The usage of Internet technologies by high school students in the completion of educational tasks outside of the school setting

Seth Freehling

Follow this and additional works at: https://scholarworks.lib.csusb.edu/etd-project

Part of the Education Commons

Recommended Citation
Freehling, Seth, "The usage of Internet technologies by high school students in the completion of educational tasks outside of the school setting" (2005). Theses Digitization Project. 2940.
https://scholarworks.lib.csusb.edu/etd-project/2940

This Thesis is brought to you for free and open access by the John M. Pfau Library at CSUSB ScholarWorks. It has been accepted for inclusion in Theses Digitization Project by an authorized administrator of CSUSB ScholarWorks. For more information, please contact scholarworks@csusb.edu.
THE USAGE OF INTERNET TECHNOLOGIES BY HIGH SCHOOL STUDENTS IN THE COMPLETION OF EDUCATIONAL TASKS OUTSIDE OF THE SCHOOL SETTING

A Thesis
Presented to the Faculty of
California State University,
San Bernardino

by
Seth Freehling
December 2005

Approved by:

Eun-Ok Baek, Ph.D., First Reader

Alayne Sullivan, Ph.D., Second Reader
ABSTRACT

This qualitative research study examined the use of Information and Communicative Technologies (ICT) by high school students from economically-disadvantaged households. This household use of ICT to complete assigned and unassigned homework outside of the traditional high school setting was the focus of this study. Qualifying surveys gathered from 240 students resulted in the finding that the majority of the students at this urban, inner-city high school had Internet access at their household or immediate access at a friend or relative’s household. Student participants in the interview phase of the study ascribed their choice of using ICT to be attributed to the ease of use and the perception that utilizing ICT as a resource resulted in tasks being accomplished at a quicker rate. The multi-tasking capabilities of computer technologies were found to be the key facilitating as well as hindering factor in student use of ICT outside of the school. The use of ICT as a supplemental resource in the completion of traditional homework assignments was a notable pattern in the findings. Teachers surveyed in the study were found to assign ICT-based homework to students regardless of the perceived levels of Internet access at students’ households.
ACKNOWLEDGMENTS

The idea and inception of this thesis was a result of my experiences as a secondary educator working with students from economically disadvantaged backgrounds. Without the input from these students and their willingness to share experiences, this research project would not have been possible. I would also like to extend my gratitude to my first reader, Dr. Eun-Ok Baek for the support and guidance in helping to frame the research presented in this thesis. Her high standards and professional expectations challenged me in all phases of this research project. Dr. Alayne Sullivan was also instrumental in the early and later phases of this study. Her encouragement and enthusiasm were paramount to the successful completion of the thesis.

Without the sacrifice of my family, this thesis would not have been a possibility. My wife's passion for my professional academic endeavors has been a constant source of inspiration. Lastly, I would like to thank my sons for their patience and understanding during my frequent absences from their lives throughout the months that I spent researching and writing.
TABLE OF CONTENTS

ABSTRACT ........................................................................................................ iii
ACKNOWLEDGMENTS ....................................................................................... iv
LIST OF TABLES ................................................................................................... vii

CHAPTER ONE: BACKGROUND

Introduction ......................................................................................................... 1
Statement of the Problem ..................................................................................... 4
Purpose of the Project .......................................................................................... 7
Research Questions .............................................................................................. 11
Significance of the Project .................................................................................... 14
Limitations ........................................................................................................... 15
Definition of Terms ............................................................................................. 16

CHAPTER TWO: REVIEW OF THE LITERATURE

Introduction ......................................................................................................... 18
The Narrowing Digital Divide .............................................................................. 20
Current Trends in Teenage Online Habits .......................................................... 21
Teacher Perceptions and Influence upon Information Communication Technologies .................................................. 30
Summary ............................................................................................................. 40

CHAPTER THREE: METHODOLOGY

Introduction ......................................................................................................... 43
Population Served ................................................................................................ 44
Data Collection .................................................................................................... 56
Data Analysis ....................................................................................................... 60
Summary ............................................................................................................. 62
CHAPTER FOUR: RESULTS AND DISCUSSION

Introduction ........................................... 65

Presentation of the Findings ......................... 66

Percentage of Students with Information
Communication Technologies Access outside
the School Setting ................................. 66

Frequency and Contributing Factors
Leading to Student Information
Communication Technologies Use .............. 69

Usage Patterns of Students Using
Information Communication Technologies to
Complete Assigned and Unassigned Work ...... 76

Factors influencing Students' Home
Information Communication Technologies
Usage: Facilitators and Hindrances ......... 84

Discussion of the Findings ....................... 89

Summary ............................................... 99

CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS

Introduction ........................................... 103

Conclusions ......................................... 104

Recommendations ................................. 107

Summary ............................................. 111

APPENDIX A: INSTITUTIONAL REVIEW BOARD APPROVAL .... 113

APPENDIX B: QUALIFYING SURVEY ................. 115

APPENDIX C: INTERVIEW QUESTIONS ............... 117

APPENDIX D: TEACHER QUESTIONNAIRE ........... 120

REFERENCES ........................................ 122
LIST OF TABLES

Table 1. Mean Numbers of Students With and Without Internet Access Outside of the Traditional School Setting ............................................. 67
CHAPTER ONE
BACKGROUND

Introduction

With the increasing prevalence of Internet access found within the modern classroom and the more recent trend in households of students from low-income backgrounds having access to online resources, the ability to exploit this powerful educational tool is within the reach of many students inside and outside of the classroom. Throughout the past decade, equality issues of access and ownership of technology amongst the social classes has been a topic of great concern to the many stakeholders within the field of education including educators, the federal government, and social welfare advocates. These issues of equality focused on technology found within the classrooms as well as inequalities found at the household.

This socially and educationally-based concern of the equality of online access by proponents within education is illustrated in the National Education Association’s (NEA) 2003 Statement on the state of technology in schools. The NEA concluded that although gains have been made in connecting schools to the Internet, it was estimated that only 60 percent of classrooms in low-income communities
were connected to the Internet in the 2000/2001 school year (National Education Association, 2003) The United States Government has also voiced concern regarding the inequalities of access as illustrated by its report in 1999 entitled *Falling through the net: Toward digital inclusion. A Report on Americans' Access to Technology Tools.* This governmental report was followed up in 2002 by a revision entitled *A Nation Online: How Americans are Expanding Their Use of the Internet.* Social welfare advocate groups such as The Benton Foundation, Kids Count, and the Children's Partnership also have also been vocal on the inequities in Internet connectivity amongst the social classes.

Historically, all three of these stakeholders, educators, government agencies, and social welfare advocates, have focused primarily upon student access to the Internet and computer technology within schools or public libraries. The trend of declining computer prices by an average of 16.5 percent annually (Nomura & Samuels, 2004) has allowed many students from economically disadvantaged backgrounds to bridge this divide and take advantage of online access from within their households. Inasmuch as it can be argued that the divide is being bridged by the increased household access of families from lower-income levels, Warschaer (2003) points out the
fallacy that the mere presence of technology alone will lead to social or educational gains. Warschaer bases this assertion on the accepted failure of the Internet kiosks erected in the poorest areas of New Delhi, India in 1999.

With the reduction of research aimed at the study of Internet access inequalities outside and inside of public schools, studies investigating the usage patterns and facilitating factors leading to student use of Internet technologies at home in order to complete school assignments are needed in an effort to develop strategies that maximize the educational benefit of this educational resource. Studies focusing on the usage patterns of teenage, student Internet use have traditionally focused on the broader, general areas of teenage recreational activities and favorite pastimes while online (e.g. Nachmias, Mioduser, & Shemla, 2000; Papastergiou & Solomonidou, 2005). A study focusing on the educational uses of online time by teenagers at their households will aid educators in understanding how students are currently using Internet technologies in order complete schoolwork outside of the classroom. Understanding these current trends in student uses of the Internet as an instructional resource will undoubtedly aid educators in realizing the
anticipated potential and maximizing the actual potential by increasing the effectiveness of this learning tool.

Statement of the Problem

Student choice and preference to use the Internet over other supplemental educational resources available whilst outside of the classroom is a factor often overlooked by instructors when assigning independent schoolwork that could be classified as independent practice, or homework. A clearer understanding regarding the contributing factors leading a student to choose to use the Internet as a resource while at home is needed. Moreover, the frequency of actual Internet use on assigned or unassigned work by high school students at home will lead to better informed decisions, instruction, and support by classroom teachers in the encouragement and directive of students using Internet technologies at home.

Much of the current body of research studying teenage Internet usage outside of school has focused on recreational usage patterns. Such macro-based studies, such as Papastergiou and Solomonidou’s (2005) have generated anticipated results: teenagers overwhelmingly use the Internet for areas of personal interest such as gaming,
music downloads, web surfing, and watching video clips. The same results were also found with the Internet kiosks in the economically disadvantaged neighborhoods of New Delhi, India (Warschauer, 2003). Gaining an understanding of how high school teenage students use the Internet as a resource in order to complete homework assignments will generate data that can be used by the classroom teacher in order to design independent out-of-class assignments that support well-designed curriculum-based lessons. Moreover, an understanding regarding the support requirements that are required by the student when using online resources at the household will help gain maximum usage out of a student’s instructional time outside of the class.

Internet usage at the households of students from low-income or disadvantaged backgrounds may present challenges that differ from those encountered at the households of students from higher socio-economic classes who have access to a greater amount of financial resources and larger support networks. Furthermore, once students leave a tightly controlled computer networked environment found within school classrooms and computer labs, students’ effectiveness and productivity will undoubtedly fall for a variety reasons. Within the school environment, students are closely monitored by teachers or instructional aides.
It is also a generalized expectation that computers are well maintained and managed by network administrators. These same computers found within the school setting may be subject to a variety of preventative group policies that are enforced within the student network domains. Lastly, it can be expected that Internet browsing is filtered to varying degrees. Once outside of this controlled, high school computer environment, maximum educational benefits of Internet use may not be realized.

As with any technology, the maintenance and upkeep of hardware and software found at the household must be maintained and repaired if the resource is to be effectively used. Outside of the controlled computer environment of the high school computer network, students often find themselves in charge of the maintenance and upkeep of the household computer. This is often a daunting prospect when one considers antivirus software developer Symantec Corporation’s report that viruses and worms have increased 64 percent over the first half of 2005 (Symantec Corporation, 2005). A clearer understanding of the problems and barriers high school students encounter with computer maintenance and Internet connectivity is an area of study needed to ascertain if computers are sitting idle at
households due to the problems and pitfalls of maintenance or software virus issues.

Teacher perceptions and influence over classroom assignments also plays an important role in how the Internet is used by the high school student. These perceptions regarding the ability of students to attain Internet access outside of the school setting will affect the frequency of assignments that explicitly call for the use of this technology. As well as perceptions of students' rates of access, a teacher's epistemological beliefs and educational theories will undoubtedly influence student learning. The support and scaffolding a classroom teacher provides for the student who uses the Internet at home on assigned or unassigned work will have an effect on the student use.

Purpose of the Project

Like its instructional media predecessors, a contrast exists between the anticipated benefits of Internet technology and the actualized benefits this technology is currently having upon educational practices (Reiser, 2002). With this in mind, the purpose of this project is to develop an in-depth portrait of the home Internet usage of high school students for the educational task of the
completion of school assignments; specifically, students from economically disadvantaged backgrounds were the focus of this research. This qualitative study identified key determinants that led to students choosing the Internet over other educational resources in order to complete outside school assignments assigned by classroom teachers. Along with making the choice to use the Internet as a resource, the frequency of use was studied in an effort to determine the amount of assignments that were being assigned by instructors that could be accomplished using the Internet as a resource.

Understanding the reasoning behind student choice to use the Internet will lead to adjustments in the instruction teachers provide for the completion of homework. Moreover, a clearer picture of the frequency or infrequency of students choosing to use the Internet will provide teachers with data in order to make well-informed decisions in adjusting the amount of work that requires Internet use. From an instructional designer’s approach to evaluating the effectiveness of a technology, understanding students’ information needs, experience, beliefs, and values are essential in all stages of the popular ADDIE model of instructional design (Cennamo & Kalk, 2005). Not only will gaining a better understanding of student
Internet habits lead to better decisions, but Papatergiou and Solomonidou (2005) suggest that such understanding will also aid educators in how students can better use the Internet at school due to the transfer of knowledge based upon habits undertaken at the home.

Providing students with best practices and strategies for utilizing educational resources will create an environment of independent learning. This follows Millard's (1997) assertion that pupil's scholastic and extrascolastic habits should be researched by key stakeholders including educators, policy planners, educational software specialists, and web designers. Understanding how students currently use the Internet as a supplemental resource to complete outside school assignments will provide educators with the necessary data to evaluate the effectiveness or ineffectiveness of student use of the resource. Only after evaluation, can best practices and strategies be developed by instructional designers and educators to assist learners when guided or independent practice is necessary.

As well as developing strategies for best practices in student usage of the Internet as a resource, understanding the hindrances that occur when students attempt to use the Internet at home is needed. Distractions hindering the completion of assignments thus limiting the effectiveness
of this resource need further investigation. As previously mentioned, students from low-income backgrounds do not have the advantages found at the high school site where well-managed computer labs are accessible to students to complete assigned and unassigned schoolwork. A clearer picture of specific software and hardware related problems will aid educators with the opportunities to provide training or support not currently being offered, such as in-house computer support offered at the high school. Lastly, standards relating to computer literacy can be revised and developed based upon research-documentated studies providing students with strategies to be proactive in developing widely-used Windows update regimes as well as anti-virus stratagem.

