WiFi in their home country five to seven years ago. The quality of technology is often brought up as one of the major differences; quality is associated with the most updated, recent software or tools. Not all respondents share the same idea about the difference in access and use of technology; some find no difference, and believe that the use of technology is the same in the U.S. as in their home country. The use of Internet cafes was brought up by a few participants, mostly those who come from developing countries (Kazakhstan, Nigeria). They describe how the only place they could access the Internet at home was the Internet café. They talk about the difference in the connection speed, which was much higher in the Internet café. One respondent (from Nigeria) brought up power outages as the main barrier to Internet access, which of course is generally not an issue in the U.S.

Another theme brought up by a few respondents is the difference in the attitudes towards technology. Nathalie expresses her ideas about her home country, France, and how she believes that French society takes a very traditional, conservative, almost puritan approach to information retrieval. Judging from her personal experiences, Nathalie finds that in the U.S., the first thing one thinks about when looking for information is by going online.

Muhhamed from Oman, suggests that the use of technology for entertainment purposes is common in the U.S., and the use of technology for education purposes is more common in his home country. Cultural perception might be different for a number of reasons, with one reason being ubiquitous access. When technology is easily accessible, after fulfilling educational and/or professional needs one might find it useful and applicable to other aspects of life. Marcela

elaborates, stating that cultural values might impact the way technology is used. She states that Brazilian people are very relaxed and laid-back; they might not want to use technology all the time as it would impact their life in a way they might find undesirable. She believes that some people in her country might choose not to be very technology savvy just for that reason. Another aspect of shared similarities between home countries and the U.S. is the generation gap in technology use. Marcela brings up a counter example of her parents, who are in their 70's and are heavy users of technology. She believes that an individual defines the ways and the extent to which he or she uses technology, and neither age nor country of origin are defining factors.

A few respondents mention that, in the last five years, there has been a shift towards more technology use in their home countries. Nathalie from France and Muhhamed from Oman state that their countries started to realize the importance of technology use, and have implemented a number of governmental technology initiatives. Nathalie describes how she used a computer only several times a week and then, upon her arrival to the U.S., she had to use it all the time and she felt a very big gap between the two countries.

Another important difference between access and use of technology in a home country and in the U.S. was brought up by Marina from Ukraine. She describes that, in the U.S., the databases that are available to her in college make a big difference for her academically and professionally. As expressed by Nathalie and Muhhamed, the way technology is being used in the educational sector is very different; more resources are available digitally in the U.S. Minh also shares Marina's idea about access to database systems; he believes that in his home country, Taiwan, that access is limited. Kim from Korea expresses a slightly different opinion. She used online databases back in her home country before she came to the U.S.; it was not new to her to use these resources.

Access and restrictive rules.

Some respondents state that in their home countries (Brazil, China, Ukraine, Kazakhstan), when they used technology in school they had to follow school rules for using a computer. These policies might be different from the ones you might find in the U.S. There seem to be more restrictions on the use of technology in other countries: Dan lists censorship issues, or limiting the number of hours a student can use a computer throughout a day, setting limits on what one can do on a computer, allowing only school related work in a school computer lab. For example, checking your email is not considered a school related task, as mentioned by Dan. (It is important to indicate that checking email might not be considered a school related activity as teachers and students do not communicate via email in some countries in contrast to the U.S.). According to Dan, another imposed limitation on computer use, frequently used in his country, is the practice of closing a computer lab at night when the speed is much faster. Some of these restrictive rules could possibly be explained by a school's limited resources. School administration might impose a rule about the use of technology only for school related work because the number of students who need to use a computer could be high, and the number of computers available could be low. Thus, in order to ensure that each student can complete school assignments, a policy about computer work only for school often seems necessary.

Learning technology.

In the survey part of this study, 82% of the respondents reported that they learn technology on their own. The findings of the interviews of the study support these results. The participants describe that, on multiple occasions after their peer/ parent/ teacher introduce a program/or software to them, they took initiative to further explore and learn on their own. Additionally, international students describe their technology learning experience as trial and error. In their home countries, they were often forced to learn on their own, as they did not have

a support system to help them learn. Later in the U.S., when they encountered a difficulty learning technology, they look for help and find that support among their peers, parents, or teachers. Often times, users would look for support not from human but by turning to technology and using it as a tool to build their technological knowledge and skills. Some learners are more likely to read a manual, but it seems that only a few among digital immigrants would use a manual. Digital natives would prefer to browse the Internet and find information online or ask a friend. The respondents said they developed their computer skills over time, by practicing and using technology for various tasks. Many of the respondents seemed to be very driven to learn about technology, as access allowed them to try things out and explore ideas.

Need to learn technology.

The respondents claim there were reasons for them to use certain types of technology. On many occasions, they provided examples of school work, for example, when they were required to use a specific program, software or a tool for a class assignment. Some research participants said they started using technology in high-school; others started using technology in college. Oftentimes technology was introduced by a teacher in class and then students were required to do an assignment to practice the skill.

Adaptation to technology use in U.S. colleges.

Some of the students found no difference between technology use while in college in the U.S. and how they used technology in their home country. On the contrary, some respondents found major differences between technology use in their home country and the U.S.; they, consequently, were not prepared for college experiences in the U.S. in terms of their technological knowledge and skills. One of the adaptations that students mention is adapting to doing all school assignments and work online. Some respondents say that they used a computer for the same purposes prior to their arrival to the U.S., at the same time they did not use it for all

the school work. A similar idea is shared by Keeta from Vietnam. She started using Facebook in her home country, but to a limited degree. That has changed once she started college in the U.S. Keeta believes that Facebook is commonly used by American students and found it to be a good medium of communication in the U.S. Marcela from Brazil believes she used more advanced technology when she studied in Japan. She found the use of technology in the U.S. not particularly sophisticated and advanced. Some respondents needed to adapt to the use of discipline-specific software, although they did not mind any major differences in the overall use of technology in college. Other respondents, like Rasa from Kyrgyzstan, had to adapt to the new technological environment on a much broader scale as they had not been using technology a lot prior to their arrival to the U.S. When Rasa went to college in Kyrgyzstan, her instructors did not require her to use technology. Independently, Rasa decided to sign up for computer training, which she found very beneficial once she came to the U.S. Nonetheless, upon her arrival to the U.S. Rasa had to learn how to use technology for a variety of purposes. For instance, she used to write papers by hand, whereas later she claims she could not start writing a paper without a computer.

Lana claims that she did not know how to use a computer for basic tasks when she was in her home country, and it was not easy for her to learn about the use of technology in college in the U.S. But gradually, with time, she started to learn and use more and more technology in her college life in the U.S. Martin also went through a gradual adaptation process. When he arrived in the U.S., he tried to find a job on campus but realized that he was missing the required technical knowledge and/or skills. Step by step, however, in every class he took on every opportunity to learn. Martin used all the resources available to him: classmates, professors, group-mates, team-mates, and friends to learn about technology. Martin believes that even after spending about a year in college in the U.S. the adaptation process still continues. Some

respondents felt very strongly about lacking technical knowledge. Nathalie from France had a lot of difficulties adapting. She found it extremely hard to learn the new way technology is being used in college. Those international students who did not use technology a lot when in their home countries found it difficult to adapt to the technology use in the U.S. For the majority, it was a gradual learning process. This includes those who claim it took them a very long time to adapt and that it was extremely difficult (Nathalie from France and Lana from Armenia).

Another aspect of college life experience brought up by some respondents was the use of a library card and printing services. Marina learned how to use these services, in addition to learning how to use all library databases upon her arrival to the U.S. With the help of lab assistants, library assistants, department assistants, and other support staff Marina learned how to use library database and thus did not encounter any major difficulties adapting.

Adaptation to school requirements was another barrier that international students had to face. Dan describes how he was not familiar with doing research and writing research papers, as what he knew prior to his arrival in the U.S. was limited to writing a creative essay. Dan says he had to learn how to use various library databases, and also learn how to use various formatting styles. As a qualification, it should be mentioned that some adaptation issues brought up by the respondents in relationship to the use of technology might not necessarily concern technology primarily, but can be explained by the transition from high school to college level requirements.

Final comments on positive aspects of technology use.

Many of the respondents, when asked to describe their positive experiences with technology, say the following: technology allows them to be more efficient, saves them money and time, brings new things to life, and allows them to "feel connected to the world" (Maya, section 114). Technology allows constant access to email, allowing a user to respond quickly at their convenience during breaks and not accumulate emails. For many respondents the use of

technology is associated with saving time, as it can allow one to accomplish a task faster. Some respondents mention how they were fascinated with what technology allowed them to do, with things that would not be possible without technology.

Final comments on negative aspects of technology use.

Some of the respondents, when asked to describe their negative experiences with technology, claim that ubiquitous access to technology can make a user very dependent on technology and can even lead to being addicted to technology use to a degree that a user has a constant urge to use it. It can also result in an overuse of technology and distraction from other important things in life, such as school work and other activities. Another negative aspect brought up by some participants was the decrease of face-to-face interaction in college. This might only be a concern for those who are used to a traditional, in-class learning environment, and might not be an issue at all for others who might be digital natives.

Conclusion

The results showed that: 1) the majority of international students feel comfortable using technology (95.5%), 2) number of hours a week spent using technology for school related purposes predicts international students' comfort levels with technology, 3) the majority of international students learn on their own how to use technology (82%), 4) international students spend almost equal amounts of time using technology for academic and non-academic purposes, 5) students who spend more than 10 hours a week using technology tend to spend more time on non-academic purposes than on academic work; students who spend less than 10 hours a week using technology tend to focus their time on academic work, 6) international students use a wide range of programs/applications/software for various purposes ranging from school work and job searches to communication and entertainment, 7) technology fulfills communication needs with

family and friends, instructors, mentors, advisors and classmates, and 8) international students believe that if there are a few negative aspects of using technology, the positive aspects outweigh the negative.