Gaining a clearer picture of the hindrances affecting student online access at home may also provide opportunities to offer students and their families computer support at the school site. These opportunities to create a positive home-to-school partnership can be realized with the additional monies offered by the No Child Left behind Act (NCLB) that provides additional monies at schools not meeting academic growth targets. This project provides the data that will aid administrators and school boards to
judge the necessity of providing community-based programs
designed to provide students with home computer support.

Only after a clearer understanding of the choice,
usage patterns, and hindrances affecting high school
students' use of the Internet at home as an instructional
resource can the effectiveness of this educational resource
be judged. Once educational usage and effectiveness issues
are assessed, the identification of hindering factors can
lead to the development of systematic plans by school
administrators and teachers in an effort to offer solutions
and support for such students utilizing the Internet
outside of the classroom.

Research Questions

In an effort to achieve the means to the development
of strategies and resources along with justifying the
proposal of offering school-based computer help, this study
addresses three questions: What is the frequency and
contributing factors leading high school students to choose
the Internet as an instructional resource in order to
complete class assignments at their home? What are the
usage patterns of students using the Internet to complete
assigned and non-assigned schoolwork outside of the
traditional school classroom setting? Finally, what are the factors that influence students' home Internet usage in the completion of assigned tasks? Specifically, what are the factors that facilitate or hinder high school students from the completion of educational tasks when utilizing the Internet at home?

The frequency of student use of this resource is of interest due to the inherent nature regarding the ease of use outside of the school setting. Are students frequently taking advantage of the Internet as a resource in their educational pursuits? As well as frequency of use, the factors and thought processes leading a student to choose or not to choose the Internet to aid in the completion of an assignment is of interest. Thus, it was deemed appropriate to question the positive and negative attributes that are associated with using this instructional resource outside of the school setting. Lastly, the factors that influence students to use or not to use the Internet as a resource when completing class assignments are of particular interest in cases when students are not specifically instructed by teachers to use the Internet to complete a particular assignment.

Current usage patterns of students are associated with current practices of teacher-assigned assignments as well
as specific strategies and sites being used by students to complete assignments. What teachers, and more specifically, what subjects are currently lending themselves to the use of the Internet at home by students? Current trends in this area of focus will lead to the types of resources being used when high school students go online. Current student practices and online strategies by students to accomplish the successful completion of schoolwork will lead to the ability to assess if such strategies and practices are effective. Once practices are deemed successful or unsuccessful, adjustments to curriculum may be deemed appropriate to aid students in using the Internet as a resource.

Lastly, the factors that influence the overall success or failure of using the Internet as a resource were studied in an effort to determine negative variables affecting the time a student has spent online for academic endeavors. Were computer maintenance and upkeep issues, specifically in regards to a lack of Windows update patches and inadequate anti-virus protection causing students to experience extended periods of Internet down time? Once identified, these data will aid in the development of possible school support services for specific hardware and software problems. When online at home, factors that
positively and negatively affected the student from completing the task were also studied. With the plethora of entertainment options available, and specifically targeted at the high school age group, are students too distracted by these distractions to successfully completing subject-specific tasks?

Significance of the Project

Gaining maximum educational benefit from an academic resource that is readily available at a student’s household can have an exponential effect on student learning and mastery of instructional standards. Therefore, it is alarming that those students who have this resource available at school and at home are performing worse than peers that do not have computers at home (Woessmann & Fuchs, 2005). A qualitative study and assessment of the frequency, usage patterns, and hindrances of student home Internet use is needed in an effort to evaluate the effectiveness of using the Internet as an online resource outside the supervision and guidance of instructors. A well-researched and documented understanding of these usage patterns and hindrances encountered by students at home will encourage quality curriculum and programs to provide
the necessary support and education for gaining maximum benefit while online.

The controversial No Child Left behind (NCLB) legislation has led to an increased focus on underperforming schools; many of these identified underperforming schools are situated in large, urban, and inner-city schools. The intensified focus this act has placed on these schools has led to the positive side effect of increased levels of funding to aid students from these economically disadvantaged neighborhoods. Providing home computer support is not only a possibility, but also a financially viable option for school district personnel and local school administrators. With an increased understanding and clearer picture of the challenges and patterns individual students face with home Internet-enabled computers, educators have the opportunity to offer solutions to some of the problems.

Limitations

During the development of the project, a number of limitations were noted. This study, as further described in Chapter Three, was conducted at only one high school location, located in an economically disadvantaged
neighborhood. Furthermore, student access to information and communication technologies was significantly limited at this particular school site that may have been a contributing factor to a larger number of students choosing to use these technologies outside of the traditional high school setting. Subsequent studies may yield varying results due to degrees of variances in teacher-assigned homework that utilize Internet technologies.

Time constraints affected this study in two areas: eleven student participants out of a possible pool of 168 were randomly selected to participate in the interview phase of the study. Correspondence with teacher-identified participants was conducted via email also as a result of time and scheduling limitations.

Definition of Terms

For the purpose and scope of this study, information and communication technologies (ICT) refer to Internet technologies including, but not limited to, web browsing, the use of electronic mail, chat technologies, and instant messaging. The digital divide is a term used to describe the observed inequalities that exist in the ownership and use of ICT amongst the social classes. This widely used
term, introduced in the early 1990s, is discussed in detail in Chapter Two. The term Academic Yearly Progress was introduced by the federally-mandated No Child Left behind Act. Schools within the United States are given a score based upon student performance on standardized exams. Schools are expected to meet or exceed growth targets and face sanctions if these growth targets are not met for two consecutive years.
CHAPTER TWO

REVIEW OF THE LITERATURE

Introduction

No technology since perhaps the invention of the printing press, telephone, or the television has had a more profound impact on our culture than the use of computers and the Internet. However, researchers such as Reiser (2002) stress the importance of distinguishing between the anticipated and actual effects that technology has upon education and learning. As with previous technologies, computers with subsequent Internet technologies have not met up to the anticipated impact of being the paradigm shifting resource that levels the socio-economic playing field of students in the public school system. However, with the lowering cost of computer ownership and subsequent availability of Internet access, information communication technology (ICT) has now evolved into an economically feasible resource for students from economically disadvantaged backgrounds to possess in their households. This positive trend in ICT has been rapid, leaving little time for its impact on education and teaching to be evaluated (Madden, Ford, Miller, & Levy, 2005).
Internet technologies are playing an increasingly larger role in the field of education inside the classroom and outside. The larger role of ICT can be seen in Hsu, Cheng, and Chiou's (2003) research conducted over a two year period in a Taiwanese high school that found only 25 percent of students using the Internet for homework in 1998. This relatively low percentage of student use is contrasted with 93 percent reporting Internet homework use in 2000. With this increased usage and the larger role of the ICT within education, Chueng and Huang (2005) call for further investigation into students' preferences and uses of these technologies. Jones, Harmon, and Lowther (2002) suggest that, "The web is a phenomenon unlike any we have seen in recent history. It is not only a new medium; it is a cultural phenomenon as well" (p. 304).

This review of the literature will discuss the use of Internet technologies inside and outside of the traditional classroom. First a brief discussion describing the history and current state of the Digital Divide and current findings regarding the trends in American society shifting towards home computer ownership and online access. With this shift in mind, trends in current teenage recreational and educational online habits and usage trends will be discussed. Lastly, current literature evaluating the
importance of teachers' influence and the educational theory of constructivism on ICT use will be reviewed.

The Narrowing Digital Divide

The term Digital Divide was coined in the early to mid-1990s in response to a large portion of the population not having computers and subsequent Internet access. This divide was attributed to the large cost associated with computer ownership and the infancy of Internet access that resulted in much content aimed primarily at scientists and researchers (Wilhelm et al., 2002). Presently, with the low-cost of computer ownership and the growing build-up of computer hardware in public schools, current government literature argues that this Digital Divide between the economic classes has become increasingly insignificant. This can be judged by comparing the titles of the U.S. Department of Commerce, Economics and Statistics Administration, and National Telecommunications and Information Administration's October 2000 report entitled: *Falling through the Net: Toward Digital Inclusion* with the February 2002 report: *A Nation Online: How Americans are Expanding Their Use of the Internet*. The United States is not the only culture bridging the digital divide. Woessmann and Fuchs' (2004) research involving responses from 32
Computer ownership, specifically with Internet access, at home helps the student academically in a multitude of ways. Levin and Arafeh (2002) found that students who have access to the Internet at home come to rely on the technology to help them do their schoolwork and complete tasks more quickly. The researchers also found that students get less stymied by material they do not understand, and students write papers and reports that draw upon up-to-date sources. Students in Levin and Arafeh’s study were also observed as greatly utilizing the Internet as a form of communication with other classmates. The students in the study were found to correspond with other classmates about homework, quizzes, and share websites that were helpful in their studies. Further benefits of home computer use can be seen by students getting better grades, watching less television and spending more time online (Landgraf, n.d.).

Current Trends in Teenage Online Habits

Of students’ favorite Internet pastime, online gaming was found to be most frequently used aspect of ICT by
teenagers (Nachmias, Mioduser, & Shemla, 2000). This was also found to be true in a study conducted with slightly older post-secondary students responding their most frequent use of ICT was for recreational endeavors (Murray, Hourigan, Jeanneau, & Chappell, 2005). After online gaming, high school students reported using email and participating in online chat sessions as preferred online activities (Turow, 1999). Notwithstanding the uncontested exploitation of ICT by teenagers for recreational activities, there exists evidence that students are taking advantage of ICT for the completion schoolwork. In Murray et al.’s (2005) research involving post-secondary students, over 90 percent of the participants claimed they had utilized the Internet as a learning tool.

Current literature suggests that students use ICT resources more frequently outside of the school setting than during the traditional school day (Papastergiou & Solomonidou, 2005). With the digital divide narrowing and allowing for ICT access at an unprecedented pace, this should not come as a surprise as it is generally accepted that most student learning takes place outside of the classroom in areas such as the home, cultural events, television, family interactions, and travel (Nachmias et al., 2000). Millard also concluded in 1997 that ICT access
at home played a more significant role in educational pursuits than access at school.

Along with academic benefits of using this technology outside of the school day, researchers have also found home computer use to produce a Pygmalion effect. Students who have access to computers and the Internet at home visualize themselves as being successful. Students who have computer and Internet access have been observed having higher levels of self-esteem. Tsikalas, Gross, and Stock (2002) found that students with a computer at home had higher academic expectations for themselves as well as having more pride in their schoolwork than those without home access to a computer. Many see these key components of having high expectations and taking pride in schoolwork as being key factors for the success of students from low-income and minority families living within central cities.

In spite of rapid growth in home Internet access, ICT availability within the school classroom has outpaced gains in household access. However, the swift push by the education profession, government, and social advocacy groups to network schools and classrooms has not returned promising achievements in the form of academic results. This lack of achievement is illustrated in Woessmann and Fuchs’s (2004) study that concluded that students who use
computers several times a week at school performed statistically worse than non-computer users in the areas of both math and reading. Several explanations for these academic shortcomings can be extrapolated from the literature. Although technical issues were noted in Cuban, Kirkpatrick, & Peck's (2001) qualitative study on current educational uses of ICT, a lack of teacher modification in lesson planning led to ICT uses limited to what could have been accomplished using a teacher and textbook. This finding was also expressed by Millard (1997, Discussion Section, ¶ 1) who states, "In an ideal teaching environment ICT would be integrated seamlessly into everyday practice, as it is in the best primary class rooms. In my experience, however, this is very seldom the case in the secondary school."

The lack of ICT integration at the secondary school setting can be attributed to a variety of factors. Lipscome and Doppen (2005) found secondary social studies teachers lacked proper pre-service teacher training in areas of best practices in successfully integrating technology with course content material. Whilst technology training was observed in the social studies teachers' pre-service teacher training course of study, integrating these technologies with specific course curriculum was found to
be lacking. A study conducted with secondary English teachers (McGrail, 2005) found these teachers ambivalent to integrating technology based upon organizational issues, pedagogical concerns, and ethical dilemmas.

A student’s ability to conduct successful online searches, using engines such as Google, Yahoo, or Ask Jeeves is an example of a basic Internet skill that is considered to be essential in order for students to use the Internet in such an integrative manner. A small scale case study by Ruthven et al. (2005) found through classroom observations that few students had been taught how to conduct successful and effective searches using search engines. Going beyond simply using the Internet to gather information call for the evaluation and judgment of the information retrieved. The ability of a student to conduct a successful Internet search is thus complicated when the student is confronted with evaluating the validity and usefulness of results returned by the search engine (Murray et al., 2005). Another complication identified by research is the naiveté of search engine users regarding the prevalence of paid placement of results (Fallows, 2005) also will affect students’ use of this resource.

Circumnavigating the need for students to evaluate searches, many teachers provide students with a specific
set of web sites to be used in the completion of an assignment or task. This instructional support strategy circumnavigates the need for students to possess the skill of conducting Internet searches using search engines with both positive and negative effects. The positive outcomes of using such a support strategy can be observed as they specifically narrow students' instruction only to those sites relevant to the content being covered. However, it has been found that students presented with this strategy do not move beyond the set of links provided for the lesson (Ruthven et al., 2005). This lack of movement beyond the structured set of links can render such lessons as being analogous with the traditional use of a course textbook, notwithstanding the media-rich environment of the Internet.