It is essential to consider the context of international students' experiences. Collins and Halverson (2009) state that, in America, institutions seek technological products and services when they compete for success; establishing specialized services and computer programs. This commercial push might create a highly technologically enhanced environments in colleges in the United States. International students, in order to survive and be academically successful, have to adapt to this environment. It is also important to note that international college students' experiences involve not only academic experiences; their experiences expand beyond the walls of an academic institution. Technology was found to support students in all aspects of their lives, academic and non-academic. International students' experiences are life-changing and transformational also in terms of technology use.

Implications for Action

Based on the findings, the researcher suggests the following implications for action:

Higher education institutions should administer a survey on the use of technology prior to an international student's arrival to the United States, to learn about his or her prior technology knowledge and skills as well as comfort level with technology. In the response to results of such surveys, higher education institutions should provide appropriate training that will prepare international students to develop technological knowledge and skill required for their studying abroad.

Computer companies and software developers should consider developing training software packages that address international student needs in terms of technology use in

preparation to living abroad, and contract with international students' offices in colleges as well as Worldwide Education Advising Centers.

Foreign policymakers and their staff should make changes to educational policies in their countries, and reallocate funds to invest in Information Communication Technology (ICT) tools and training to prepare students for the global economy, and help them become competent users of technology in the international arena.

Recommendations for Further Research

As no publications reviewed by the researcher covered technology use by international students, the researcher's findings add to the literature on international students and connect three fields: higher education (in the United States), international students, and information communication technology (ICT). The study is important in breaking new ground connecting fields that have not been previously related. The study invites further research to explore other than traditionally addressed areas of international students' experiences.

Despite the rapid development of ICT and increasing enrollment of international students, little research has been conducted to assess the impact of technology on international students' experiences. It is important to measure the impact of technology on international students' lives in order to identify what strategies can be used to support international students.

Higher education professionals are impeded by almost the complete absence of empirical research on the importance of technology use by international students and its impact on overall college experiences of international students. Technology use by American students has received some attention in the literature, thus further research could be conducted to compare experiences of these two populations (international students and American students) and discover differences and/or similarities.

Further research could be conducted to identify current technology training programs that are being offered at colleges and through third party providers to support international students' use of technology. This kind of study could establish a foundation for a basic technology training curriculum, which would be used to better prepare future international students for their college experiences abroad.

Other recommendations for further research include the following: continue to explore the demographic changes in the international student population and relate them to their experiences with technology; identify which strategies are particularly effective in developing technological knowledge and skills; determine how an advanced/proficient user of technology differs from a typical user; and explore the impact of technology training of various duration, context, and design.

Additional research in the field of international education and educational technology will add to the understanding of the impact of technology on international students' lives.

REFERENCES

Adria, M., & Rose, T. (2004). Technology, Preprocessing, and Resistance--A Comparative Case Study of Intensive Classroom Teaching. *Journal of Education for Business, 80* (1), 53-60.

Arthur, N. (2004). *Counseling international students: Clients from around the world / Nancy Arthur*. International and cultural psychology series. New York: Kluwer Academic/Plenum.

Baez, B. (2002). *Affirmative action, hate speech, and tenure: Narratives about race, law, and the academy*. New York: Routledge Falmer.

Baird, D., & Fisher, M. (2007). Neomillennial user experience design strategies: Utilizing social networking media to support "always on" learning styles. *Educational Administration Abstract, 42* (3), 5.

Baird, D. (2005, November 1). The promise of social networks. *Tech &Learning*. Retrieved May 17, 2009, from http://www.techlearning.com/article/4816

Baker, E. A. (2008). Creating valuable class web sites. *Learning & Leading with Technology, 35* (7), 18-21.

Barbas, M. P. S.-C. (2006). Expanding knowledge: From the classroom into cyberspace. *Educational Media International, 43* (1), 65-73.

Barrett, H. (2009). Electronic Portfolios and Digital Storytelling for lifelong and life wide learning portal. Retrieved May 13, 2009, from http://electronicportfolios.org/

Berg, B. L. (2007). *Qualitative research methods for the social sciences*. Boston: Pearson/Allyn & Bacon.

Berman, S. D. (2008). 65. ICT-Based distance education in South Asia. *International Review of Research in Open and Distance Learning, 9* (3), 1-6.

Blackwell, L. (2003, October 21). Instant Messaging gets the picture. Retrieved May 18, 2009,

from http://www.pcworld.com/article/113025/instant_messaging_gets_the_picture.html

Bogatin, D. (2007). Why Facebook is scarier than Google. Retrieved May 14, 2009, from http://blogs.zdnet.com/micro-markets/?p=1437

Brown, M. (2007). Mashing up the once and future CMS. *EDUCAUSE Review, 42* (2), 8-9.

Brown, J. S., & Duguid, P. (2000). *The social life of information*. Boston: Harvard Business School Press.

Bugeja, M. (2006). Facing Facebook. *Chronicle of Higher Education*. Retrieved May 16, 2009, from http://chronicle.com/jobs/news/2006/01/2006012301c.htm

Caelli, K., Ray, L., and Mill, J. (2003). 'Clear as Mud': Toward Greater Clarity in Generic Qualitative Research. *International Journal of Qualitative Methods, 2* (2).

Carlson, W. B. (2007). Diversity and Progress: How Might We Picture Technology across Global Cultures? *Comparative Technology Transfer and Society, 5* (2), 128-155.

Chein, I. (1981). An introduction to sampling. In: Kidder, L.H. et al. (eds.), *Research Methods in Social Relations*. New York, NY: Holt, Rinehart, & Winston: 418-441.

Churchill, D. (2007). Reflection on Educational Technology: Moving forward and beyond. *Educational Media International, 44* (3), 181-183. Retrieved October 06, 2009, from http://www.informaworld.com/10.1080/09523980701491617

Clyde, L. A. (2005). Educational Blogging. *Teacher Librarian, 32* (3), 43-45.

Coffin, C., & O'Halloran, K. (2008). Researching argumentation in educational contexts: new directions, new methods. *International Journal of Research & Method in Education, 31* (3), 219-227.

Collins, A., & Halverson, R. (2009). *Rethinking education in the age of technology: The digital revolution and schooling in America*. New York: Teachers College Press.

Corbin, J. M., & Strauss, A. L. (1990). Grounded theory research: Procedures, canons, and evaluative criteria. *Qualitative Sociology, 12* (1), 3-21.

Council of Graduate Schools. (2008). *Ph.D. completion and attrition: Analysis of baseline program data from the Ph.D. completion project*. Washington, DC: Author.

Craig, D. (2003). Instant Messaging: The Language of Youth Literacy. Retrieved May 18, 2009, from http://bcs.bedfordstmartins.com/easywriter3e/studentwriting/pdf/CraigMLAResearchEssay-final.pdf

Cranton, P. (2006). *Understanding and promoting transformative learning: A guide for educators of adults*. The Jossey-Bass higher and adult education series. San Francisco, CA: Jossey-Bass.

Daloz, L. A., & Daloz, L. A. (1999). *Mentor: Guiding the journey of adult learners*. The Jossey-Bass higher and adult education series. San Francisco: Jossey-Bass.

Dawson, V., Forster, P., & Reid, D. (2006). Information Communication Technology (ICT) integration in a science education unit for preservice science teachers; students' perceptions of their ICT skills, knowledge and pedagogy. *International Journal Of Science And Mathematics Education, 4* (2), 345-363.

Delicious (2009, May 17). Learn More about Delicious. Message posted to http://delicious.com/help/learn

Denzin, N. K. (1995). *Handbook of qualitative research*. Thousand Oaks, Calif. [u.a.]: Sage.

Dixon, M., Kuhlhorst, M., Reiff, A. (2006). Creating Effective Online Discussions: Instructor and Student Roles. *Journal of Asynchronous Learning Networks, 10* (3). Retrieved May 18, 2009, from http://speech.ipfw.edu/research/onlineres.pdf

Downes, S. (2004). Educational Blogging. *EDUCAUSE Review, 39* (5), 14-27. Retrieved May 10, 2009, from http://www.educause.edu/EDUCAUSE+Review/EDUCAUSEReviewMagazineVolume39/EducationalBlogging/157920

Draucker, C. B., Martsolf, D. S., Ross, R., & Rusk, T. B. (January 01, 2007). Theoretical sampling and category development in grounded theory. *Qualitative Health Research, 17,* 8, 1137-48.

D'Souza, Q. (2006). *RSS Ideas for Educators - Version 1.1.* Retrieved October 14, 2010 from http://www.teachinghacks.com/wp-content/uploads/2006/01/RSS%20Ideas%20for%20Educators111.pdf

Edgerton, D. (2007). *The shock of the old: Technology and global history since 1900.* Oxford: Oxford University Press.

Eisenstadt, M., & Vincent, T. (1998). *The knowledge web: Learning and collaborating on the net*. London: K. Page.

Ertmer, P. A., Gopalakrishnan, S., & Ross, E. M. (September 06, 2001). Technology-Using Teachers: Comparing Perceptions of Exemplary Technology Use to Best Practice. *Journal of Research on Technology in Education, 33*, 5.

Farmer, R. (2003). Instant Messaging – Collaborative Tool or Educator's nightmare. Retrieved May 19, 2009, from http://www.unb.ca/naweb/proceedings/2003/PaperFarmer.html

Field, A. P. (2006). *Discovering statistics using SPSS: (and sex, drugs and rock 'n' roll)*. London: Sage Publications.

Flick, U. (1997). The episodic interview. *LSE Methodology Institute discussion papers in qualitative research. No.5.* Retrieved October 9, 2007, from http://www2.lse.ac.uk/methodologyInstitute/pdf/QualPapers/Flick-episodic.pdf

Flick, U. (1998). *An introduction to qualitative research*. Thousand Oaks, CA.: SAGE Publications, Inc.

Flickr (2009). Teaching and learning possibilities. Retrieved on May 17, 2009, from http://ltc.umanitoba.ca/wiki/index.php?title=Flickr

Fox, R. (2007). Information Technology Use During Severe Acute Respiratory Syndrome (SARS): Teachers' Experiences. *Journal Of Technology And Teacher Education, 15* (2), 191-206.

Gall, M. D., Gall, J. P., & Borg, W. R. (2003). *Educational research: An introduction*. Boston: Allyn and Bacon.

Garcia, A.(2008). Rethinking MySpace: Using social networking tools to connect with students. *Rethinking Schools, 22* (4), 27-29.

Gathercoal, P., Love, D., Bryde, B., & McKean, G. (2002). On Implementing Web-Based Electronic Portfolios. *Educause Quarterly, 25* (2), 29-37.

Glaser, B. G., & Strauss, A. L. (1967). *The discovery of grounded theory; Strategies for qualitative research*. Chicago: Aldine Pub.

Glaser, B. G. (1978). *Theoretical sensitivity: Advances in the methodology of grounded theory*. Mill Valley, Calif: Sociology Press.

Grove, H.(2006, October 11). Education with Technology. Message retrieved May 17, 2009, from http://eduwithtechn.blogspot.com/2006/10/flickr-vs-google-educational.html

Guba, E. G., & Lincoln, Y. S. (1981). *Effective evaluation*. San Francisco: Jossey-Bass.

Gudynas, P. (2003). Education and social inclusion in Lithuania. *PROSPECTS- UNESCO, 33* (1), 63-76.

Guy, T. C. (1999). Culturally Relevant Adult Education: Key Themes and Common Purposes. *New Directions for Adult and Continuing Education, 82* (82), 93-98.

Hammond, T., Hannay, T., Lund, B., & Scott, J. (2005). Social Bookmarking tools (I), a general review. *D-Lib Magazine, 11* (4). Retrieved from http://www.dlib.org/dlib/april05/hammond/04hammond.html

Hoagland, C. (2009, April 28). Social Networking in the Schools. Message posted to http://coeexchange.com/?p=2504

Holmes, D. (1997). *Virtual politics: Identity and community in cyberspace*. London: Sage Publications.

Husserl, E. (1960). *Cartesian meditations: An introduction to phenomenology*. [The Hague]: M. Nijhoff.

International Affairs Office, U.S. Department of Education. (2008). *Structure of the U.S. Education System: Bachelor's Degrees.* Retrieved April 17, 2009, from http://www.ed.gov/about/offices/list/ous/international/usnei/us/edlite-structure-us.html

International Affairs Office, U.S. Department of Education. (2008). *Structure of the U.S. Education System: Master's Degrees.* Retrieved April 17, 2009, from http://www.ed.gov/about/offices/list/ous/international/usnei/us/edlite-structure-us.html

International Affairs Office, U.S. Department of Education. (2008). *Structure of the U.S. Education System: Research Doctorate Degrees.* Retrieved April 17, 2009, from http://www.ed.gov/about/offices/list/ous/international/usnei/us/edlite-structure-us.html

Isenberg, S. K. (2007). *Applying andragogical principles to Internet learning*. Youngstown, N.Y.: Cambria Press.

Iskold, A. (2006). The social bookmarking faceoff. *Read/WriteWeb,* September. Retrieved from http://www.readwriteweb.com/archives/social_bookmarking_faceoff.php

Jafari, A. (2006). *Handbook of research on ePortfolios*. Hershey, Pa. [u.a.]: Idea Group Reference.

Jenkins, H., & Clinton, K. (2006). *Confronting the challenges of participatory culture: Media education for the 21st century*. Chicago: MacArthur Foundation.

Jules, D. (2008). Rethinking Education for the Caribbean: A Radical Approach. *Comparative Education, 44* (2), 203-214.

Kinuthia, W., & Dagada, R. (2008). E-Learning Incorporation: An Exploratory Study of Three South African Higher Education Institutions. *International Journal on E-Learning, 7* (4), 623-640.

Kozma, R. B. (2003). Innovative Technology Integration Practices from Around the World. *Learning and Leading with Technology, 31*, 6-9.

Kvavik, R. B., Caruso, J. B., Morgan, G., & EDUCAUSE Center for Applied Research. (2005). *ECAR study of students and information technology, 2005: Convenience, connection, control, and learning*. Boulder, Colo: ECAR, Educause Center for Applied Research.

Le, T., & Gardner, S. K. (May 23, 2010). Understanding the Doctoral Experience of Asian International Students in the Science, Technology, Engineering, and Mathematics (STEM) Fields: An Exploration of One Institutional Context. *Journal of College Student Development, 51,* 3, 252-264.

Lee, C., & Witta, L. (2001, November). *Online students' perceived self-efficacy: Does it change?* Paper presented at the national convention of the Association for Educational Communications and Technology, Atlanta, GA.

Lengnick-Hall, C. A., & Sanders, M. M. (1997). Designing Effective Learning Systems for Management Education: Student Roles, Requisite Variety, and Practicing What We Teach. *Academy of Management Journal, 40* (6), 1334.

Lima, C. O., & Brown, S. W. (2007). ICT for Development: Are Brazilian students well prepared to become global citizens? *Educational Media International, 44* (2), 141-153.

Lindsay, J., & Davis, V. (2007). Flat Classrooms. *Learning and Leading with Technology, 35* (1), 28-30.

Lipson, C. (2008). *Succeeding as an international student in the United States and Canada*. Chicago guides to academic life. Chicago: University of Chicago Press.

Livetext (2009). LiveText Accreditation Management System. Retrieved May 13, 2009, from https://college.livetext.com/

Loyd, B.H., & Gressard, C. (1984). *The Effects of Sex, Age, and Computer Experience on Computer Attitudes.* AEDS Journal, *18* (2), 67-77.

Malterud, K. (2001). "Qualitative research: Standards, challenges and guidelines." The Lancet. 358: pp. 483-488.

Martin, K. P., & Gura, M. (2007). *Podcasting for teachers: Using a new technology to revolutionize teaching and learning*. Emerging technologies for evolving learners. Nathalie, NC: IAP.

Martin, M. F. (2008). *Ph.D. completion and attrition: Analysis of baseline program data from the Ph.D. Completion Project*. Washington, D.C: Council of a Graduate School.

Mason, R., & Rennie, F. (2008). *E-learning and social networking handbook: Resources for higher education*. New York: Routledge.

McFarlane, S. (2008). The laptops are coming! The laptops are coming! *Rethinking Schools, 22* (4), 22-26.

Merriam, S. B., & Merriam, S. B. (1998). *Qualitative research and case study applications in education*. San Francisco: Jossey-Bass.

Merriam, S. B., & Simpson, E. L. (2000). *A guide to research for educators and trainers of adults*. Malabar, Fla: Krieger Pub.

Morgan, G., & EDUCAUSE Center for Applied Research. (2003). *Faculty use of course management systems*. Boulder, Colo: ECAR, EDUCAUSE Center for Applied Research.

Nachmias, R., & Shany, N. (2002). Learning in Virtual Courses and Its Relationship to Thinking Styles. *Journal of Educational Computing Research, 27* (3), 315-29.

National Center for Education Statistics, United States, & Institute of Education Sciences (U.S.). (2007). *Digest of education statistics*. Washington, D.C.: U.S. Dept. of Health, Education, and Welfare, Education Division, National Center for Education Statistics.

Nie, M. (2006). The potential use of mobile devices in higher education. Retrieved May 11, 2009, from http://www2.le.ac.uk/projects/impala/documents/resources-and-tools-for-creating-podcasts/Mobile%20Devices%20in%20Higher%20Education.doc/view.

Nijhuis, G. G., & Collis, B. (May 01, 2003). Using a Web-Based Course-Management System: An Evaluation of Management Tasks and Time Implications for the Instructor. *Evaluation and Program Planning, 26,* 2, 193-201.

Norris, P. (2001). *Digital divide: Civic engagement, information poverty, and the Internet worldwide*. Communication, society, and politics. Cambridge: Cambridge University Press.

Open Doors. (2010, November 10). *International Student Enrollments Rose Modestly in 2009/10, Led by Strong Increase in Students from China* [Press release]. Retrieved March 27, 2011 from http://www.iie.org/en/Who-We-Are/News-and-Events/Press-Center/Press-Releases/2010/2010-11-15-Open-Doors-International-Students-In-The-US

Open Doors (2010). *International Students: All Places of Origin.* Retrieved March 27, 2011 from http://www.iie.org/en/Research-and-Publications/Open-Doors/Data/International-Students/All-Places-of-Origin/2008-10

Open Doors (2008). *Fast Facts.* Retrieved April 17, 2009,

from http://www.opendoors.iienetwork.org/file_depot/0-10000000/0-10000/3390/folder/68485/Open+Doors+Fast+Facts+2008.pdf

Open Doors (2008). *International Educational Exchange. Figure 1B: International Student and U.S. Higher Education Enrollment Trends, Selected Years 1954/55 - 2007/08*. Retrieved April 18, 2009, from http://opendoors.iienetwork.org/?p=131533

Open Doors (2008) *International Educational Exchange. Table 15: International Students by Primary Source of Funding, 2006/07 & 2007/08.* Retrieved April 18, 2009, from http://opendoors.iienetwork.org/?p=131536

Open Doors (2008). *International Educational Exchange. Economic Impact on States from International Students.* Retrieved April 18, 2009, from http://opendoors.iienetwork.org/page/131554/

Open Doors (2008). *International Educational Exchange. Table 16: International Students by Field of Study, 2006/07 & 2007/08.* Retrieved April 18, 2009, from http://opendoors.iienetwork.org/?p=131537

Open Doors (2008). *International Educational Exchange. Table 3: International Students by Academic Level, 2006/07 & 2007/08.* Retrieved April 18, 2009, from http://opendoors.iienetwork.org/?p=131550

Open Doors (2008). *International Educational Exchange. Figure 2B: Top 20 Leading Places of Origin of International Students, 2006/07 & 2007/08.* Retrieved April 18, 2009, from http://opendoors.iienetwork.org/?p=131534

Pascarella, E. T., & Terenzini, P. T. (2005). *How college affects students: A third decade of research*. The Jossey-Bass higher and adult education series. San Francisco: Jossey-Bass.

Patton, M.Q. (2002). Qualitative evaluation and research methods (3nd ed). Thousand Oaks, CA: Sage Publications.