Student use of ICT is not relegated to solely to the use of the Internet. Email and chat technologies are being utilized by students, most predominantly outside of the classroom. Such technologies are producing positive results in their academic uses. Woessmann & Fuchs's (2004) research concluded that student performance was positively correlated with Internet access, educational software, and the use of email. Much like the telephone, student collaboration is facilitated through these communicative technologies that have the ability of being tightly
integrated with Internet and software technologies with the benefit of the student not being required to leave the computer. These same email and chat technologies were also deemed to be effective within the traditional classroom environment. Observing secondary schools Ruthven et al. (2005) concluded that dialogue in an online environment did have an influence upon student achievement.

Using the communicative advantages of ICT at the home and at the traditional school site as a supplemental resource is in agreement with current literature regarding best ICT educational practices. Of Jones, Harmon, and Lother's (2002), classification of the five levels of web use found within a school, the majority of schools studied were found to be at the second level: as an educational supplement. According to the same Jones, Harmon, and Lother model, with level one being identified as informational, and level three labeled essential, business and commerce are using outpacing education by utilizing ICT beyond the second level. This is in agreement with many evaluations that view schools as an environment that has not assimilated ICT as quickly or effectively as business and commerce (Nachmias et al., 2000). The increased communicative use of students quickly adapting to this
aspect of ICT will undoubtedly move the field of education to a higher level of use.

Inasmuch as communicative use not being fully integrated within the school, student communication and collaborative benefits of ICT use show much promise outside of the classroom. With a larger proportionate amount of time spent by students using the Internet at home for educational use as compared to usage time in schools, research should not entirely be limited to ICT use within the school. There is a call for research to be conducted at both the school and home environments as to the communicative usage patterns of teenagers both for educational uses and entertainment endeavors (Nachmias et al., 2000). The advent of mobile and wireless technologies involving notebook computers, cell phones, and personal digital assistants (PDAs) has not only benefited the business person, but also allows the high school student to have the opportunity to utilize ICT in many environments other than school.

The ability to effectively use such communicative resources outside of the school’s computer network, security and maintenance issues will confront the student. What was once only a concern for primarily corporate networks, Internet security issues are now a growing
concern for the general public. Students attempting to use the Internet at home to complete school work will likely contend with computers that are periodically inoperable or unable to access the Internet due to a variety of malicious worms, Trojans, spyware, or adware (Hinojosa, 2005). What is a challenging, often full-time position at a school or corporate entity to manage such threats to computer operability is now left up to individual families. Whilst on a school managed computer, the high school student benefits from having access to a computer managed by teachers, computer lab aides, microcomputer specialists, or network administrators.

Trained to assess and implement a variety of Internet and computer maintenance regimes, school network administrators have taken important steps to protect school client computers from Internet threats. The importance of having a good strategy to protect a computer on the Internet are illustrated by Spenbauer, Freed, McEvoy, and O’Reilly (2005) who urge home computer users to update software, use antivirus software, update browsers, utilize a software and hardware firewall, and run anti-spyware software utilities. Students not taking the above-mentioned steps may find themselves unable to complete school assignments due to the crippling effect a trojan or a
malicious spyware program may have on their browsing the Internet.

Teenagers may also find themselves more susceptible to Internet vulnerabilities as more code has been identified that specifically targets audio and video files. This finding in Symantec Corporation’s (2005) most recent Internet security threat report is illustrated in the identification of the exploitation of a vulnerability found within the JPEG image file format. This finding as well as others by Symantec, such as the identification of a 64 percent increase in new Win 32 viruses and worms lead many to believe that Internet security will get worse in the near future (MacInnis, 2005). It can be concluded that Internet usage at the home will be negatively affected to some degree by such Internet vulnerabilities as students use the Internet to complete school work.

Teacher Perceptions and Influence upon Information Communication Technologies

The evolution of ICT use within education has led to a body of research regarding teacher perceptions and attitudes towards using the Internet as a supplemental resource. Perceptions and subsequent use is described as an evolving process and is described by Hsu et al. (2003) as
being dynamic, changing from entry, adoption, adaptation, appropriation, to invention. Complex demands on technological resources and the inherent nature of the school exhibiting tight control over learning have impacted the perceptions and attitudes of teachers’ view of using ICT. Teachers’ views that students from low-income backgrounds do not have adequate Internet access inside and outside of the school setting plays an important role in decisions regarding their assigning schoolwork and homework that utilizes the Internet. Research conducted by Levin and Arafeh (2002) found that teachers were reluctant to assign Internet assignments to be completed outside of the classroom because of teacher perceived such practices as being unfair to those students not having household ICT access.

The importance of the instructor promoting effective ICT use in the high school classroom is an essential component of incorporating effective Internet practices. Effective, higher-level, instruction and the promotion of best uses by students, does not appear to be commonly practiced by teachers in the high school classroom. Hsu et al. (2003) found that the majority of teachers devote class time to presenting, demonstrating, and assigning tasks that consist of students generating a single, concrete solution.
This finding is consistent with other (e.g. Ruthven, Hennessy, & Deaney, 2005) research findings documenting secondary student ICT use consisting of finding specific or concrete answers or simply guiding students to specific web sites.

Teacher-assigned projects and curriculum making use of the Internet to find such concrete, knowledge-based answers leads to a lower-level of instructional delivery when judged according to the Bloom’s Taxonomy scale. This well-known theory, introduced in Bloom, Engelhart, Furst, Hill, and Krathwohl’s paper in 1956 believes in classifying instruction according to a graduated scale, leading from the simple level of knowledge to a more complex level of knowledge identified as being evaluation (as cited in Seung-Youn & Stepich, 2003). The use of Bloom’s Taxonomy to judge ICT curriculum is urged by Seung-Youn and Stepich in their 2003 study evaluating online instruction. Linear approaches that utilize ICT in the lower knowledge levels of instruction render ICT as a static system much like the pencil, paper, and textbook. This was a finding in Ruthven et al’s study (2005, Section 2, ¶ 6) that concluded students observed in their study were, “...practicing an immediate and restricted form of ‘information gathering’, simply acquiring relevant material, rather than undertaking
a more iterative and expansive process of 'information seeking'.”

The inherent constructivist nature of ICT is one such positive strength of this educational resource that leads students to negotiate learning from a more independent outlook. The relatively new educational paradigm of constructivism views the learner as being actively involved in constructing meaning and knowledge from past experiences. This view of placing the learner at the center of the educational instruction are observed as being more active, interesting, and focused on real life, which in turn are judged to be more effective in educating students (Sherman & Kurshan, 2005). This seemingly unrestricted access to knowledge is unlike anything encountered in the traditional classroom. Tsai and Lin's (2004) findings follow along this theme in the researcher's findings that the Internet emphasizes prior knowledge, forces social negotiations to occur, fosters autonomy, and enhances student-centered learning. Thus, the home is viewed as being a highly desirable student-centered learning environment where constructivist learning can occur (Chuang & Tsai, 2005). Madden et al. (2005) further argue that the classroom and the computer are at polar opposites in regards to epistemology. The classroom is viewed as
demanding control of the learner, as opposed to the inherent nature of ICT placing the learner in control of knowledge and learning subsequent construction of knowledge.

With this constructivist philosophical underpinning, Chuang and Tsai (2005) suggest that ideal learning environments depart from the traditional view of the teacher being the information provider towards viewing the role of the teacher as the facilitator. This new teacher role is for aiding the students in their construction of knowledge. Findings about the lack of ICT-based constructivist learning within the traditional classroom have been discouraging. Ruthven et al. (2005) found in a small scale case study conducted in England that classroom teaching practices had not moved classrooms to a more constructivist pedagogy. Without the teacher being present at the student’s home whilst the student is completing assignments, further forces the removal of the instructor as the information provider and gives students ownership of their education.

The importance of facilitating instruction, rather than delivering instruction should not overlook the teaching of specific strategies and support for student use of ICT. The literature encourages the classroom teacher as
being proactive in the support of ICT skills. Presently, there exists a general need for the teaching of students a formal set of online skills before the Internet is effectively used in specific courses (Murray et al., 2005). Without a set of preliminary or standard set of Internet negotiation skills, it can be argued that students will not be able to fully utilize the Internet to construct knowledge. Once such skills and scaffolding support are introduced to ICT instruction, student attitudes will positively change toward using the resource (Hsu et al., 2003).

Such findings regarding teacher promotion of ICT and the teaching of best practices are significant when considering the influence teachers exercise over pupils. The teacher’s role as the promoter, motivator, and instructor of ICT best practices greatly influence students’ educational use of ICT inside and outside of the classroom (Cheung & Huang, 2005). The teacher’s role in the promotion and development of ICT skills is illustrated in Murray et al.’s (2005) finding that college students had the opinion that the Internet had a large amount of potential, but student participants in this study were unsure about the steps required to fully take advantage of ICT in their educational studies. Teachers’ roles will
undoubtedly change as ICT evolves; researching current trends and teenage online habits will aide teachers in facilitating instructions that aid students to take advantage of ICT as a resource at their households.

Inconsistencies between the educational use of ICT and that of a student's personalized non-educational style and habit of using ICT for personal use outside of the classroom may conflict with ICT use in educational endeavors. Providing support and strategies for developing positive student educational practices for ICT use may be the answer to overcome such personalized Internet styles that are at odds with educational practices (Ruthven et al., 2005). The need for teacher support and influence over such personalized Internet habits can be seen in higher academic achievement from students in a study that were influenced and supported to make use of a course bulletin and message board for the purpose of student and teacher dialogue (Hoskins & van Hooff, 2005).

Although a certain percentage of students will always represent students without Internet access available outside of the traditional school setting, teacher perceptions greatly influence ICT use within the class curriculum and subsequent assignments required of students. The availability, training, and use of ICT within the
actual school site were found to be an influence upon a teacher’s perception and integration of ICT with curriculum (Madden et al., 2005). Teacher perceptions about how students use the Internet also affect how this resource is integrated with the curriculum. An example of this effect is the not assigning of ICT homework because of the perception that students will view inappropriate content while completing the assignment.

The perception that students are more knowledgeable than their teachers is a view that is seen as an obstacle to the integration of ICT within the curriculum (Madden et al., 2005). However, with the evolution of ICT and influx of younger teachers into the profession, this perception may see a reversal. This common perception that teenagers are more Internet savvy than adults is being questioned. A recent Nielsen study (Baig, 2005) found that teenagers completed specific tasks at lower percentages than adults. In the study, teenagers were only able to complete tasks such as making a DMV appointment and finding concert dates 55 percent of the time, compared with a 66 percent rate of completion by adults given the same task.

Teacher perceptions were also found to influence ICT use within the traditional school day. A teacher observed and interviewed in a school computer lab by Ruthven et al.
in 2005 (Section 5.1.1, ¶ 6) states, "Our students are so used to using the computers now...it's not a novelty anymore, it's just run of the mill." This statement also reflects findings that suggest students adapt more quickly to ICT skills more quickly than teachers. Such perceptions, erroneous or valid, have called for more research to be conducted on the strengths and weaknesses of ICT use at every instructional level to get a better understanding of its strengths and weaknesses (Reiser & Dempsey, 2002).

Possessing good Internet skills is a strong determinant in students possessing a positive attitude toward the use of the Internet as an educational resource. Once positive attitudes are established, Internet effectiveness increases. This finding by Cheung and Huang, (2005) also concluded that effective ICT use by students was dependent on teacher encouragement, and support of the technology within the specific course content being taught. The support and integration of ICT within core content areas presents unique challenges in the current educational climate of standardized testing and highly structured often scripted lessons.

With the absence of basic skills, the educational effectiveness of any instructional technology becomes suspect. Current research regarding school Internet use is
questioning the academic usefulness of this resource during the instructional school day. These findings are not due to issues regarding limited Internet access; inasmuch as home Internet access has dramatically increased, so has student’s Internet access at school. It was found that over 99 percent of secondary high schools in the United Kingdom had Internet access. This was estimated to be a six fold growth over a three year time period (Ruthven et al., 2005). However, with increased Internet access, a rapid academic growth has not been witnessed. Woessmann and Fuchs’s (2004) research found negligible and even negative effects of student computer use in the traditional classroom; however, it should be noted that students with Internet access at home did perform better statistically than students without Internet access at home. Time allotted to ICT use by students at school may be a leading cause to this negative trend. In an Israeli high school, it was reported that out of an average of 7.36 hours of ICT use per student per week, over five of these hours were spent at the students’ home (Nachmias et al., 2000). Woessmann and Fuchs’s (2004) research also found a lack of ICT time spent during school hours. Nearly half of the students in this study reported that they never or hardly use the Internet at school. These findings suggest that
home use of ICT for educational benefits is the current trend in the current evolution of this educational resource.

Summary

The literature reviewed supports the importance and paradigm-shifting nature of ICT in the lives of high school teenagers. This trend towards the use of ICT technologies is being led by the drop in the cost of owning and operating ICT, which in turn has led to the increased ownership of computers and ICT by households classified as low-income. No other group has benefited more from this lowered cost of ownership than students from these economically-disadvantaged backgrounds. Students once considered on the wrong side of the Digital Divide now are taking advantage of the many academic, psychological, and communicative benefits of ICT use from their homes.

With this increased use of ICT by low-income students, current research has found that recreational usage, including online gaming, is the preferred activity of teenagers in the study of their online habits. However, studies have also indicated that the vast majority of students are using the Internet to aid them in the completion of schoolwork. Students completing schoolwork
that involves the use of ICT prefer to complete these assignments outside of the traditional school day. This finding may indicate the learner-centered nature of ICT use at the home as opposed to the teacher-centered nature found within the classroom.

Teacher roles as facilitators, as opposed to traditional views as the teacher portrayed as the lecturer are further seen by the design of ICT-based lessons that rely on providing students with a list of hyperlinks directing pupils to specific content. Providing students with such a list of teacher-provided links appears to be leading cause of the lack of student search strategies using search engines to aid in instruction. Furthermore, current ICT practices found within the classroom are at odds with the constructivist inherent nature of the Internet.

The literature suggests the prominent role of the classroom teacher in the promotion of the quantity and effectiveness of student use of ICT in the classroom as well as outside of the classroom. However, the perception of an existing Digital Divide keeps many teachers from assigning independent practice that make use of ICT at the students' households. This perception as well as the perception that students are more knowledgeable than
teachers in using ICT is hindering the communicative use of the technology once students leave the classroom. These findings are significant as recent studies question the effectiveness of ICT use during the traditional school day as opposed to home use.

A lack of research in how high school students are using the Internet at home calls for more studies to be conducted that focus on this subgroup of students. Nachmias et al. (2000) concluded: "Research on children’s use of ICT primarily describes and examines the potential of the Internet within the educational system. These research efforts seldom take into account that the real impact of the Internet on children might come from home use rather than from school access" (p. 4).
CHAPTER THREE

METHODOLOGY

Introduction

The increased ability of economically-disadvantaged high school teenage students to have access to ICT outside of the traditional school setting called for this qualitative research study to be conducted at a low-income, urban high school. The decision to study the ICT use of high school students at this particular school was undertaken to uncover the usage patterns of students using the Internet to complete assigned and non-assigned schoolwork outside of the traditional school classroom. Furthermore, conducting this study with this population group was carried out in an effort to determine the frequency and contributing factors leading high school students to choose the Internet as an instructional resource. The last research question dealing with the factors that influence students' home Internet usage in the completion of assigned tasks was also deemed appropriate to the realm of this particular high school.

This chapter will detail the characteristics of the student population served at the high school where this
research was undertaken as well as highlight the geographical location and culture found to be prevalent at the school. A description of how the data were collected during this qualitative study will be followed by an analysis of the data collected from students involved in the study as well as teachers that were surveyed.

Population Served

This qualitative study was conducted at a secondary school located in a mid-sized city in Southern California. The secondary school in this study is a fairly large, urban high school located in a low-income, older neighborhood with households reflecting a mix of immigrant, transient, and working class residents.

Located in the midst of the city center, the high school has undergone significant transformations since its opening in 1885. The historical changes in the neighborhood and history of the community can be seen reflected in the culture of the high school. The city has seen major changes from its beginning as a Mormon settlement, to a citrus agricultural center, to a stopover on the famous driving route 66, to the Cold-War era Air Force Base and subsequent closure, and finally to its present-day strivings to
reinvent itself as a land port linking Asian products to the continental United States.

The high school is part of a large school district, being the seventh largest district within the State of California. The school district provides public education to approximately 57,000 students. Of the 65 schools in operation, the high school involved in the study is one of five traditional high schools offering a college preparatory curriculum within the school district. The school district has 40 schools identified by the Federal government as being Program Improvement schools. This classification of schools is designated to schools receiving Title I funds who do not make Academic Yearly Progress (AYP) for two consecutive years (San Bernardino City Unified School District, 2005).

The city’s large population and low mean income levels are considered to be significant factors for underperforming schools within the district. According to census data conducted between 2000 and 2004, the population of the city where the high school is located is estimated at 194,643 (Claritas, Inc., 2004). This same Executive Summary report projects a 6.2 percent population growth that exceeds the national average of 4.8 percent. The increase in population is in contrast to that of income.
levels; it is reported that the average household incomes are also significantly lower than the national average. The city estimates combined households within the city to have an average $43,482 yearly income level compared with the national $63,301 average (Claritas, Inc.). Future household income projections are not optimistic, estimating national averages to double that of the residents of this city.

Located in the one of the economically-challenged, inner-city areas of the city, household income levels within school’s attendance boundaries are much lower than city averages. According to student registration records, approximately 71.4 percent of students at the high school qualify for a free or reduced lunch. This generally accepted method of ascertaining parental income places the overwhelming majority of students at this school as living in households earning less than $24,000 annually.

Unemployment is another cause for concern in this low-income neighborhood. Although no specific data exists for the neighborhood, it is estimated that the city where the study was conducted has twice the national unemployment rate (Claritas, Inc., 2004).

In 2001, the high school underwent a change in student population and school administration due to the opening of a new high school located within a five mile radius of the
present campus. This fairly recent change resulted in a new principal, four new vice-principals, three new counselors, and an influx of district program specialists. Of the many changes encountered by the opening of the new high school, the redrawing of attendance boundaries and large numbers of inter-district transfers has resulted in a student population change that has declined over the past four years.

The total school enrollment as reported on the School Accountability Report Card for the 2003-2004 school year is 2,677 students (2004). Of these students, 1,058 consisted of the freshmen class (grade 9), 677 comprised the sophomore class (grade 10), 443 made up the junior class (grade 11), and 499 made up the senior class (grade 12). Over the past four years, graduation rates have been a growing concern to the school. Historically, the school graduates less than 70 percent of the seniors from the original freshman class. With a high drop-out rate, the geographical area surrounding the school is plagued with street gang activity and a large number of neighborhood youths affiliated with gang-related activity. As often observed with poverty-stricken areas, crime and violence is a major concern for students attending this high school.
The high school is one of the forty schools within the district identified as a Program Improvement school. Failing to reach its AYP target score for the past five years, the school is facing sanctions from the State of California. In the 2002-2003 school year, the State of California conducted a school and district-wide audit of the educational program provided to students at the high school. Implementing the mandated programs dictated by the State Auditing Team did not result in an improvement in school AYP scores for the 2003-2004 school year. Students performed worse than previous years, resulting in a negative growth of four points for the 2003-2004 academic school year (San Bernardino City Unified School District, 2005).

The ethnic makeup of the school reflects the urban neighborhood in which the school serves. The largest portion of the student population, 62 percent, consists of Hispanic students. African-American students make up the second largest ethnic group, representing 18.6 percent of the student body. Students of Caucasian descent account for 15.2 percent of the population. Asian, Filipino, Pacific Islanders, and other ethnicities account for less than 4 percent of the student population. Racial tensions that forced the temporary closure of a few high schools during
the 2004-2005 school year in the Southern California region did not affect this high school.

As a result of the State audit conducted in the 2002-2003 school year, a list of non-negotiable recommendations for program improvement was issued to the high school and school district. In response to the recommendation of the school to build stronger bonds between the home and school, the school district will be implementing smaller, school-wide learning communities beginning in the 2005-2006 school year. In response to this new direction students participating in this study will be randomly selected from the high school’s two existing smaller learning communities. The researcher of this study was a teacher in one of these small learning communities at the school site where the study was conducted.

The participants of this study will be polled from The California Partnership Academy (CPA) programs. This program is a college preparatory course of study, differing only in the elective class chosen by the program administrator. These two programs were established at the high school in 1991. The CPA programs are a state, grant-funded, school-within-a-school concept fashioned after the successful Philadelphia career academies. The CPA programs were introduced by the State of California in the early
1980s in an effort to provide career and technical training for students from economically-disadvantaged backgrounds. The primary purpose of this program is to offer students career-oriented training through a three-year sequence of elective courses in the student's career field of interest. As well as being career-training oriented, the CPA program also provides college preparatory classes, thus providing students with opportunities to be admitted to a state or private four-year university. Teachers within this small-learning community have the opportunity to plan collaboratively on a weekly basis; student assignments are designed to be cross-curricular in nature and be driven from the career pathway chosen by students. Classrooms are arranged in the same school wing in order to facilitate this collaborative approach. Lastly, teachers within this program have the opportunity to track specific students and the best practices in working with individual learning styles.

The student participants within this small learning community are representative of the general population of the school as per State grant requirements. Likewise, students in the program represent the ethnicity, economic diversity, and academic level as that of the general student population. Furthermore, students enrolled in the
career academy voluntarily apply to be accepted into the program. Selection of students to be accepted are based upon attendance, credits, and other determinants that ensure the makeup reflects that of the general school’s student body.

The pool of students for this study consisted of over 248 students enrolled in one of the two smaller learning communities. Students in the Public Safety small learning community consisted of students interested in police work, firefighting, or paramedic careers. These students were scheduled together throughout the school day in the same core academic content subjects. The students in this small learning community received no specific ICT training from the Public Safety teacher and were not given any ICT specific assignments by the teacher. The second smaller learning community consisted of students from the Business Academy. Students enrolled in this program received extensive ICT training and were required to daily utilize these skills in their business elective class. Students in this second small learning community were interested in pursuing careers in business administration and worked toward receiving certifications in Microsoft Office Software products. Participants from both smaller learning communities consisted of sophomores (grade 10), juniors
(grade 11), and seniors (grade 12). Freshmen were excluded from this study as students enter the CPA program at the beginning of their sophomore year and remain in the program until graduation as a senior.

The student population in this study had varying degrees of access to ICT during the traditional school day. The high school campus has a robust, reliable computer network. The school's Internet access is serviced by two T-1 lines, and the campus has arranged the network in a VLAN in order to decrease network traffic and boost speeds. The school’s network is arranged in a peer-to-peer configuration, with only school administrators, counselors, and support staff utilizing a domain server. Every classroom and administrative office at the school has access to the Internet. Actual student access to ICT within the classroom varies from classroom and teacher. Whilst all classrooms have a teacher computer, it is the norm rather than the exception for this to be the only computer present in the majority of the classrooms; the exception to this norm is the elective, career-specific classes that provide computer specific instruction. However, students not enrolled in these specific computer-related elective courses are not permitted to use computers within these classrooms.
No dedicated computer labs are currently functioning on the campus for teachers to schedule classes for ICT use. Moreover, students also do not have access to a dedicated lab to use for personal ICT use. Classroom space issues and a lack of funding for computer lab assistants to manage such computer labs forced the closure of two such labs in the 2000-2001 school year. There are currently no plans to reopen the dedicated computer labs in the near future. With little access to ICT within the traditional classrooms and the closure of the two dedicated computer labs, students at this secondary school have ICT access in either the school library or school career center. In the 2003-2004 school year, the library transformed itself into the role as a media center. With this goal, fifteen computers were arranged for student ICT use throughout the school day. In addition to student use of these computers throughout the school day, students are also permitted to use these computers thirty minutes before the first class period as well as thirty minutes after the last class period of the school day.

However, actual student access is limited to this location given that the school library/media center is closed to student use periodically throughout the school year for various reasons. At the beginning and end of the
school year, computers are not accessible due to textbook check in/out procedures. The school also operates the library as the standardized testing center at various times throughout the year which subsequently closes the library to student use. These various closures prevent students from utilizing the fifteen computers for an average of one week per month.

The fifteen computers located in the library are network configured in the same manner as the school classrooms, being a peer-to-peer network configuration. Printers are not available for student access in the library, leading students to save documents on floppy disks, USB flash drives, or more recently observed, using attachments on web-based email programs. The computers in the library/media center are well-maintained as the school’s microcomputer specialist’s office is located in an office adjacent to the computers.

The school’s career center is the alternative location for students to access the Internet and work on school assignments on the twelve computers located in this resource center. This unlikely point of ICT access is popular with students for a variety of reasons. The career center has two dedicated printers allowing for students to print schoolwork and assignment-based projects. Another
benefit to using this location is the presence of a career center liaison who is available to assist students with ICT related questions and issues, acting in the same capacity and roles as that of a traditional computer lab assistant. Students also take advantage of the later closing time of the career center after the last class period.

Unlike the library, the career center’s computers are not maintained to the same high standard. Both viruses and computer inoperability are considered the norm rather than the exception at this location. This pseudo computer lab also is closed periodically for the varying activities normally associated with a career center. Students are not permitted to use the computers when college representatives are presenting, military recruiter testing, and also when the center is used as a standardized testing location. Like its counterpart, the school library, the career center is also closed for these activities approximately one week per month.

Student use of ICT outside of school hours is limited to home use or the city’s public library. The city public Library is located approximately three miles from the high school. The library has six computers available for public ICT use during operating hours. In order for public use, users must have a valid library card. In addition to this
requirement users are limited to thirty minute intervals of use, and often must reserve time slots if the need exceeds the amount of users desiring to use the computers. The library's peer-to-peer network is reliable and the computers are well-maintained. Like the school's career center, an assistant is available for providing users with computer support.

Data Collection

Due to the previously discussed limited ICT access students at this high school encounter, and also to remain within the scope and focus of this qualitative study dealing with how students use ICT outside of the traditional school setting, it was necessary to give a qualifying survey (see Appendix B) to the potential pool of students participating in the study. For the purpose of this study, participants were required to have the predetermined qualifying factor of having access to a computer equipped with Internet access at their household. However, if participants had immediate Internet access by means of a friend or relative's household, this would also qualify a participant to take part in the study. Participants having access to the school library, career center, and public
library did not qualify as participants of this study due to the mitigating access limitations.

Qualifying surveys (see Appendix B) were administered to 240 students currently enrolled in the two smaller learning communities discussed in the previous section. Although used as a means to qualify participants to take part in the qualitative study, the qualifying surveys provided valuable data discussed in the following chapter. Extra credit points were earned in the students' career elective classes to students' participation in completing the voluntary questionnaire. Student participation in completing the qualifying survey resulted in 100 percent of the 240 surveyed participants.

Participant responses were recorded and scored according to participants' response to the second question: Have you ever used the Internet at home to help you complete a school assignment. A positive response to the first option (yes) or the third response (no, but I have used a friend's or relative's computer to complete an assignment when I needed to use the Internet) were determined as qualifying responses to participate in the interview phase of the study. From the data records of the 168 (70%) qualifying participants, eleven students were randomly selected to further participate in the next phase
of the qualitative study. Of these randomly selected eleven students, ten qualified as participants by responding that they had ICT access at their household. The one randomly selected student participant responding to having immediate access at a friend's household subsequently gained household access between the time span of administering the survey and the commencement of the interviews.