Pollack, T.A. (2003). *Using a course management system to improve instruction.* Paper presented at the annual conference in the Association of Small Computer Users in Education, held at Myrtle Beach, South Carolina.

Prensky, M. (2001). Digital natives, digital immigrants. *On the Horizon: the Strategic Planning Resource for Education Professionals 9* (5). Retrieved on April 29, 2011, from http://www.marcprensky.com/writing/Prensky%20-%20Digital%20Natives,%20Digital%20Immigrants%20-%20Part1.pdf

Proctor, R. M. J., Watson, G., & Finger, G. (2004). Measuring Information and Communication Technology (ICT) Curriculum Integration. *Computers in the Schools, 20* (4), 67-87.

Project Gutenberg home page. Retrieved May 18, 2009, from http://www.gutenberg.org/wiki/Main_Page

Robbins, S., & Bell, M. R. (2008). *Second Life for dummies*. Hoboken, NJ: Wiley Pub.

Rovai, A. P. (2002). Building Sense of Community at a Distance. *International Review of Research in Open and Distance Learning, 3* (1). Retreived May 17, 2009, from http://www.irrodl.org/index.php/irrodl/article/view/79/152

Rose, D. H., & Meyer, A. (2002). *Teaching every student in the Digital Age: Universal design for learning*. Alexandria, Va: Association for Supervision and Curriculum Development. Retrieved May 18, 2009, from http://www.cast.org/teachingeverystudent/ideas/tes/

Schwandt, T. A. (1997). *Qualitative inquiry: A dictionary of terms*. Thousand Oaks: Sage Publications.

Second Life in Education (2009). Educational Uses of Second Life. Retrieved May 17, 2009, from http://sleducation.wikispaces.com/educationaluses

Seidman, I. (2006). *Interviewing as qualitative research: a guide for researchers in education and the social sciences (3ed.).* New York: Teachers College Press.

Sellers, D., Dochen, C. W., & Hodges, R. (2005). *Academic transformation: The road to college success*. Upper Saddle River, N.J.: Pearson/Prentice Hall.

Shank, G. D. (2005). *Qualitative research: a personal skills approach (2nd ed.).* Columbus, OH: Merrill/Prentice Hall.

Shareski, D., & Winkler, C. A. K. (2006). Are Wikis Worth the Time? *Learning and Leading with Technology, 33* (4), 6-7.

Shiratuddin, N., Landoni, M., Gibb, F., and Hassan, S. (2003). E-Book Technology and Its Potential Applications in Distance Education. *Journal of Digital Information, 3*(4). Retrieved May 18, 2009, from http://strathprints.strath.ac.uk/2613/1/strathprints002613.htm

Schuman, D. (1982). *Policy analysis, education, and everyday life.* Lexington, MA: Heath.

Seidman, I. (2006). *Interviewing as qualitative research: A guide for researchers in education and the social sciences*. New York: Teachers College Press.

Siemens, G. (2004). *ePortfolios*. Retrieved May 14, 2009, from http://www.elearnspace.org/Articles/eportfolios.htm

SIESWE Learning Technology Team (January 25, 2007). What is it and How can I use it? *Scottish Institute for Excellence in Social Work Education.* Retrieved May 17, 2009, from http://www.iriss.ac.uk/node/231

Smith, J. A. (2008). *Qualitative psychology: A practical guide to research methods*. Los, Angeles, CA: SAGE Publications.

Smith, L. M. (January 01, 1978). 8: An Evolving Logic of Participant Observation, Educational Ethnography, and Other Case Studies. *Review of Research in Education, 6*,1, 316-377.

Spradley, J. P. (1979). *The ethnographic interview*. New York: Holt, Rinehart and Winston.

Stake, R. E. (2005). *Multiple case study analysis: Step by step cross-case analysis*. New York: Guilford.

Stefani, L., Mason, R., & Pegler, C. (2007). *The educational potential of e-portfolios: Supporting personal development and reflective learning*. London: Routledge.

Structure of U.S. Education. (n.d.). Retrieved March 24, 2011, from http://www2.ed.gov/about/offices/list/ous/international/usnei/us/edlite-structure-us.html

Strauss, A. L. (1987). *Qualitative analysis for social scientists.* New York: Cambridge University Press.

Strauss, A. L., & Corbin, J. M. (1998). *Basics of qualitative research: Techniques and procedures for developing grounded theory*. Thousand Oaks: Sage Publications.

Su, K.-D. (2008). An Integrated Science Course Designed with Information Communication Technologies to Enhance University Students' Learning Performance. *Computers & Education, 51* (3), 1365-1374.

Roberts, C. M. (2004). *The Dissertation journey: A practical and comprehensive guide to planning, writing, and defending your dissertation*. Thousand Oaks: CA.

Smith, L. (September 01, 1996). With Knowledge in Mind: Novel Transformation of the Learner or Transformation of Novel Knowledge. *Human Development, 39*, 5, 257-63.

Teichler, U. (1999). Internationalisation as a Challenge for Higher Education in Europe. *Tertiary Education and Management,* 5 (1), 5-23.

Tseng, W.-C., & Newton, F. B. (January 01, 2002). International Students' Strategies for Well-Being. *College Student Journal, 36*, 4, 591.

The United Nations Information and Communications Technologies Task Force. (2005). *Innovation and Investment: Information and Communication Technologies and the Millennium Development Goal.* New York: Gilhooly, D.

United Nations Department of Public Information (2000). We the peoples: The role of the United Nations in the 21st century. New York: United Nations Department of Public Information. Retrieved March 8, 2011, from http://www.un.org/millennium/sg/report/full.htm

United States Department of State. (2008). *International Students in the United States.* [Press Release]. Retrieved June 14, 2009, from http://opendoors.iienetwork.org/?p=131590

U.S. Department of Education, National Center for Education Statistics. (2007). *Digest of Education Statistics, 2007* (NCES 2007-020)

Vogt, W. P. (1999). *Dictionary of statistics & methodology: A nontechnical guide for the social sciences*. Thousand Oaks, Calif: Sage Publications.

Walsham, G. (2001). *Making a world of difference: IT in a global context*. Chichester: J. Wiley.

West, R., Waddoups, G., & Graham, C. (2007). Understanding the experiences of instructors as they adopt a course management system. *Educational Technology Research and Development, 55*, 1, 1-26.

Zhao, C.-M., Kuh, G. D., & Carini, R. M. (2005). A Comparison of International Student and American Student Engagement in Effective Educational Practices. *Journal of Higher Education, 76* (2), 209.

Zur, O. & Zur, A. (2011): *On Digital Immigrants and Digital Natives: How the Digital Divide Affects Families, Educational Institutions, and the Workplace.* Zur Institute - Online Publication. Retrieved on April 20, 2011 from http://www.zurinstitute.com/digital_divide.html.

APPENDIX A: SAMPLE EMAIL FROM THE INTERNATIONAL STUDENT OFFICE TO INTERNATIONAL STUDENTS

Dear Student:

Olena Zhadko is a Doctoral Student at the University of Missouri – St. Louis. She is conducting research on experiences of international college students as adult learners using Information Communication Technology in the United States and would like to ask you for your help with this project. Olena Zhadko would really appreciate if you would complete the survey about your experiences with different technologies once you enrolled in college in the United States. Your participation in this study is voluntary. You have the right to withdraw from the study at any point or refuse to answer any question during the study. Please click on the link below to proceed with a survey. There will be a drawing for a completed survey and five $20 gift cards will be given away!

After you complete the survey, in the last section you will be asked for your contact information if you are interested in participating in a follow up interview regarding this research study. Please indicate your contact email address and a phone number in that last section of the survey. If you are selected to be interviewed you will be compensated $20 for your participation for one hour interview. A personal interview will be scheduled at your convenience. If you are interested in helping, please click on the link and fill out the survey.

If you have any questions or concerns regarding this study, or if any problems arise, you may call the Investigator, Olena Zhadko at 314-359-9909; the Faculty Advisor, Carl Hoagland at 314-516-4802; or, you may also ask questions or state concerns regarding your rights as a research participant to the Office of Research Administration, at 314-516-5897.

Please contact Olena Zhadko at 314-359-9909 or email at zhadkolena@yahoo.com if you have any questions.

Thank you!

(International Student Advisor's Name)

APPENDIX B: INFORMED CONSENT FOR PARTICIPATION IN RESEARCH ACTIVITIES (IMBEDDED IN THE SURVEY)

Experiences of International College Students as Adult Learners Using Information Communication Technologies (ICT) in the United States

Thank you for participating in the "International College Students' Experiences with Technology" Survey. The purpose of the survey is to gain insight about experiences of international college students with technology (digital learning resources and online social networking) in the United States. The information gained will be used to help facilitate international students' use of technology in college. There will be a drawing for a completed survey and five $20 gift cards will be given away!

By hitting "Next" on this screen, you consent to the use of the questionnaire responses by the researcher. All responses will remain anonymous. The researcher will do everything to protect your privacy. As part of this effort, your identity as well as the name of the university will not be revealed in any publication or presentation that may result from this study. Your participation in this study is voluntary. You have the right to refuse to participate in the survey without penalty and the right to refuse to answer any question during the survey. You also have the option to exit the survey at any time (please see the upper right-hand corner of the screen). It should take approximately 15 minutes to complete the survey. If you have questions or concerns regarding your participation in this survey, please contact the researcher, Olena Zhadko (tel: 314-359-9909, email: zhadkolena@yahoo.com)

APPENDIX C: INFORMED CONSENT FOR PARTICIPATION IN RESEARCH ACTIVITIES

Division of Educational Leadership and Policy Studies

One University Blvd.