Of the original eleven students randomly selected to participate in the study, two opted not to participate in the interviews, leading to the random selection of two additional participants. Interview questions (see Appendix C) were framed around the three research questions: 1) What is the frequency and contributing factors leading high school students to choose the Internet as an instructional resource in order to complete class assignments at their home? 2) What are the usage patterns of students using the Internet to complete assigned and non-assigned schoolwork outside of the traditional school classroom setting? 3) What are the factors that influence students' home Internet usage in the completion of assigned tasks?

Interviews were arranged during the students' sixth period class in agreement and coordination with each individual student's instructor for that class subject. Due
to this arrangement, interviews were conducted over a six-
week period to ensure that students would not miss
important instructional material covered while they were
pulled out of their class for the interview. In order to
eliminate distractions, the interviews were conducted in a
classroom not being used for instructional purposes during
this class period. Interviews with the participants lasted
approximately twenty to thirty minutes. The participant
interviews were tape recorded to ensure the development of
accurate transcripts of student responses and for
validation purposes.

Upon the completion of the final interview, and a
preliminary analysis of the typed transcripts, follow-up
interview questions were developed for the eleven
participants so as to deal with clarifications as well as
investigation into areas not considered in the development
of the original interview questions. Follow-up interviews
were briefer, averaging approximately five to ten minutes
in length. Lending to the brevity of the follow-up
interviews, all eleven interviews were conducted over the
period of two weeks. Once again, participant interviews
were audio recorded for the purpose of preparing typed
transcripts of the interviews.
A preliminary analysis of original participant interviews and subsequent follow-up interviews led to the necessity of developing an open-ended questionnaire (see Appendix C) to be administered to teachers at the high school. This questionnaire was administered to four teachers identified in student interviews as teachers that encourage or engage students in ICT use that led them to use ICT outside of the teachers' classroom. Due to time constraints and scheduling difficulties, the questionnaires were sent as attachments via email. All four identified teachers participated in responding to the questionnaires, returning completed questionnaires via email.

Student interview transcripts were validated by the interviewee to ensure accuracy of responses and to eliminate erroneous inferences by the researcher. The same procedure was followed for student follow-up interviews. This validation process was unnecessary for the written responses generated by the email attachments for the teacher participants.

Data Analysis

A content analysis was conducted on the original interview responses by the eleven participants. Subsequent follow-up interviews were also analyzed in the same manner.
Teacher questionnaires were originally analyzed independent of student interview responses in original and follow-up interviews. A subsequent analysis of teacher responses was conducted collectively with student responses in regards to the research questions.

Data were first analyzed in conjunction with the original three research questions. Participant responses were codified and evaluated using conceptual analysis within the structure of the three original research questions. This conceptual analysis involved all three sets of data: original student responses, follow-up questions, and teacher responses. Upon the completion of the conceptual analysis, a relational analysis was conducted upon the three sets of data external of the three original research questions. This approach was undertaken in an effort to identify themes, trends, and patterns not originally considered by the researcher in the framing of the original questions in regards to ICT use by students outside of the classroom. Upon completion of the conceptual and relational analyses, concepts and subsequent inferences derived from the two analyses were peer reviewed to ensure the validity of the findings. This peer review was conducted by a teaching colleague working at the same school site in a separate academic department. The peer
reviewer was knowledgeable about ICT use and was considered to be a technology advocate for students at the school site.

Summary

This qualitative study was conducted with high school participants at a low-income high school located in Southern California. The school, situated in an urban city center location, provides a college preparatory curriculum to students in this economically challenged area. One of five traditional high schools, the high school where data were collected was currently on the fifth year of a Federally-mandated academic improvement plan.

For the purpose of this study, participants where polled from one of two pre-existing smaller learning communities. The two smaller learning communities in this study consisted of a public safety and business academy that are designed to develop career training. Students in this convenience poll were representative of the general student population in ethnicity, socio-economic background, academic achievement, and sex. The participants in this convenience poll consisted of grades ten, eleven, and twelve.
Participants at this high school have limited ICT use throughout the school day and have limited access at the school site before and after the traditional school day. With no computer labs available for use, students must rely on the school library or the school career center in order to have access to ICT. As well as not being available outside of school hours, these two locations are periodically closed throughout the month for a variety of reasons. With limited access to ICT during the traditional school day, students at this school location who desire to utilize this educational resource often will be required to do so at their households outside of school hours.

With the limited access issues at the school site, qualifying surveys where conducted in an effort to disqualify students from a pool of 248 students who did not have access to ICT outside of the high school. From the qualifying pool eleven students were randomly selected to be participants in the next phase of the study. Interviews were conducted with these eleven students over a six week period, proceeded by follow-up interviews after a preliminary analysis of the eleven original interviews were conducted. Student interview transcripts were reviewed by participants in an effort to ensure the validity of their content. The third area of data collection involved the
distributing of an open-ended questionnaire given to four
teachers at the school site who were identified in student
interviews.

Two analyses were conducted on the data that were
collected. A conceptual analysis was conducted followed by
a relational analysis. Upon completion of both analyses,
themes, patterns, and theories were peer reviewed to ensure
the validity of the results. The peer reviewer was
conducted by a teaching colleague of the researcher from
another academic department at the high school campus where
the study was conducted.
CHAPTER FOUR
RESULTS AND DISCUSSION

Introduction

Included in Chapter Four is a presentation of the results of this qualitative study. Results are presented in four sections. The findings relating to the results of the qualifying survey administered to the 240 students and subsequent percentages of students within this low-income high school with ICT access outside of the classroom are briefly discussed. The second section outlines the first research question presenting the findings as to the frequency and contributing factors leading high school students to choose the Internet as an instructional resource in order to complete class assignments at their home. The third section details the findings regarding the usage patterns of students using the Internet to complete assigned and non-assigned schoolwork outside of the traditional school classroom setting. Finally, the fourth sections detail the factors that influence students' home Internet usage in the completion of assigned tasks.

The findings presented in this chapter represent the data collected from the 240 original students participating in the qualifying survey, the eleven students randomly
selected to take part in interviews, and the four teachers who were surveyed. The student findings reflect interviews and follow-up interviews. Teacher findings are representative of questionnaire responses emailed by way of attachment.

Presentation of the Findings

Percentage of Students with Information Communication Technologies Access outside the School Setting

As described in the methodology section, student participants in this study were first administered a qualifying survey to determine eligibility for the potential poll of students selected to participate in interviews. Inasmuch as this study was qualitative in nature and design, data collected from the qualifying survey proved invaluable in determining the prevalence of ICT access of students from low-income households outside of the traditional school setting. Findings reporting students' Internet access at home vary greatly amongst the current body of research. Woessmann and Fuchs (2004) found the number of students with household Internet access at 43 percent in their multi-country study. Hsu, Cheng, and Chiou (2003) found 93 percent of students in their study with home Internet access; no population demographic data are...
given in this study of high school students conducted in Taiwan. The reasons for such variances undoubtedly reflect the socio-economic population of students the students surveyed.

For the population surveyed in this study of low-income high school students residing in Southern California, 72 students (30%) responded that they had no Internet access outside of the traditional school setting (see Table 1).

Table 1.
Mean Numbers of Students With and Without Internet Access Outside of the Traditional School Setting

<table>
<thead>
<tr>
<th>Level of Access</th>
<th>N</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Without</td>
<td>72</td>
<td>(30%)</td>
</tr>
<tr>
<td>At Household</td>
<td>140</td>
<td>(58%)</td>
</tr>
<tr>
<td>At Friends' or Relatives'</td>
<td>28</td>
<td>(12%)</td>
</tr>
<tr>
<td>Total With Access</td>
<td>168</td>
<td>(70%)</td>
</tr>
</tbody>
</table>

Note. Sample size = 240
Respondents who had immediate access to the Internet at their household represented 140 students (58%) of the total 240 students participating in the qualifying survey. When considered with students who responded positively to having ready and immediate ICT access at a friend or relative's household, 168 (70%) of the 240 student population surveyed had Internet access outside of the traditional school setting.

Of the 28 students who responded positively to having access at a friend or relatives' household, one participant randomly selected to participate in the interview phase of the study had disclosed that they had moved into the household access category during the time spanning the administering of the qualifying survey and the student interview. Given the increasing numbers of households going on line, percentages of students living in households without access will undoubtedly continue to decrease such as participants in Hsu, Cheng, and Chiou's (2003) two year study.

Teachers surveyed in the study do not appear to have reservations regarding the assigning of homework that requires ICT use. A math teacher [T2] surveyed believed that Internet access at the school’s two public access
locations, the school library and school career center, was adequate:

They have access to the internet in class, but will need to use outside time to really obtain the information that they need. The school has computer labs and available computers so they have the opportunity to use the internet. They may not want to find the time, but all the resources are available if they really are motivated (T2).

Adding to the belief that motivated students will find a way to complete homework-based ICT assignments, an economics teacher [T3] believes students will learn life skills by overcoming access problems:

I do expect students to use the Internet outside of class time. Although I am aware that many students do not have access to the Internet at their home, I make myself available after school to help. Students must learn to overcome challenges if they are to become successful. By finding ways to accomplish assignments when they have to solve the problem of not having the Internet in their home, they are learning this important skill (T3).

**Frequency and Contributing Factors Leading to Student Information Communication Technologies Use**

The frequency of home ICT use for the completion of schoolwork varied amongst the participants of this study. Answers varied from using ICT everyday to using this resource, on average, once a week. However, all participants interviewed stated that they use the Internet outside of school at least once a week for the completion of a school-related assignment or task:
[I use the Internet] a few times a week. Two, three, or four times (S3).

A few students commented that they daily use ICT in the completion of schoolwork. One student, an English language learner, commented:

Almost everyday I use the Internet to help me with schoolwork (S6).

This high frequency of ICT use was also seen in the one student interviewed that did not have Internet access at home, but would go to a friend’s house or the public library:

I say at least 3 to 5 school days because I am always on the Internet working on school stuff (S4).

Contributing factors determining student use of ICT outside of the classroom can be classified into two categories: 1) assigned ICT explicit schoolwork and 2) assigned schoolwork implicitly lending itself to ICT uses. Schoolwork falling into the first category contributes to student use of ICT depending entirely on the possibility of students being enrolled in a particular instructor’s course that assigns such work. The second category is dependent upon a student having knowledge regarding the availability of resources readily obtainable as they are attempting to complete a particular assignment not explicitly lending itself to ICT use.
Term papers assigned by history teachers and English teachers were the most common of the explicitly assigned ICT homework documented in this study. Junior students in the study were in the last stages of completing their history term paper:

Mr. F's history biography report was the last assignment that I used the Internet. I don't think I could have done the report without the Internet because that was where I got all of my information from. I used the Internet for all of my work. If you are doing any report, your outline will always have sources that you have got from the Internet. (S4)

A big [Internet assignment] would be like in Mr. F's term paper. You use that to look up the information I was looking for, like mine on Edgar Allen Poe (S1).

The English teacher [T1] within the small learning community was also identified by students in the study as a teacher that frequently assigned explicit ICT assignments. One student enrolled in this English class explained:

Some of the work we did in Mrs. W's class was using the Internet. Most of the schoolwork I did on the Internet was for her class (S9)

Other explicitly assigned ICT homework assignments were high-interest in nature. A student pursuing a career in Automotive Technology enthusiastically described a recent ICT project completed at home:

In Mr. S's class, he gave us a project that we have to find parts with $3,000 to spend. I am looking up part sites, and specific sites that have information about a car's body. For parts, I use one of the two big sites (S7).
Students in an algebra class were assigned the task of creating a business plan for a start-up company of their choice. The teacher participant surveyed explained a business assignment utilizing mathematical principles:

I do a "Make Your Own Business Project" that requires the students to do research on things that they would need for their potential businesses. The Internet helps them to find a wide range of items and allows them to "shop" for the best prices (T1).

Assignments that were not explicitly assigned to be completed using ICT were identified as those assignments that could be completed in a quicker manner using these technologies as well as homework assignments that were considered difficult and needed further explanation to the student before the task could be successfully completed. Several students identified a homework assignment from their economics course that involved the tracking and recording of stock market data on a weekly basis over the period of one academic quarter. One participant explained that ICT was chosen over the traditional method of accessing stock data via the newspaper:

Ms. A had us pretend that we were investing money in the stock market. She had newspapers [in the classroom], but if we wanted to, we could use the Internet. I used yahoo. She did not give any sites or support if we decided to use the Internet (S5).

The ease of setting up an online stock portfolio that was automatically updated in real-time was explained by another
student who was taking the course from this economics teacher:

In econ, the assignments related to stocks. The stock [assignment] is where we go online and find the high and low of the stocks and then sell stocks per share. I preferred to do it online because it's easier. I didn't have to look it up [in a newspaper], I have it set-up on my account (S3).

The repetitive tasks such as retrieving stock data was not the only assignment lending itself for students to choose to use ICT as a resource when it was not explicitly assigned by the classroom teacher. The often viewed mundane task of looking up vocabulary words in a dictionary was also an assignment lending itself to students' choice to use this technology. Students choosing to use ICT resources for the ease and relative quickness over the traditional method of looking up words in a book can be seen echoed in students' use of online dictionaries:

In Mr. R's class, we could look up vocabulary words online or in a dictionary; I looked them up online because it's quicker and easier then flipping page by page. I would go to dictionary.com and other times to Google (S10).

A student's desire to excel and successfully complete assignments were also contributing factors for a student choosing to use ICT as a resource when not explicitly assigned to do so. Finding samples of math problems was once such case:
One math assignment I had was hard, so I went online and it guided me step-by-step on how to use it. I used AOL and went to the homework help section. My friend told me about the AOL section in middle school. I have been using it ever since, when I need help (S3).

The ability to view a large amount of material including explanations and samples is also seen in other academic subjects outside of mathematics. Frustrated with an English unit, and attempting to understand Macbeth, one student explained:

I just went online and got a summary of the story so that would help me on tests. I did a Google search on Macbeth to help me find a few good web sites (S9).

Another student from a senior English course was tasked with the writing of a sonnet. Frustrated with the inability to begin the task, the student explained:

I received the highest grade for the sonnet I wrote for Mr. R. I wrote the sonnet in one night after going online. I probably read over a hundred sonnets so I could understand the structure (S12).

The ability to work independently, outside of the school setting without the aid of the teacher was also echoed in student responses. The school environment at large, urban high schools is often viewed as dangerous or threatening, leading to the perception by students as being an unsafe place to be. One student commented about this factor leading to outside school ICT use:
I would rather go to the city library over the school library because you know how it is around here...I just like to get out of this place quick (S4).

The independent learning factor leading to ICT use outside of the classroom was seen by one student as caused by the frustration with the inherently large class sizes typifying the modern classroom. Moreover, the ability to access a multitude of subject area experts was identified as a contributing factor leading to ICT use:

I learn more from the Internet than what teachers talk about. For instance, you can't raise your hand in class all the time. If you can't understand something on the Internet, you can go to a different site that explains the same things, but they might use different words. It depends. Sometimes you will understand something better when you use the Internet (S6).

Student participants viewed ICT educational use in a positive manner. The speed that ICT provides students was the leading factor for this positive view:

It is quicker than going to a library (S7).

[Using the Internet] is much quicker and it will tell us all the information that we need on one page instead of going through all kinds of pages (S8).

I enjoy using the Internet because it is quicker (S3). As well as speed, many participants felt the relative ease of using the Internet was a contributing factor leading them to choose ICT as a resource when at their households:

Well its school work and it makes it easier so I enjoy it (S9).
All yeah. It's easy, it's fast. I know a lot so I can find a lot of the same thing in different categories (S6).

It's sort of the easy way out, but then again, it's there for a reason. You're not thinking as much, but then again, we're getting a lot more information than in the past, before they had the Internet (S4).

This contributing factor of ease of use is no doubt a reflection on the amount of experience using this resource that this generation of students has attained since entering elementary school.

**Usage Patterns of Students Using Information Communication Technologies to Complete Assigned and Unassigned Work**

The usage patterns of economically-disadvantaged students in this study yielded findings that students are using personal, web-based email accounts as an educational resource. Student use of email was found to occur as a means to email teachers assignments, collaborate on group assignments, and use this technology as a file storage system. Student participants in this study do not have a school-based email account, leading to the use of web-based email systems such as Yahoo, Gmail, or hotmail.

The use of email as a collaborative effort is noted on group assignments given to students in a physics class:

I use the Internet to email people too. Get information across to your people-your friends if you need it. That's what I mainly use it for-to email when
I do PowerPoint and work on a group project for Dr. S (S4).

Although the group assignment did not involve the use of ICT outside of school for this particular assignment, students opted to work on completing their respective sections at home in order to improve their chances of receiving a higher grade. For collaborative purposes, the business career teacher requires students to sign up for a web-based email account as a course requirement:

I got my [email] account when Ms. T had us sign up in her class. I’ve used it a lot on projects in that class. I use it to email my part of the projects to other people in my group, so they can do their part (S10).

Student use of email as a file storage system was also a common theme found in many responses. Choosing not to use a floppy disk or flash drive, students are using email as a way to open their files on multiple computers on the campus and at home. Ease of using this system of file storage system is evident in this ICT pattern of use:

I do group projects using PowerPoint for Mr. O. I could work on them here (referring to the classroom where the interview is being conducted), and then finish up at home. It is pretty easy because you always have the files you need to work on. If we send it, it will be there before we get to the period (S7).

Students have also voiced their concern over the failure of floppy disks when attempting to access them on multiple
computers throughout the school campus as well as at their households:

My friend showed me how to do it (transfer files as attachments using web-based email) after I lost my term paper. The computer kept wanting to format my disk because it was unreadable. No, I haven't had any problems with files getting messed up since I started emailing myself the files (S5).

Students' use of ICT in this manner is not a result of teacher influence or instruction. All of the respondents interviewed had been shown how to use email in this manner by a friend or relative.

Student use of email to correspond with teachers does not appear to be a common pattern in their usage. Only one respondent claimed to have emailed their teacher:

We had to use the internet to email our teacher, Mrs. W. so that we could get our homework. I checked the email at home and at school (S8).

This finding is surprising considering the responses by most students in the study responding that email usage was their most frequent use of ICT at their household:

I find myself checking my email mostly. It's the first thing I do when I'm at home or whenever I use a computer at school (S3).

The use of search engines in order to complete schoolwork was a recurrent theme in student ICT patterns of usage. Students mentioned using a variety of search engines as a major part of completing schoolwork at home. Search
engines that were commonly mentioned included: Google, Yahoo, and Ask Jeeves. As a repeated activity, students positively responded that searching was a major ICT activity undertaken to complete schoolwork at home:

I'm always looking up words on Google (S4).

I usually go to Yahoo to look up the stock information (S3).

I have been spending all my time working on the term paper for Mr. F. I looked up the years, the timeline. I went to Google to find the timeline (S2).

Along with the pattern of the frequency of using search engines, student participants were generally confident about their ability to search and their effectiveness in finding what they were tasked to find. Along with confidence, students were quick to describe their searching strategies. Specifically, strategies were discussed when students did not get the desired search results that were needed to complete an assignment:

Yeah, I get what I want if I know what to type in [the search field]. Like if it's like a problem or a question, I know I can type in the question it will usually give me an answer. If I don't get the answer I am looking for, then I change around the question sometimes until I get it answered (S3).

It's always on the first page (the desired search results), but sometimes I have to reword my search to get better results (S9).
Rewording searches was not the only pattern observed. Students also cited switching search engines in an effort to achieve the desired results:

If one [search engine] doesn’t work, I will just use another one. Like if Yahoo doesn’t work, I’ll use Google. I’m not really into getting into something deep (S4).

Unlike email skills, teachers were attributed with being the driving force behind students’ acquisition of Internet search strategies:

...back then, in middle school, teachers taught us how to do these things (S2).

I learned this [search strategies] from all my teachers. But mostly from Mrs. W, my English teacher, and Mr. F [business teacher] (S8).

Like email and the utilization of search engines, students are utilizing a variety of ICT educational resources as supplements to complete homework. Moreover, these supplemental resources are being utilized without teacher direction or encouragement. One such supplemental resource is the use of online dictionaries. Many students interviewed discussed their use:

I have a list of links saved in my favorite’s folder like dictionary.com a thesaurus site (S6).

I just had a science project. The words I didn’t know, so I looked them up in the dictionary - at dictionary.com (S2).
Another student also echoes the same patterns of using an online dictionary as a resource:

In Mr. R's class, we could look up vocabulary words online or in a dictionary; I looked them up online because it's quicker and easier then flipping page by page. I would go to dictionary.com and other times to Google (S3).

The use of a specific site dedicated with providing help to students with their homework outside of the school setting was mentioned by two students as a resource they used when extra help was needed. A student classified as an English language learner explained:

I'll go to the homework help section because you know my teachers don't really explain good so I'll have to go in there and look around and once I see a problem that looks like the one I'm doing, I'll see...I go to AOL Homework [to do this]. I'll get sample problems by asking someone in the site (S1).

The same site was also used by another student for extra help with math problems:

One math assignment I had was hard, so I went online and it guided me step-by-step on how to use it. I used AOL and went to the homework help section. My friend told me about the AOL section in middle school. I have been using it ever since - when I need help (S3).

The use of chat rooms and message boards do not presently appear to be exploited by high school students, however, it is worth noting that students are aware of this resource and discussed how it is being used by other students:
I post on a message board, and I see that a lot of kids are going there for [school] help. I remember just the other day, a girl was doing an assignment on Macbeth, and she wanted us to help her write an obituary for one of the characters. Or they ask for help to find research material that they couldn't find themselves, and they ask if we could help them find it. This is something that I have noticed on this board recently. I have seen this done on other boards, but you would have to search for them. I will probably use this resource in the future because it is convenient and right there in your home (S5).

When students were questioned during follow-up questions about their use of this ICT resource, students responded that they had never used this resource. However, respondents were positive about using this resource in the future:

I have used chat rooms when we had AOL. If all else fails, I would do that for school help (S9).

I chat and use Messenger, but not for homework. It has crossed my mind to do this, but I haven't really ever put it into practice. Maybe next year I'll try it out if I get stuck (S6).

Students' ability to utilize the non-educational resource of online stock portfolios illustrates the pattern of students' readiness and acceptance of the use of ICT tools. All of the respondents in this study who received the stock market project assigned in the economics class set up an online portfolio in order to track their chosen stocks. The economics teacher gave no instruction or specific direction about using the setting up an online
stock portfolio nor encouraged Internet to complete the project:

Students were given the option of using classroom daily newspapers in order to track their purchased stocks, or they were given the option to use a website. I presented a lesson pertaining to the use of the newspaper because this is how I personally access stock information (T3).

Like the use of web-based email, the teaching of this skill fell to fellow students and relatives.

The majority of the assignments discussed by students regarding their use of ICT as a resource involve data mining to a large extent. This data retrieval pattern is illustrated in the use of the online dictionary, the retrieval of stock quotes, searching for car part prices, and to some extent the term paper assigned in the history class. The exception to this data mining trend was the assignments given by the English teacher:

These [ICT] assignments range from social issues (such as prejudice and discrimination in America) to technological advancements (such as computers or transportation) and vary each year. The common focus is for students to research the topic historically and compare it to the present in order to predict the future (T1).

This use of the Internet in order to conduct a comparison or analysis is in contrast to the data mining assignment given by the automotive technology teacher:

For auto shop I had to search for parts, finding manuals, and processes, and programs for cars (S7).
Factors influencing Students' Home Information
Communication Technologies Usage: Facilitators
and Hindrances

The major factor facilitating students' use of ICT recurrent in interview responses was the positive view that the Internet was a tool that aided them in completing work in a quicker and easier manner than traditional educational resources. This positive view is explained by a sophomore (grade 10) student:

It [ICT] makes it so easy to complete homework. I wish all of my teachers would give more assignments that I do at home on my computer (S4).

The same sentiments were also shared by a senior (grade 12) student:

I definitely like to use the Internet to do my homework. It is so much quicker than trying to find information from the text book. It's easy to use too. I have been helping my little sister to use the Internet because it is so much easier (S6).

This high degree in the level of confidence expressed by the senior student was a recurrent theme in the majority of student responses to feelings about ICT use. Likewise, students expressing a high degree of confidence in using this tool can be seen as a major facilitating factor driving students to utilize this resource:

As soon as teachers give an assignment, I'm glad that I have the Internet. The Internet is reliable. I see it as it's there for you to learn (S4).
Yeah, I feel really confident because I feel I will do better on that assignment, and I usually do (S3).

Teacher instruction and direction in best practices regarding Internet use is seen as also a causing factor to these high levels of confidence:

Yes I do [feel confident] because my teachers show me how to use the computers very well (S3).

Successful ICT uses in the past as well as the experience that has been gained are also facilitating factors leading students to use ICT resources at home. Two participants explained their experience in the use of the Internet since the sixth grade:

Yes, I feel very confident about using the Internet to at home with homework. I've been using the Internet to help me with school stuff since sixth grade (S6).

Yeah, [I do feel confident]. I've been doing it since sixth grade, for the past six years (S1).

In spite of past experiences and teacher instruction, the majority of participant interviewees responded that they desired more support and help from classroom instructors. Commenting on the history term paper, one student noted a desire for more specific support:

Mr. F did not help us on how to use it. He only showed us how to do the works cited page. I would like more help because it would be easier and quicker, and that is how you get by these days (S4).

Another student also echoed that teacher support would make using the resource easier:
Every once in awhile it [teacher support] would be helpful because it would make it easier (S9).

However, participants expressed doubt about teacher expertise and experience to provide them with the ICT support they needed:

If they know how to use it then yes, I would like support. But most of the teachers don't even know how to use it themselves. This is because they are older and have been using what they have been teaching with themselves. This is just new to them (S5).

Teacher respondents also supported this finding that instructional time was not devoted to support or the teaching of best practices in the use of ICT. The math teacher surveyed suggested a desire for students to learn independently:

I teach them some key words to search for to find the things that are applicable to their business. I do not tell them too much since I want them to be creative and to have to find the terms that they need (T2).

Another teacher expected students to stay after school for support:

Because students are researching various topics, I work individually with them to identify keywords and help them locate valid sites (T1).

The findings by research (e.g. Nachmias et al., 2000) regarding the overwhelming use of ICT for recreational activities by high school students, was also found to be a recurrent them in student interview responses. However, the ability of high school students to utilize these
recreational attributes of ICT whilst concurrently working on school assignments is another facilitating factor in students' choice to use ICT resources to complete homework. The multi-tasking capability of listening to music whilst working on school-related assignments was a recurrent theme:

I enjoy using the Internet at home to do homework because I log into a music website before I start to do my work (S1).