St. Louis, Missouri 63121-4499

Telephone: 314-516-4800

314-359-9909

Fax: 314-516-4812

E-mail: ooz96c@umsl.edu

Informed Consent for Participation in Research Activities

Experiences of International College Students as Adult Learners Using Information Communication Technologies in the United States

Participant _____ HSC Approval Number _____

Principal Investigator **_Olena Zhadko_____** PI's Phone Number__**314-359-9909_____**

1. You are invited to participate in a research study about international student's college experiences with Information Communication Technologies (ICT) in the United States. The study will be conducted by Olena Zhadko of the College of Education at the University of Missouri-St. Louis and Washington University in St. Louis. The purpose of this study is to learn how international college students use Internet and other electronic technologies that support and

aid international students in their successful college life experiences. You have been asked to participate in the research because you have been identified as an international student attending University of Missouri-St. Louis or Washington University in St. Louis, have participated in the first phase of the study (online survey) and demonstrated your interest in your further participation. Please read this form and ask any questions you may have before agreeing to participate in this research study. Your participation in this research is voluntary. Your decision whether to participate will not affect your current or future relations with the University. If you decide to participate, you are free to withdraw at any time without affecting that relationship.

2. a) Your participation will involve

- Answering questions in your own words in a face-to-face informal interview. An interview will be recorded on video and audio. The interview will be conducted at your college, in a secure room. You will be asked questions about your experiences with the Information Communication Technology tools.
- The audio/video recording will only be studied by the researcher, and portions may be made available to the dissertation committee members if requested, and will be kept confidential. No one else will have access to the recordings. The recordings will be transcribed (typed) for analysis and comparison with the transcripts of other participants. The recordings will be destroyed once the research study is completed.

Approximately 20 subjects may be involved in this part of the study. The participants will come from two colleges in the state of Missouri, and possibly each will come from a different country. Approximately 10 subjects will participate from each site; a minimum of five subjects will be involved in the study from each site.

b) The amount of time involved in your participation will be approximately one (1) hour and you will receive $20 for your time.

3. There are no anticipated risks associated with this research. You may be asked questions about education that you received in your homeland, your family, financial matters, or other topics that you may feel are too personal to discuss. You may refuse to answer any question that causes discomfort and still be able to continue with the interview. Your identity will be kept confidential at all times and no personal information will be released.
4. There are no direct benefits for you participating in this study. However, your participation will contribute to the knowledge about the use of the Information Communication Technologies (ICT) by international college students in the United States. Your input may help a broad audience such as prospective international students preparing for educational endeavors in the United States, Worldwide Education Advising Centers preparing international students, higher education institutions in the United States and in other countries to gain knowledge on the research topic. The possible benefit to you from participating in this research is an opportunity to reflect on your experiences with the Information Communication Technology (ICT) and make further decisions about their use in your life.
5. Your participation is voluntary and you may choose not to participate in this research study or to withdraw your consent at any time. As mentioned above, you may choose not to answer any questions that you do not want to answer. You will NOT be penalized in any way should you choose not to participate or to withdraw.
6. The researcher will do everything to protect your privacy. As part of this effort, your identity as well as the name of the university will not be revealed in any publication or presentation that may result from this study. In rare instances, a researcher's study must undergo an audit or program evaluation by an oversight agency (such as the Office for Human Research Protection). That agency would be required to maintain the confidentiality of your data.

7. If you have any questions or concerns regarding this study, or if any problems arise, you may call the Investigator, Olena Zhadko at 314-359-9909 or the Faculty Advisor, Carl Hoagland at 314-516-4802. You may also ask questions or state concerns regarding your rights as a research participant to the Office of Research Administration, at 314-516-5897.

I have read this consent form and have been given the opportunity to ask questions. I will also be given a copy of this consent form for my records. I consent to my participation in the research described above.

Participant's Signature	Date	Participant's Printed Name	
Signature of Investigator or Designee	Date	Investigator/Designee Printed Name	

APPENDIX D: SURVEY

International College Students' Experiences with Technology

Welcome!

Thank you for participating in the "International College Students' Experiences with Technology" Survey. The purpose of the survey is to gain insight about experiences of international college students with technology (digital learning resources and online social networking) in the United States. The information gained will be used to help facilitate international students' use of technology in college. There will be a drawing for a completed survey and five $20 gift cards will be given away!

By hitting "Next" on this screen, you consent to the use of the questionnaire responses by the researcher. All responses will remain anonymous. The researcher will do everything to protect your privacy. As part of this effort, your identity as well as the name of the university will not be revealed in any publication or presentation that may result from this study. Your participation in this study is voluntary. You have the right to refuse to participate in the survey without penalty and the right to refuse to answer any question during the survey. You also have the option to exit the survey at any time (please see the upper right-hand corner of the screen). It should take approximately 15 minutes to complete the survey. If you have questions or concerns regarding your participation in this survey, please contact the researcher, Olena Zhadko (tel: 314-359-9909, email: zhadkolena@yahoo.com)

Background Information:

1. There will be a drawing for a completed survey and five $20 gift cards will be given away! Please enter your email address here if you would like to qualify for a drawing._____

2. What school do you attend?

3. Please indicate your academic level
   - Undergraduate
   - Graduate
   - Non-degree
   - Other (please specify)

4. Please indicate your gender
   - Female
   - Male

5. Please indicate your age
   16-20 21-25 26-30 31-35 36-40 41-45 46-50 over 50
6. Please indicate your housing information
   - campus housing
   - off-campus with friends/roommates

- off-campus on your own
- off-campus with family
- Other (please specify)

7. Please indicate the primary source of your school financing (who pays all or most of your college/ life expenses in the United States?).

- Personal/Family Funds
- U.S. College/ University Funds
- Home Government/ University Funds
- U.S. Government Funds
- U.S. Private Sponsor
- Foreign Private Sponsor
- International Organization
- Current Employment
- Loans
- Other (please specify)

8. Please indicate your country of origin_____

9. Please indicate your academic program (your focus of study)_____

10. Please indicate your relationship status

- single
- in a relationship
- it's complicated
- married (spouse and/or children are in a home country)
- married (spouse and/or children are in the US)
- separated
- divorced
- Other (please specify)

11. Please indicate the amount of time that you've been AT THIS SCHOOL (for example: 2 years and 7 months) _____

12. Please indicate total amount of time spent IN THE UNITED STATES (for example: 1 year and 3 months) _____

13. How comfortable are you communicating in English? (1=not comfortable, 5=very comfortable)

1=not comfortable
2=a bit comfortable
3=somewhat comfortable
4=comfortable
5=very comfortable

14. Do you struggle to express yourself in English?

1=consistently
2=occasionally
3=rarely
4=never

15. How often do you communicate in English? (1=never, 5=always)
1=never
2=occasionally
3=sometimes
4=often
5=always

Use of Technology

16. How comfortable are you using technology? (1=not comfortable, 5=professional)
1=not comfortable
2=somewhat comfortable
3=comfortable
4=very comfortable
5=professional

17. How many hours A WEEK do you use technology (NOT required for classes, for NON-academic purposes) i.e. to check email, check your facebook account, watch TV online, listen to music online, etc.

- less than an hour
- 1-2 hours
- 3-5 hours
- 6-10 hours
- 11-20 hours
- over 20 hours
- Other (please specify)

18. How many hours A WEEK do you use technology (REQUIRED for classes, for ACADEMIC PURPOSES) i.e. to do research, blackboard, etc.

- less than an hour
- 1-2 hours
- 3-5 hours
- 6-10 hours
- 11-20 hours
- over 20 hours
- Other (please specify)

19. What is your primary location for accessing the internet and using technology? (mark only one)

- School Campus (i.e. a computer lab, a library)

- Home
- Work
- Public location (i.e. a cafe, a shop, a public library)
- Other (please specify)

20. How did you learn most of your technology skills?

- How did you learn most of your technology skills? I taught myself.
- My peers taught me.
- My instructors taught me.
- I took a technology class for credit.
- I took a non-credit class in technology.
- Other (please specify)

21. Rank the use technology in situations listed below in order of importance to you (1- most important, 7-least important)

- interact with family and friends in my home country
- interact with instructors
- interact with my mentor
- interact with my classmates
- interact with non-classmates in my school
- interact with friends in the US
- interact with family in the US interact with family in the US

22. Please rate how often you use the following

1 Never 2 Rarely 3 Sometimes 4 Often 5 All the time

- Blogs (Weblogs)
- Wikis
- Podcasts (videopodcast, blogcasts)
- E-portfolios
- Social Networking (Facebook, MySpace)
- Social Bookmarking (Delicious)
- Photo Sharing (Flickr)
- Second Life
- Online Forums
- Video Messanger (Windows Messanger, FlashMeeting)
- E-books (google books)
- Instant Messanger
- Skype
- Computer games
- Computer simulations
- Mashups (Panoramio, eBay, Google applications, Amazon)
- Mobile Learning (M-Learning: cell-phones,iPhones,PDAs, MP3 player, portable game devices, handhelds, tablets, laptops)
- RSS feeds

- Video Clips and YouTube
  Audiographics or Interactive/Electronic Whiteboards
- Other (Please specify what other)_____

23. How often do you use technology to engage in the following activities?
    1 never 2 rarely 3 occasionally 4 often 5 regularly
- Use technology on your own?
- Use technology collaboratively (in a group to study,work on assignments together, group projects, etc.?)
- Seek assistance from the instructional computing(computer lab) staff on a specific matter?
- Use the Internet to conduct research for course assignments
- Use the Internet for self-instruction (e.g. online tutorials)
- Use the Internet to locate resources for course assignments (e.g. lesson plans, quiz generators, puzzle makers, or reference materials)
- Email instructors or students
- Word Processing
- Create spreadsheets to make tables or analyze data
- Conduct statistical data analysis
- Create multimedia presentations
- Develop concept maps (Inspiration, Cmap)
- Use subject specific software or Internet modules (e.g. Math Tutor, Social Studies Timeline)
- Develop web pages
- Create video, DVDs, or CDs
- Use a digital still or video camera
- Scan photos and documents
- Participate in online discussions
- Look up grades
- Use Blogs, Wikis or Podcasting
- Store data electronically
- Listen to music
- Download music, video, or other applications
- Watch TV/movies online
- Play video games
- Browse the Internet
- Keep in touch with family/friends(through social networking i.e. facebook, myspace, etc.)
- Email family/friends
- Conduct research for academic purposes
- Conduct research for non-academic purposes
- Shop online
- Keep track of your calendar online
- Keep track of your contacts
- Pay bills

- Other (Please specify what other)

24. What is your skill level in using the following computer technologies and applications?

Do not use Poor Fair Good Very Good Excellent

- Spreadsheets (Excel, etc.)
- Presentation software (PowerPoint, Inspiration, etc.)
- Graphics software (Photoshop, Flash, etc.)
- Video/audio software (Director, iMovie, etc.)
- Online library resources
- Computer maintenance (downloading software updates, installing additional memory, organizing files, etc.)
- Course management system (MyGateway,Blackboard, etc.)
- Social networking (Facebook, MySpace)

25. Overall do you have positive or negative experience with technology?

- Positive
- Negative

Please describe briefly_____

26. Please rate your agreement with the following statements. When I use technology...

1=Strongly Agree 2=Agree 3=Neutral 4=Disagree 5=Strongly Disagree

- I am more likely to communicate with other students taking a course.
- I am more likely to work in online groups.
- I am LESS likely to work in face-to-face groups.
- I am more likely to spend additional time studying.
- I am more likely to communicate with my instructor.
- I am more likely to learn more.
- I am more satisfied with the courses.
- I am more likely to stay engaged with my course work.
- I am more likely to think more about the course topics.
- I am more likely to complete course assignments.
- I am more likely to take another class at my school because of technology used.
- I am more likely to complete my degree because of the advantages of using technology in my courses.