It’s like you can open up Media Player and listen to your music at the same time as you do the work. That’s what I like about it (S11).

The ability to play an interactive game whilst doing homework was also explained as a multi-tasking function:

Games also distract me, I like Pogo. I am tempted [to play], and I have two windows open so that I am doing two things at the same time (S9).

Other multi-task functions that related to recreational activities included instant messaging friends and using chat technologies to speak to others while working on an assignment. One student who used the multi-tasking attribute of ICT explained how they worked on multiple homework assignments:

You are doing your work and you can do two things at one time because you can separate the windows and search for English and econ things at the same time. You are doing homework for both classes at the same time. And it's easy because you click on the words and you've got it (S6).
Such multi-tasking attributes of ICT use at the home are also hindrance factors to students using this resource. Students adamantly stressed how they can become quickly distracted when they use the Internet at home. All eleven participants answered positively that they are often distracted when attempting to use the Internet to complete homework. Pop-up ads were cited by most respondents as being the most distracting to getting tasks accomplished:

There are a lot of pop-ups and they can be distracting but that's if you follow them, but you can 'x' out of them; you don't have to follow them. A couple of times I follow them, especially if they are about money (S4).

Yes, I'm distracted all the time by pop-ups. Like how you could win an iPod or Palm Pilot or stuff like that. I click on the links to find out about them (S8).

Certain times [I am distracted]. A pop-up might come up showing something more important - like a project that I want to do in my future life. I might try to research that and it walks me off into a different area (S7).

Ad banners were also seen as a source of distraction for students doing homework:

All yeah, I'm distracted all the time. Pop-ups distract me. Some websites have advertisements on the side. For example, some websites have ads for movies and you like go to it and come back to your work. There are a lot of advertisements everywhere. If it's a good advertisement, I usually click on it (S10).

Listening to music, a desire to play games, and going to unrelated websites were other areas of distraction
identified by students as hindrances to completing homework.

The responsibility of maintaining the household computer(s) and ensuring that virus protection was maintained, windows updates were current, and the removal of spyware/adware programs fell upon the majority of the students interviewed. A student in this role explained:

If I don't [maintain the computer], the whole show falls apart because my brother - all he knows is how to turn it on and download music. All my dad knows how to do is go to his chat website and that's it. When something goes wrong they don't know what to do, but I do (S6).

This was echoed by others respondents:

I am responsible for fixing it, and I get the blame for messing it up too (S10).

I am for all the computers in the house except for my dad's. My dad and my uncle taught me how to do updates and all that stuff (S1).

I am. [I learned this] mostly from just doing it myself and things I learned in the computer literacy class (S5).

Home computers being inoperable or not being able to access the Internet were not listed as hindrances or noted by any interview participants.

Discussion of the Findings

Current research detailing the level of household Internet access within the specific subgroup of economically-disadvantaged teenagers has been lacking.
Accordingly, teachers have been reluctant to assign specific homework assignments requiring the use of ICT as a result of the perception that such practices will place certain students at an unfair disadvantage. The finding that .70 of low income students in this study having access to the Internet outside of the school setting is a positive trend within this economically challenged subgroup of students. With such data, individual teachers will have to determine the appropriateness and fairness of assigning homework that specifically requires the use of ICT. However, the finding that the majority of high school students are online at their households should be a catalyst to provide best practices for using ICT as a supplemental resource to their instructional practices.

This finding also supports the notion of the declining Digital Divide. The implications of such a decline will undoubtedly have positive effects on the field of education. Whilst the identification of student ICT use being centered outside of the school setting (e.g. Nachmias, et al., 2000), the finding that the majority of students from economically disadvantaged backgrounds having access outside of the traditional high school environment can lead to adjustments in assigned homework taking advantage of ICT. Not only can homework that specifically...
uses ICT be assigned, but ICT resources that supplement traditional assigned homework can be exploited with those students who have home Internet access.

Teachers surveyed in the study were not reluctant to assign outside ICT projects with teacher responses indicating a belief that students will overcome obstacles to complete teacher-assigned ICT tasks. This finding is contradictory to the conclusions found by Levin and Arafeh (2002). This contradiction may be attributed to the manner that the identification of the four teachers surveyed in the study were chosen based upon student responses identifying them as teachers giving them assigned ICT homework. However, such attitudes lending themselves to the belief that motivated students will find ICT access in spite of not having access at their households may place students from low-income households at an unfair advantage.

Students interviewed struggled to estimate the average amount of time and the frequency of how often they used ICT at home to complete schoolwork. Student estimates about time spent using ICT may be low due to the timing of these interviews being conducted during the last month of the school year. This timing may have affected student responses as many teachers assign fewer homework
assignments after California State mandated standardized tests are administered in April.

This timing issue is evidenced by a senior who commented the frequency of their use of ICT:

Once a week probably (S5).

This particular student was viewed by peers as being extremely knowledgeable about ICT use and was sought out by other students as a mentor when ICT problems could not be solved by themselves. One interview participant stated this particular student:

...is always on the Internet at home doing homework (S9).

Had this study been conducted earlier in the second semester or in the midst of the first semester term, a higher rate of ICT use may have been offered.

Contributing factors involved in student choice of ICT use are extraneous in the case of explicitly assigned schoolwork requiring ICT use; a teacher assigning ICT homework is the predominate factor leading students to use ICT as a resource in these cases. However, student responses involving high-interest ICT assigned homework were much more detailed over the assigned term papers. Another key finding regarding teachers explicitly assigning
ICT homework is noted in students responding that they would like more explicitly assigned ICT homework:

    Yeah, I would like more homework that required me to use the Internet because when you use the Internet, you can do things twice as fast and you have more information to work with (S2).

Another student echoed this desire based upon the speed and ease ICT provides for students:

    I'd like to see more because we're students; we like easy work. You still have to read, but it narrows it down a lot (S9).

The ease and quickness associated with repetitive, mundane tasks were noted as contributing factors when students chose to use ICT resources to complete tasks not explicitly directed by the assigning teacher. Student participants responded to using dictionary web sites as well as setting up stock portfolios in an effort to minimize the amount of time spent completing respective school assignments. Beyond the speed and ease of use factors, students are making use of ICT to gain further explanations and material that was covered by the instructor during the traditional school day. Students independently accessed these resources in response for a desire to achieve higher grades on exams, as well as being able to complete a specific task assigned by the teacher.
This factor regarding a student's desire to excel academically is seen in student participants accessing resources that gave multiple examples and samples of identical tasks assigned to the student. Students recognized the value of the Internet as being an abundant source of instructional material that provides much more information from multiple subject matter experts that complement their classroom teacher.

Student use of email as a recurring pattern in the study is an area of ICT not facilitated or influenced by teachers surveyed in the study. Respondents developed the skill and familiarity of using this resource outside of the traditional curriculum. Friends and family members of students appeared to be the influencing agents on email skills developed by students in the study. Although the utilization of this resource appears to be fully exploited in the areas of collaboration and as a file storage system, the use of email as a resource to communicate with teachers was not evident from student interviews or teacher surveys.

The use of search engines was identified as a major area of ICT use outside of the classroom. Student participants were confident about their abilities to conduct searches and generate the desired results in order to complete home work. This finding supports the finding by
Fallows (2005) who found a large number of respondents, 92 percent, reporting high levels of confidence using search engines. Teacher involvement in instructing students on best practices when conducting searches was evident in the respondents. There is evidence that this ICT skill is being taught within the classroom curriculum in earlier grades such as middle school and perhaps even at the elementary level.

With this skill to conduct Internet searches being taught at earlier levels, a growing concern about the students' ability to evaluate the validity of sources generated from a search is called into question by the English teacher surveyed:

My primary concern [with student ICT use] is that students often fail to go through the steps to determine the accuracy of a site. Although I spend a significant amount of time teaching this skill, they continue to use sites such as "Wikipedia" or sites which have a commercial interest (T1).

This finding is consistent with Murray et al.'s research conducted in 2005 documenting teacher concerns about student evaluation of the reliability of Internet sources at the post-secondary level. The previously discussed contributing factor of students enjoying the speed ICT lends itself to the completion of a task may also lend
support to the failure of students determining the accuracy of Internet sites.

The use of online resources in order to complete school-related tasks at home is a common pattern with the high school student. Most of these resources are not encouraged or directed to be used by teachers, but are rather encouraged or introduced through fellow peers or by relatives. The student use of the dedicated AOL homework web site is an example of such a peer-introduced resource. The knowledge and ability to set up an online stock portfolio is another example of the acceptance of ICT resources not necessarily taught or encouraged through teacher instruction. The apparent infancy of student use of message boards and chat technologies as a resource to get supplemental school help is an area of educational ICT use that shows much promise.

With the majority of assignments described by students as falling under a data retrieval or data mining descriptor, most ICT-based assignments would not be classified as being constructivist in nature such as that found by Cuban et al. (2001). The one exception to this would be the English teacher whose assignments not only showed characteristics of being constructivist in nature,
but also are consistent with being classified higher on Bloom's taxonomy scale of learning and knowledge.

Teacher concerns regarding ICT use varied. The science teacher [T4] surveyed voiced concern regarding a lack of student use of ICT as an outside resource:

I have found that unless students are given a specific assignment, with the requirement of using the Internet, they rarely access additional information. They also generally do the minimum required, rather than using the Internet as a starting point for information (T1).

Another concern illustrated the concern regarding students' inappropriate use of ICT whilst completing school assignments:

They could find some inappropriate sites from some of the searches that they do...If they do the research at school, the likelihood of inappropriate sites are minimized, but it is still a possibility. Most students are aware of what is inappropriate and to stay away from. Curiosity is sometimes too much to resist, but I feel the students are intelligent enough to know the difference (T4).

The economics teacher's primary concern regarding ICT use was also non-content related:

I'm concerned that students will not know how to use 'traditional' resources, and they will always rely on the easy way out (T3).

High degrees of confidence in students' ability to use ICT usages are a factoring into their choice leading them to choose ICT use at their households. Students in the study reported that teacher instruction, guidance, and
direction were reasons for this level of confidence. Students cited specific teachers they currently were taking courses from as well as past teachers that taught them specific ICT skills. Experience and past successes were also documented as being attributed to high confidence levels. Students pointed to ICT uses extending back to middle school, giving examples of assignments and projects that were completed at these lower grade levels.

The attribute of being able to multi-task while using ICT is both a facilitator as well as a hindrance to student ICT use at home. Student participants cited the facilitating features of listening to music, being able to instant message and chat, and play games while concurrently working on assignments were all positive facilitators leading them to desire to use ICT to complete schoolwork. However, each of the identified facilitators was also identified by students as hindrances to the completion of homework. Pop-up ads were viewed by most respondents as being the largest distraction whilst completing a school-related task. Students responding to these hindrance-related factors responded in an apologetic manner and tone when discussing these distractions. Students in the study appear to have a self-awareness that they are being hindered and appear to have the ability to act in a self-
regulatory manner. This can be seen as one student explains the problems of such hindrances:

The Internet can be useful, but it can also be very distracting and can actually make you do less work. I know a lot of people that say I'll do my homework and then they play online for two hours and work for only five minutes (S1).

Computer inoperability and maintenance issues resulting in not being able to access the Internet were not observed to be hindrances. Of interest, the responsibility for the upkeep of the family computer did fall upon the majority of the high school participants. These students from low-income households used a variety of strategies and resources to ensure the continued operability of the household computer(s). Utilizing skills learned in high school computer literacy courses, networking with family and friends, and troubleshooting using online resources were all strategies found to be utilized by students to successfully ensure that ICT was available at the household of these students.

Summary

The majority of student’s from this low-income, urban neighborhood school responded to having access to the Internet outside of the traditional school setting. According to the student participants in the qualifying
survey, .70 of these students have ready and immediate access to the Internet at home or have access at a friend or relative's household. Teachers who participated in this survey are not deterred in their assigning of ICT-related homework assignments by the percentage of students not having Internet access outside of the school setting.

All student interview participants responded to using ICT to aid them in homework at least once a week, with the majority of interviewees estimating a higher rate of frequency. The speed and ease of using ICT to complete assignments were the two most commonly offered contributing factors leading students to choose to use ICT when a teacher-assigned task did not specifically require them to use such technologies. A student's desire to excel and master material was also a finding attributed to the choice of ICT to complete homework. Lastly, the desire to be independent learners and the view that a wider body of knowledge exists on the Internet than what is found in the classroom and the use of traditional resources were also contributing factors leading students to use ICT at their households.

A current pattern in the use of ICT at home is seen in the prevalence of email technologies. Students using this ICT tool are utilizing its collaborative features to excel
on group projects. The ability to utilize web-based email as a file storage system in the practice of emailing files as attachments to be worked on at multiple computers is also a pattern observed in interview responses. However, the use of email as a communicative tool to correspond with teachers was not found to be a common practice with student.

The use of search engines, specifically Google, Yahoo, and Ask Jeeves was also found to be a recurrent pattern of ICT use. Students are confident with the use of this resource and use strategies to adjust searches to enable them to find desired information. Students are also using the educational resources of sites dedicated to providing specific homework help as well including online dictionaries. Students in the study were also found to be utilizing non-educational resources such as online stock portfolios for the completion of an economics project outside the direction of their instructor. One emerging educational resource is the knowledge about the use of message boards as a place to post homework questions and collaborate with peers from around the world. Homework assignments explicitly assigned by teachers involving the use of ICT resources were found to have a data mining
quality and could not be characterized as being constructivist in nature.

Facilitating the use of ICT at the household was the view that work could be completed quicker and the tasks completed with this resource were thought to be less difficult to accomplish than using traditional educational resources. Students' acceptance and choice to use these technologies were also concluded as seen in the responses characterized by high levels of confidence gained by means of teacher instruction and past experience. The multi-tasking nature of ICT was found to be a facilitator as well as a hindrance to student performance in completing tasks at home. This finding is based upon positive and negative responses from participants in the study. All eleven interviewees responded that distractions while using ICT were hindering them in the completion of the specific tasks that were attempting to be accomplished. Computer inoperability was found not to be a factor hindering student ICT use at home.
CHAPTER FIVE
CONCLUSIONS AND RECOMMENDATIONS

Introduction
Student and teacher participants in this qualitative study provided valuable insights into the frequency of their ICT use. Along with frequency of use, the contributing factors leading high school students from economically-disadvantaged households to use this resource, and once chosen, the facilitating factors as well as hindrances encountered when attempting to complete homework were studied. Several conclusions were derived based upon the findings regarding these factors affecting the effective use of home ICT use in the completion of homework. The narrowing trend of the Digital Divide was noted and teacher assumptions regarding student access outside of the school are discussed first. The factors of speed and ease of use are discussed next, followed by a discussion on the use of ICT as a supplemental resource. The duality of the benefit and hindrance of multi-tasking is presented next. Lastly, the conclusions that the role of the high school student as the household party responsible for computer maintenance and upkeep of the household computer(s) will be presented.
Based upon these conclusions, as well as other findings outlined in this study, a series of recommendations are presented as a result of student responses and teacher surveys. The instruction and teaching of best practices in using ICT as a supplemental resource are recommended. Secondly, specific strategies on minimizing the distraction of pop-up and banner advertisements are followed by a discussion on the inclusion of required computer literacy courses offered at the high school level.

Conclusions

The qualitative study conducted at this large, urban high school supports the assertion that the Digital Divide is narrowing amongst the social classes. This assertion was confirmed at this particular high school illustrated by the majority of students surveyed responding positively to possessing immediate Internet access from their household or having immediate Internet access at a friend or relative's household. The trend of growing home ICT access within this population of students from economically-disadvantaged households has positive implications on the education system as reflected by research studies reviewed previously in this paper. The explicit teacher assigning of
ICT-related homework is one such outcome that will encourage the ethically-related discussions dealing with the acceptable access level allowable for such undertakings. The frequency of students using ICT would undoubtedly increase if these explicitly assigned types of homework assignments were a frequent component of class curriculum.

An intriguing aspect to emerge from this study is the readily accepted practice of using ICT as an independent, supplemental resource outside the encouragement, direction, and support of classroom teacher. Best practices in the using technologies such as email collaboration, online dictionaries, and homework support sites were attained through the influence and direction of a student’s peers. However a student’s effectiveness or making an evaluation if best practices are being followed in the use of such supplemental resources remains unclear. The common theme regarding the awareness about the increased use of message boards by students to gain help with homework assignments illustrates students’ acceptance and willingness to embrace new uses of ICT in their educational studies if they perceive the resource possessing a means to facilitate the speed and ease of completing the assignment.
Positive attitudes and the frequent sharing with peers about available ICT educational resources are attributed to the students' belief that such technologies make school homework quicker and easier to accomplish. The validity of the perception that ICT tasks are accomplished in a quicker and easier manner than traditional methods was a common theme in all student participants. The inherent nature of ICT facilitating the practice of multi-tasking and the use of search engines was determined to be a leading cause for the increased speed involved in the completion of tasks.

A duality exists in the multi-tasking attribute associated with ICT use. The positive attribute associated with the ability to utilize the multi-tasking functions of ICT while working on educational endeavors was also identified by students as a major hindrance to the completion of homework utilizing this technology. The distractions associated with multi-tasking, in particular, pop-up advertisements whilst browsing online, is the leading cause for students not successfully completing homework. The high-interest nature of these advertisements cause students to investigate the advertisers' claims that in turn directs them to another browser window, away from the original material being sought or utilized in the completion of the educational task. The ability to utilize
media components, in particular music and video, is also a leading cause of distraction to high school teenagers attempting to accomplish homework assignments.

Computer maintenance issues were not found to be a significant hindrance in the completion of school work at the household of the high school student. However, the ability to troubleshoot and repair hardware, software, and Internet security issues including the increase of spyware, adware, and Trojan horses is the primary responsibility of the high school student in the household of low-income families. This finding is attributed to the ability of students to utilize the knowledge and technical support gained from previous personal knowledge, support from family or relatives, strategies learned from teachers. If the problem still persists, families were found to resort to the use of paid technical support. This finding illustrates the view and belief that ICT is an invaluable resource to the student and families within the household of this socio-economic class.

Recommendations

The use of ICT as a supplemental resource to aid the high school student in the completion of assignments not explicitly assigned to be completed using this resource
provides opportunities for instructors to teach strategies and best practices in exploiting these supplemental resources. Student effectiveness using these resources should first be studied and analyzed in an effort to identify strengths and weaknesses of each particular resource. For example, best practices in the use of email as a collaborative tool is one such resource that has potential to be exploited by educators in the completion of a multitude of assignments. Providing a standard for the inclusion of online resources for each offered high school class is another recommendation that would support the use of such supplemental resources.

The identification of pop-up advertisements and banner advertisements as a major distraction to students completing ICT related school work should lead educators to develop strategies for minimizing this form of hindrance to the completion of home work. Strategies for preventing pop-up advertisements through the use of software programs, ISP-offered packages, and new features of operating systems should be included in computer literacy curriculum as well as school-to-home communication, such as school newsletters. Secondly, classroom web sites currently being utilized by teachers should not be hosted on free, commercial web servers commonly associated with the
prevalence of aggressive pop-up and banner advertisements. Lastly, providing web-based email accounts to students is another recommendation that would circumnavigate the abundance of pop-up and banner advertisements prevalent with widely-used free email services. Inasmuch as technical strategies will prevent advertising distractions, the ability to identify and prevent such commercialization distractions will undoubtedly be an ongoing endeavor.

The support and guidance of teaching best practices for use of supplemental resources should also include technologies currently being exploited for non-educational purposes by high school students. One such technology of interest is the frequent use of message boards by students. The student-noted trend of seeing more homework related posts should lead educators in the development of instructionally designed message boards that would maximize the potential of this collaborative resource to enhance current class curriculum. The use of this resource may include the direction of students to an outside message board, or perhaps lead to the development of a high school hosted message board. Moreover, providing high school students with the skills, etiquette, and strategies for best uses of this resource will aid students in their use of this supplemental tool outside of the classroom.
The findings related to the consensus of teacher attitudes regarding the explicit assigning of ICT-related homework need further investigation. The four teachers surveyed at this high school were identified by student interviews as being teachers who assigned ICT-related homework and projects that could not be accomplished during class time. Therefore, the confidence by these teachers that students can overcome obstacles and that self-motivation will lead students to find ICT access outside of the classroom needs further study. Likewise, studies involving multiple high schools from large, urban and economically-disadvantaged neighborhoods are needed to study these teacher perceptions and beliefs. Studying teacher beliefs regarding student ICT use would also ascertain if pre-conceived notions lead to the hindrance or facilitation of the support of student use of ICT as a supplemental resource at their households.

The ability of students to manage home computers and maintain the operability of software and operating systems can be attributed to skills learned in graduation-required computer literacy courses. The skills learned in these courses, and other teacher instructed lessons have contributed to the elevation of the high school student in the household as the responsible party for the upkeep of
the family computer. As trends call for the elimination of such courses and place the teaching of ICT skills within the core content curriculum, valuable computer maintenance skills and Internet security strategies may not be gained by these responsible students. The continued offering of these courses and this important component within the curriculum is needed.

Summary

A review of the conclusions gained from this study included the increased ICT access of economically-disadvantaged students, the mitigating factors leading students to choose to use ICT at their households, a summary of the benefit and negative aspects of students using ICT as a multi-tasking tool, and the identification of the computer maintenance role given to the student. Following a discussion of the conclusions, recommendations derived from the project were presented. Recommendations included the analysis and teaching to students best practices of utilizing ICT as a supplemental resource in the successful completion of homework assignments. Strategies for the elimination of pop-up and banner advertisements was offered followed by a call for the
continuation of the inclusion of dedicated computer literacy courses as a program requirement.
APPENDIX A

INSTITUTIONAL REVIEW BOARD

APPROVAL
March 18, 2005

Mr. Seth Freehling  
C/O Prof. Eun-Ok Baek  
Department of Education  
California State University San Bernardino  
5500 University Parkway  
San Bernardino, California 92407

Dear Mr. Freehling:

Your application to use human subjects, titled, "Going Beyond Computer Access: A Study of Internet Usage of Low-Income Students Outside of the Public School Setting" has been reviewed and approved by the Institutional Review Board (IRB). All subsequent copies used must be this officially approved version. A change in your informed consent requires resubmission of your protocol as amended.

You are required to notify the IRB if any substantive changes are made in your research prospectus/protocol, if any unanticipated adverse events are experienced by subjects during your research, and when your project has ended. If your project lasts longer than one year, you (the investigator/researcher) are required to notify the IRB by email or correspondence of Notice of Project Ending or Request for Continuation at the end of each year. Failure to notify the IRB of the above may result in disciplinary action. You are required to keep copies of the informed consent forms and data for at least three years.

If you have any questions regarding the IRB decision, please contact Carmen Jones, (Interim) IRB Secretary. Mrs. Jones can be reached by phone at (909) 880-5027, by fax at (909) 880-7028, or by email at ccjones@csusb.edu. Please include your application identification number (above) in all correspondence.

Best of luck with your research.

Sincerely,

Joseph Lovett, Chair  
Institutional Review Board

JL/ccj

Cc: Prof. Eun-Ok Baek – Department of Education
APPENDIX B

QUALIFYING SURVEY
Internet Survey

Student Name ____________________________________________

Do you have a computer at home that can access the Internet? (Check only one)

□ Yes
□ No
□ No, but I have a friend or relative who does and I use their computer to access the Internet on a regular basis.
□ Do Not Know

Have you ever used the Internet at home to help you complete a school assignment? (Check only one)

□ Yes
□ No
□ No, but I have used a friend's or relative's computer to complete an assignment when I needed to use the Internet.

Return this survey your teacher to receive 5 extra credit project points.
APPENDIX C

INTERVIEW QUESTIONS
Interview Questions

1. Do any of your teachers assign homework that specifically requires you to use the Internet? What teachers and what subjects have you been assigned this type of work?

2. Do you ever use the Internet to help you complete an assignment even though the teacher did not require you to use it? What are some of the class subjects that you have done this for.

3. What was the last school assignment that you completed using the Internet?

4. If you are not specifically instructed to use the Internet, why do you decide to use the Internet instead of something else (perhaps like a book)?

5. How often do you use the Internet to complete assignments at home? (Once a week, twice a week, every night?)

6. What sort of tasks do you find yourself repeatedly completing using the Internet?

7. Do you enjoy using the Internet to complete school assignments? Why do you feel this way?

8. Do you feel teachers give enough assignments that require the Internet? Would you like teachers to give more work that requires you to use the Internet?

9. What do you like most about using the Internet at home?

10. Do you feel confident about using the Internet at home to help with school assignments?

11. Do you feel that your teachers should give you more help with how to use the Internet to complete assignments? If so, what sort of help would be beneficial to you?

12. Do you feel confident using search engines like Google, Yahoo, etc.? Do you get the results that you are looking for when running a search?

13. Have you ever used a chat room or message board in order to get help with a specific school assignment or problem? If so, explain the situation and how you
learned about this aid.

14. While using the Internet to complete an assignment at home, have you ever been distracted? If so, what sorts of things distract you?

15. If there were controls in place that prohibited you from these distractions, do you think this would help while specifically attempting to complete a school-related task?

16. How many computers at your home have access to the Internet?

17. How many people at your house use the Internet?

18. Have there ever been times when you needed to use the Internet at home and could not? If so, what prevented you from using the Internet?

19. Have you ever not been able to use the Internet because your computer was not working properly?

20. Who is responsible at your house for making sure that your computer has updated Windows software and virus protection?

21. Who is responsible for troubleshooting or doing repairs when your computer is not working properly?

22. If the school provided free computer help so that you could call or bring the computer in to be worked on, do you think your family would use this service?
APPENDIX D

TEACHER QUESTIONNAIRE
Teacher Internet Practices

1. Describe an assignment that you have given to your students in the past year that required them to use the Internet.

2. What sort of support, if any, do you offer students before, during, and after the assignment? (List of hyperlinks, lesson on searching, etc.)

3. Would you describe your assignment as being constructivist in nature?

4. Do you expect students to use the Internet outside of class time? If so, are you concerned that some students may not have access to the Internet at their home?

5. What are some of your concerns about students using the Internet as an educational resource?

6. Is there anything else you would like to add about how your students use the Internet as an educational resource?
REFERENCES


http://education.guardian.co.uk/elearning/story/0,10577,1442532,00html


Journal of Educational Technology, 36(2), 177-192.


Sherman, T. M., & Kurshan, B. L. (2005). Constructing learning: Using technology to support teaching for


appropriate home computers to meet their needs for autonomy, belonging, and competence, and how this affects their academic and future prospects. Paper presented at the Annual Meeting of the American Educational Research Association, New Orleans, LA.

Turow, J. (1999). The Internet and the family: The view from the parents, the view from the press. (Report no. 27). Philadelphia: Annenberg Public Policy Center of the University of Pennsylvania.


Connecting kids to technology: Challenges and opportunities. Baltimore, MD: Annie E. Casey Foundation.