27. Rank the reason for the use technology in the below situations in order of importance to you (1- most important, 5-least important)

- School work
- Communication (with family/friends)
- Retrieving information/learning
- Entertainment/watching TV, listening to music
- Emloyment (job)
- Other

28. Please rate your agreement with the following statements about technology.

Strongly Agree Agree Neutral Disagree Strongly disagree

- My experience with technology has always been positive for me since I came to the US to study.
- The experience with technology helped me to adapt the new environment.
- It was easy to adapt to the new technologically enhanced society here in college in the US.
- In comparison with my home country, I had more access to educational technology.
- I am still struggling with using technology.
- I had adequate technical training in the US.
- The instructional computing (computer lab) staff at the university is helpful.
- The instructional computing (computer lab) staff at the university is knowledgeable about technology.
- Access to technology helped me complete my assignments on time.
- I effectively integrated technology in my course assignments.
- Using technology this semester contributed to meeting the learning goals of my course(s).
- Using technology this semester contributed to my acquiring new technology skills (regardless of the goals of my course(s)).
- Using technology this semester contributed to my sense of being a part of the campus community.

29. Which statement(s) describe(s) your knowledge of technology workshops on campus? Please check all that apply:

- I am aware of technology workshops (e.g., Microsoft office workshop, digital camera workshop), but have NOT participated in them.
- I am NOT aware of technology workshops offered on campus.
- I have participated in technology workshops.
- The technology workshops are beneficial.
- The technology workshops were a graduation or course requirement.
- I am aware of technology technical help sheets/tutorials available on campus (either paper copy or electronic versions).
- I know where to find the help sheets.
- The help sheets are beneficial.

30. How do/did you learn technology skills that you use IN YOUR DAILY LIFE? Please choose only one of the following:

- I taught myself
- My peers taught me
- My instructor(s) taught me
- I took an Information Technology course
- Other (please specify)

End of Survey

Thank you for completing this survey. There will be a drawing for a completed survey and five $20 gift cards will be given away!

Are you interested in participating in a FOLLOW UP INTERVIEW regarding this research study? Please indicate your CONTACT EMAIL ADDRESS and A PHONE NUMBER in the box below! If you are selected to be interviewed you will be compensated $20 for your participation for one hour interview. A personal interview will be scheduled at your convenience._____

APPENDIX E: INTERVIEW GUIDE

I. Establishing the context of the participant's experience

- Please tell me as much as possible about your past lives with or without technology up to the present time
- Please reconstruct your early experiences with technology in your family, in school, with friends, in your neighborhood, and at work.
- How did you start using technology?

II. Reconstructing the experience of the participants in the context

- Please reconstruct the details of your experiences with technology.
- How did/do you actually use technology in your everyday life?
- Please reconstruct a day from the moment you woke up to the time you fell asleep, describing the ways you used technology throughout a day once you arrived to study in the United States.
- How did the factors in your life interact to bring you to the present situation?

III. Engaging participants in reflective activities of the meaning of their experiences

- Given what you have said about your life before you came to college in the United States and given what you have said about your work now, how do you understand technology in your life? What sense does it make to you?
- Given what you have reconstructed in these interviews, where do you see yourself going in the future with technology?

Appendix F: Office of Research Administration: Interdepartmental Correspondence

Appendix F

University of Missouri St. Louis

OFFICE OF RESEARCH ADMINISTRATION

Interdepartmental Correspondence

Name: Olena Zhadko

Title: Experiences of International College Students as Adult Learners Using Information Communication Technologies in the United States

The chairperson of the Human Subjects Committee for UM-St. Louis has reviewed the above mentioned protocol for research involving human subjects and determined that the project qualifies for exemption from full committee review under Title 45 Code of Federal Regulations Part 46.101b. The time period for this approval expires one year from the date listed below. You must notify the Human Subjects Committee in advance of any proposed major changes in your approved protocol, e.g., addition of research sites or research instruments.

You must file an annual report with the committee. This report must indicate the starting date of the project and the number of subjects to date from start of project, or since last annual report, whichever is more recent.

Any consent or assent forms must be signed in duplicate and a copy provided to the subject. The principal investigator must retain the other copy of the signed consent form for at least three years following the completion of the research activity and they must be available for inspection if there is an official review of the UM-St. Louis human subjects research proceedings by the U.S. Department of Health and Human Services Office for Protection from Research Risks.

This action is officially recorded in the minutes of the committee.

Protocol Number	Date	Signature - Chair
090730Z	8/4/09	

APPENDIX G: FREQUENCY OF THE ICT USE (OFTEN AND ALL THE TIME)

Social Networking (Facebook, MySpace)	77.6%
Instant Messaging	57.6%
Video Clips and YouTube	57.4%
Skype	51.1%
Mashups (Panoramio, eBay, Google applications, Amazon,	48.7%
Video Messaging (Windows Messanger, FlashMeeting)	45.5%
Wikis	41.3%
Mobile Learning (M-Learning: cell-phones,iPhones,PDAs, MP3 player, portable game devices, handhelds, tablets, laptops)	37.6%
E-books (google books)	30.8%
Blogs (Weblogs)	25.4%
Online Forums	22.5%
Photo Sharing (Flickr)	18.0%
Podcasts (videopodcast, blogcasts)	14.7%
Other*	14.0%
Computer simulations	11.7%
Computer games	11.6%
Social Bookmarking (Delicious)	10.8%
RSS feeds	10.4%
E-portfolios	10.0%
Audiographics or Interactive/Electronic Whiteboards	8.6%
Second Life	3.6%

Other*: download and/or listen music, e-mail, find articles on google scholar, Java, Newspaper, radio stations, online dictionary, courses, download software, no idea of other, organize tools for searches, capture citations for research purpose (firefox add on- zotero), research, send cards, VoipBuster, watch movies and/or news.

APPENDIX H: FREQUENCY OF THE ICT USE (OFTEN AND ALL THE TIME)

Email family/friends	91.86%
Browse the Internet	91.44%
Keep in touch with family/friends(through social networking i.e. facebook, myspace, etc.)	90.05%
Word Processing	85.20%
Listen to music	83.18%
Use the Internet to conduct research for course assignments	82.06%
Email instructors or students	80.18%
Conduct research for academic purposes	80.09%
Store data electronically	75.91%
Use the Internet to locate resources for course assignments (e.g. lesson plans, quiz generators, puzzle makers, or reference materials)	75.68%
Download music, video, or other applications	68.02%
Watch TV/movies online	66.67%
Conduct research for non-academic purposes	63.76%
Create spreadsheets to make tables or analyze data	62.78%
Look up grades	62.78%
Pay bills	61.64%
Use the Internet for self-instruction (e.g. online tutorials)	59.91%
Use technology collaboratively (in a group to study, work on assignments together, group projects, etc.?)	53.13%
Shop online	52.04%

Keep track of your contacts	51.82%
Create multimedia presentations	51.80%
Conduct statistical data analysis	49.10%
Use a digital still or video camera	47.75%
Use Blogs, Wikis or Podcasting	47.06%
Scan photos and documents	41.44%
Keep track of your calendar online	35.59%
Participate in online discussions	30.63%
Use subject specific software or Internet modules (e.g. Math Tutor, Social Studies Timeline)	25.23%
Seek assistance from the instructional computing (computer lab) staff on a specific matter?	22.87%
Create video, DVDs, or CDs	22.62%
Other*	22.39%
Play video games	20.09%
Develop concept maps (Inspiration, Cmap)	19.73%
Develop web pages	14.09%

Other*: banking, simulation software, data analysis tools, java, Skype website maintenance, almost everything in my life is tied to technology, ArcGIS.

APPENDIX I: THEORETICAL MEMO

1. It seems like all the experiences of the participants can be divided into 2 domains:
    - Past (most likely in their home country, or other countries rather that the US, or maybe early U.S. experiences)
    - Current or Present (experiences in the United States)
    - (Optional) Future (participants' expectations for the future)

    Note: it might be necessary to organize issues chronologically:
    - First, establish a background
    - Second, describe current struggles/experiences upon arrival

    Note: Combine Access in Comparison of technology use in the U.S. and in a home country
2. Learning and Motivation:
    - Motivation (ICT is something new/Hot topic) and Family Members ICT competence (Don't know how to use ICT/Use ICT) what does it have to do with Learning? Family doesn't know how to use ICT this may cause fear of technology.
    - Learned by myself (learning by doing, trial and error)/learned thru a training/learned with help of others (friends/lab assist/professor) and the respondent's level of skill and competence? Combine: learning type
    - The use of T is defined by 2 factors: extrinsic (required by school/system, country) and intrinsic (to connect with friends/family)
    - Daily use of the ICT can define the needs of a respondent: we can create a model of a traditional/international student (his/her needs and consequently create a system to support those needs).
3. The perception of technology use is different in different countries. In many countries technology knowledge is associated with technical knowledge of programming languages and hardware/software repair. In the U.S. it seems technological knowledge is associated with information retrieval and the use of technology for communication purposes.
4. Adaptation to unlimited access to internet and ICT. Who teaches international students how to appropriately use it?
5. Combine ICT as a distraction with appropriate/inappropriate use of ICT.
6. Look into daily use and access. Maybe combine. Add distraction.
7. Combine use of technology for communication purposes (with family/friends) and technology allows to do things that would be impossible otherwise (?)/ keeps people connected/up to date
8. Access to Technology allows you to be more efficient and productive
9. Combine important/non important with daily use of the ICT/T
10. Combine ICT makes you more competent and knowledgeable and professional development.
11. Combine learned by myself and purpose of learning
12. Combine ICT makes your more competent and knowledgeable and Allows you to do things ….

13. Combine learning easy /hard with learned by myself …it seems like when learning is easy they learn it by themselves.
14. Combine adaptation/transition/shift (in the country...maybe personal)-allows to do things that…..communication
15. Combine Important/Non important part of life and daily use
16. Combine: learning easy/hard with resistance
17. Combine English Language Impact/ Knowledge if English does NOT impact the level of comfort of T use/ Knowledge of English impacts the level of comfort of T use
18. Combine positive/negative attitude towards ICT& OR learning //// T positive affect/experience
19. Combine T is addictive and time-consuming
20. Search for and combine: disconnected and technology breaks down.
21. Combine: resistance and fear/adaptation
22. Combine: new skills developed over time/// need to learn
23. Combine: personal aspect/no personal aspect/online identity/safe environment///// and substitution of real interaction with technology supported interaction
24. Combine: importance of technology and daily use
25. Combine use technology (a laptop) in class//and for school/work
26. Combine: future with technologies and reflections on learning experiences
27. Combine: adaptation and frustration
28. Combine: ICT makes your more competent and knowledgeable and for personal/professional development
29. Combine: use technology for class/school work and for school/work
30. Combine substitution of real interaction with technology supported interaction////personal aspect/no personal aspect/online identity/safe environment
31. Combine: positive/negative experience ////and dependent
32. Look into for school/work for reasons why they learnt a program/software
33. Combine: environment defines the level of skill and access??
34. Combine: technical difficulties and appropriate/not appropriate use of the computer.

APPENDIX J: PROCEDURAL MEMO

Irrelevant Comments: for a long time I was not sure what to do with the comments that are side comments, or something that doesn't mean really anything. So I decided to code them as "irrelevant" so I can easily search for the quotes later and maybe find a new code for them.
Developing categories and their relationships? Another question that I pondered around. First, I thought I would define codes, their properties and dimensions and then the relationships among codes, and then later on I will proceed with the development of categories and their relationships.
Do I have to pay attention to individuals? The answer to this question was rather unexpected, until I develop a category I should not pay attention to an individual but then I will be reconstructing the people.
How do I develop a code? From the very beginning I had no problem, but once I started to work further I started seeing that some of the codes overlapped or some were assigned to a wrong quote, thus not really portraying the picture. To ensure consistency of a code, I started to write a definition for each code.
Technical Solutions: from the very beginning I knew I had to find a tool that would allow me to manage a lot of text data, a tool that would be able to support the analysis process in a manageable way. One of the programs that seemed to be user-friendly and reliable was **Atlas.ti.** The drawback of it was that the visual representation of the codes was not its strength. Hierarchical coding is not one its strength either. Often times I found myself lost in new codes, and I could not think outside the program. I needed to see how the codes are related to each other; I needed to see the properties and dimensions on a different level. As a result of my search for another program that can allow for visual representation I discovered **Webspiration** to be a very powerful tool. It allowed me to break out of the microscopic view and see a larger picture. This tool also allows for user-friendly display of relationships.
Initial Coding: after finishing coding the first interview, I proceeded with the second one. That's when I started to get lost as I had no coding book at that point, and I did have not developed a structural understanding where my codes belonged. Thus I started to develop a coding book. That helped me to get a better understanding of the whole structure. **Coding process:** thus I continued to work on my code book, working on the next transcript. It became more obvious where the codes belonged. Categories do not have to exclusive. Most likely I will be comparing past and present. No deterministic line.
What are the indicators? What is the intervention? Is it support/family/friends? Is it a class requirement? What is the defining point of the level of skill with the ICT?
Summary: in my summary I think I will be able to group my participants in three categories: 1) experienced 2) limited experience 3) no experience upon arrival to the US. Then I will describe the process of adjustment, as well as intervening factors, as well as some hypothetical relationships, what might have influenced a student's experience i.e. bad conditions, lack of confidence…etc. I would also group my participants by a type of learner they are. I would describe the factors determining the theory.

APPENDIX K: CODE BOOK

Category	**Subcategories**	**Properties**	**Dimensions**
Need to Learn Technology	Purpose of Learning	Extrinsic (Academic School Needs/Requirement) Intrinsic (Entertainment Interest; Personal Interest/Need/Curiosity)	Present or Not Present Compulsory or Optional Present or Not Present
	Type of Learning	Learning Independently, Being Taught by others, and Formal Learning (i.e. Computer Training Course)	Present or Not Present
Prior Technology Learning/Experience	Personal Support	Personal Support (family/friends, teachers) School Support	Present or Not Present Present or Not Present
	Supportive Environment	Environment Type (Structure and Policies at School or Workplace)	Supportive or Not Supportive Conducive to Learning or Not Conducive to Learning Restrictive or Not Restrictive
	Individual Openness	Type of Openness	Avoiders, Reluctant Adopters /Minimalists and Enthusiastic Adopters/Participants
	Digital Natives Digital Immigrants	Socialization into Technology at an Early Age/or Late	Early or Late
	Technological Knowledge upon arrival to the U.S.	Level of Prior Technological Knowledge	Nonexistent to Advanced
	Comparative Attributes/Conditions of Technology Use (U.S. and Home Country)	Note: All of the following would be compared in terms of being same or different Quality of Technology (Degree of Quality) Terms of Technology Use Variety of Resources (Degrees of	Note: All of the following would be compared in terms of being same or different Low To High No Limitations to Limited Use Low to High

		Availability) Commonality of Use (Degrees of Commonality) The Extent of Use (Degrees of The Extent) Cultural Attitude (Type of Attitude) Generation Gap (Type of Gap Condition: Individual Or Societal)	 Not Common To Very Common Low To High Negative To Positive Present or Not present
Technological Adaptation to College Life	Adaptation Process	Degree of Adaptation	None to Full Adaptation
		Ease of Adaptation	Easy to Difficult
		Fear of Adaptation	Present or Not Present
Access to Technology	Degree of Access	Full Access/ Limited/No Access at different locations (School, Home, Public Location)	Present or Not Present
	Type of Access	Software/Hardware/Internet Access at different locations (School, Home, Public Location)	Present or Not Present
	Ease of Access	Degree of Accessibility	Easily Accessible to Difficult to Access
	Digital Divide	Type of Divide	Global and Social
	Cost	Condition (Personal and Abstract) Affordability	Expensive or Not Expensive Affordable or Not Affordable
Experience with Technology	Impact of Technology Use	Negative	Malfunctioning of Technology Distraction Misuse/Overuse (distraction) Time-Consuming Dependency
		Positive	Supports Independent Learning Convenient/Efficient

			Provides Easy/Fast Access to Information Supports Easy/Fast Communication Saves Time
	Importance of Technology Use	Degree of Importance	Low to High

APPENDIX L: INITIAL CONCEPTS

Code-Filter: All

HU: Phase Two
File: [E:\Documents\ Qual Data Analysis\Updated Analysis\Phase Two.hpr6]
Edited by: Olena Zhadko
Date/Time: 2011-04-18 17:03:32

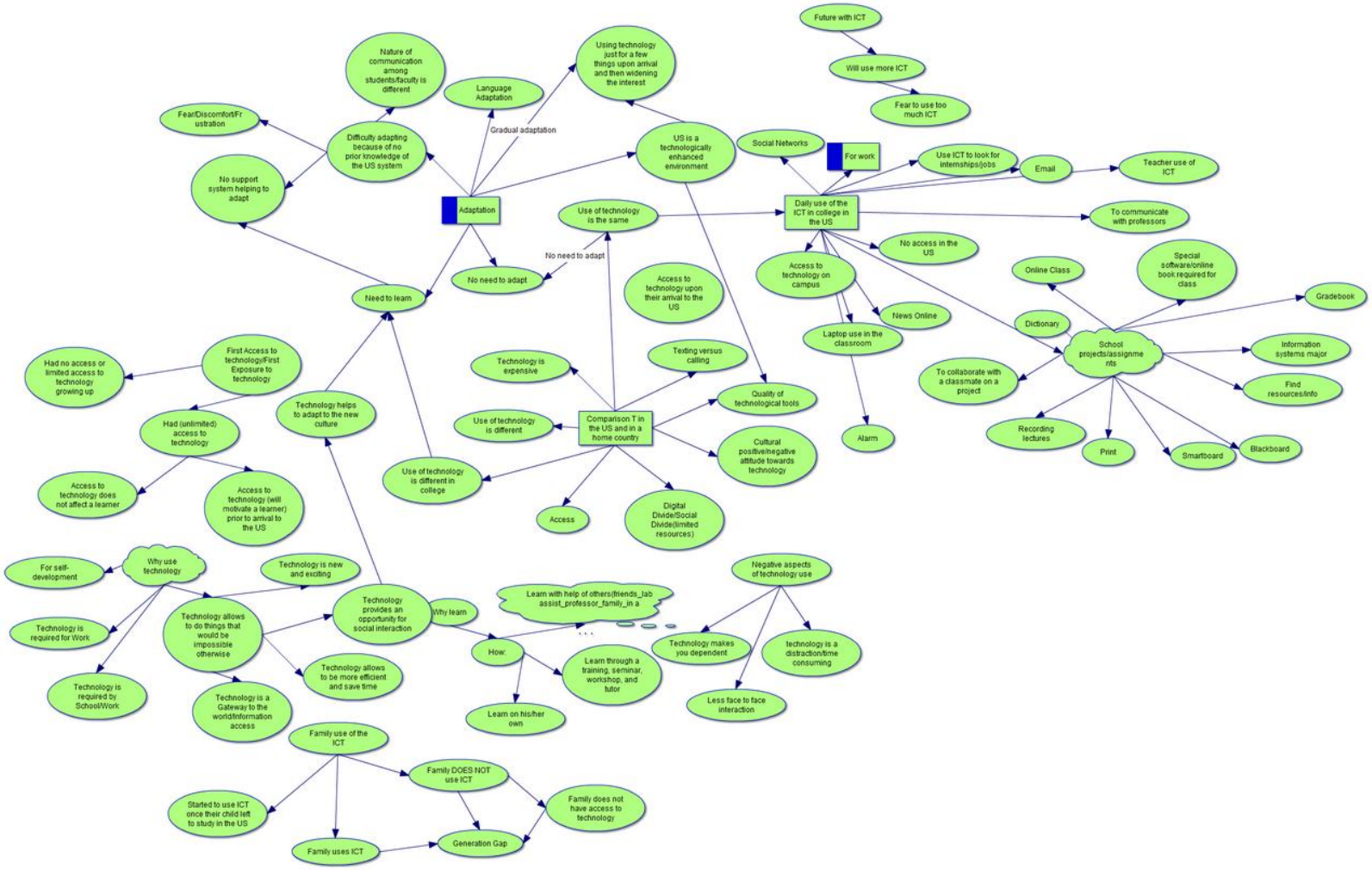
Access/no access
Admitting personal responsibility for not knowing technology or how to use it efficiently
Allows to do things that would be impossible otherwise (?)/technology keeps people connected/up to date/socializing
Basic use of the ICT
Buy/shop online/download/sell
Call home
Check and answer emails for work/school
Check and answer personal emails
Collaboration
Comfortable/not comfortable using technology
Computer maintenance impacts the overall comfort level with technology
Confidence in the ability to learn
Conscious decision to learn ICT
Cultural difference
Daily use of ICT
Difficulty using the ICT (for basic task) or difficulty learning overall
Divide democratic (signifies the difference between those who do, and do not, use the panoply of digital resources, to engage, mobilize, and participate in public life)
Divide global (divergence of internet access between industrialized and developing societies)
Divide social (concerns the gap between information rich and poor in each nation)
Does not use technology a lot or often
Efficient/inefficient use of technology
Encouraging others to use technology
English language impact
Environment defines the level of skill
Everyday use of the ICT
Family doesn't know how to use ICT, family doesn't use ICT
Family knows how to use ICT, family uses ICT
Feeling disconnected
Feeling incompetent & behind because of no ICT knowledge or skill
Feeling that others know a lot more
Follow sports
For personal/professional development
For work/school
Friends use technology
Frustration using ICT
Future with technology
Gender differences
Generation gap
Hard to concentrate because technology allows multitasking
Health issues

ICT can harm people/ no privacy
ICT is something new/ hot topic/ curiosity/ excitement
ICT makes your more competent and knowledgeable
ICT use makes people more independent-learners
Important/non important part of life//importance or value of technology
In/appropriate use of t//misuse
Inappropriate use of the ICT/failure to use ICT
Irrelevant comments
Knowledge if english does not impact the level of comfort of technology use
Knowledge of english impacts the level of comfort of technology use
Knowledge transfer from one task to another
Learn a tech tool cause it might be useful
Learned by myself
Learned ICT to go to the us
Learned thru a training/seminar/workshop/tutor
Learned with help of others(friends/lab assist/professor, family)
Learning easy/hard
Learning technology for the sake of technology/ just a tool
Life change
Listen to music
Listen to music online
Money (computer degree makes a good career)
Multitasking
Need to be connected
Need to learn
New ICT skills developed over time
New tools make you learn to be up to date
New way of content production
No excuse to be ignorant
No fear of the ICT
No ICT skills
No prior training/experience with ICT
Overload/overwhelmed
Personal aspect/no personal aspect/online identity/safe environment
Plagiarize
Positive/negative attitude towards ICT& or learning
Printing
Read/ watch the news online
Reason for learning the ICT/ motivation
Resistance to technology use/or learning or does not care
Satisfied with the level of skill of technology
Share your technological knowledge with others/ provide opportunities for learning
Stress reliever
Substitution of real interaction with technology supported interaction
Technology allows to deal with urgent situations
Technology and joy/happiness/satisfaction from communication using technology in personal life
Technology as a distraction
Technology helps to adjust to the society
Technology is addictive//makes you dependent/fear to loose data
Technology is not used by some people (older non-technology reasons, professional beliefs)
Technology might be deceiving/reliability of info
Technology negative affect/experience
Technology positive affect/experience
Technology shift

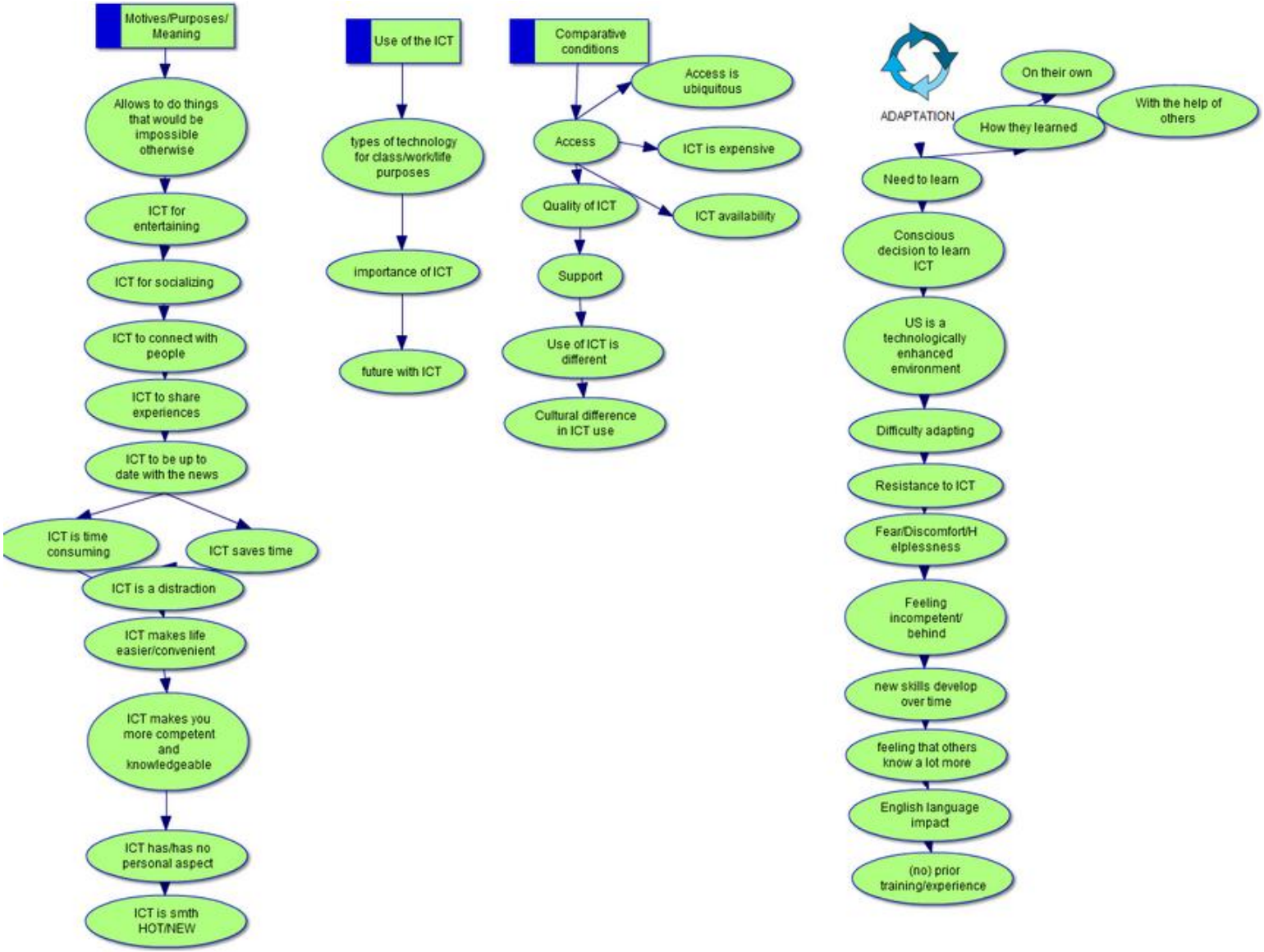
Technology use for entertainment/socializing
Technology use is considered showing off
Technology use is tiring
Take digital pictures and post them online
Technical difficulties
Technology allows easy/fast access to information
Technology defines your social status
Technology is expensive/ no money for purchasing ICT or training
Technology makes you excel in life/allows to do things that you couldn'technology do otherwise
Technology makes your life easier/convenient
Technology saves money
Technology saves time
Texting versus calling/voice messages
Time-consuming/ waste of time/procrastination
Time spent using ICT
Uncertainty about the need to learn
Us is technology enhanced environment
Use of the ICT is time consuming
Use technology for class/school work
Use technology for information retrieval
Use technology for job applications
Use technology (a laptop) in class
Using ICT for propagating
Using technology to stay connected/to be up to date with the news
Using technology for communication purposes with family
Using technology for communication purposes with friends
Using technology for life purposes
Using technology for work/professional stuff
Video games/simulation games
Virus, identity theft
Watch videos/movies
Window-shopping learning about technology

APPENDIX M: CONCEPT MAPS

Concept Map 1 http://www.webspirationpro.com/view/575047a24d64 (please click on the hyperlink for a full quality version)



Concept Map 2 http://www.webspirationpro.com/view/656740a2d0c5 (please click on the hyperlink for a full quality version)



Concept Map 3 http://www.webspirationpro.com/view/595831a12014 (please click on the hyperlink for a full quality version)