AN ABSTRACT OF THE THESIS OF

Allyson S. Dean for the degree of Master of Science in College Student Services Administration presented on April 26, 2012.
Title: Finding Techknowledgey: Students’ Navigations of an Institution’s Technological Landscape

Abstract approved:

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Larry D. Roper

This study explored how students navigate the technological landscape of a public, land-grant institution. Through online surveys and semi-structured, one-on-one interviews, the study operated through an anticipatory/participatory lens to research with the intent of understanding students’ experiences with technology at a research institution. Using this methodology and Triandis and Triandis’ (1960) Theory of Social Distance and Sanford’s (1969) Theory of Challenge and Support as theoretical support, the study identified five themes regarding students’ experiences with technology: (a) differences in students’ perceived levels of technological fluency (b) institutional expectations of students’ technological fluency, (c) variance in institutional training on educational technologies, (d) importance of personal computer ownership and Internet access, and (e) understanding individual technological needs. Coupled with the methodology, these findings serve to proffer institutional awareness and understanding of students’ experiences of an institution’s technological landscape.
Finding Techknowledgey: Students’ Navigations of an Institution’s Technological Landscape

by
Allyson S. Dean

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I understand that my thesis will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my thesis to any reader upon request.

____________________________________________________
Allyson S. Dean, Author
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Chapter I: Introduction

I remember the exasperation I felt my first time taking an online course; I was 27 and thought I was well-versed at technology after several years of use. Everything was through Blackboard, a technology initially I found quite confusing. The layout seemed counter-intuitive; I would search for several minutes to try to find a hidden link to something I would need for my class. It made me think, “If this is frustrating to me, how would it be for someone like Mom?”

The next term I started working with a federal program established to help underrepresented students, particularly those from lower socio-economic statuses and often non-traditionally-aged, and saw their struggles play out in the wake of lack of access to technology. One student, who worked two jobs to afford her way through college, did not have home access to a computer, let alone a high-speed Internet connection. She had to find time in her schedule to make it to the institution’s library or one of the computer labs during open hours in order to complete the work she needed for each class. Another student complained about not knowing how to use one of the programs required of his major. When I asked him if he was ever taught how, he said, “It’s assumed you know.” Upon walking in an academic support office’s computer lab one day, I met a non-traditional student having a similar problem as I had on Blackboard. She panicked, asking me to help her find how to submit her assignment to her instructor with only 15 minutes to spare until the time by which it was due. I asked her if she could just e-mail the instructor instead of using Blackboard; she responded saying she did not know how to send attachments via e-
mail. Nobody had ever shown her how to do it and perhaps would not have done it for a long time if I had not shown her.

The problem became clear to me as my interactions with non-traditional students increased. Many of these students did not grow up in a digital culture. Many of these students indicated sincere reservations about using technology, some apprehensive because of lack of knowledge about how to use certain programs and some harboring trepidations about what kind of personal information could be accessible through these technologies. Some students noted lack of access coinciding with expectations of access by their professors. Students would miss e-mails sent less than a day in advance of a class and feel unprepared for class activities or assignments. The overwhelming sense among many of these students was that there was nowhere for them to go for help. Technological fluency, in a sense, was and still is a necessity for academic survival in higher education.

**Background of the Study**

The United States is a technology-dependent society. Each year, the push for technology in most aspects of daily commerce and personal management becomes more prevalent. Professional positions come with the assumption of a certain level of technological fluency; while listing one’s computer capabilities on a resume was once highlighted, it is now considered seemingly irrelevant to include them. While job orientations may incorporate technology orientation, those informational components tend toward technology specific to the organization; “universal” programs are seen as being a part of one’s inherent technological knowledge skill set. As the technology
boom created new avenues for skilled labor, low-skilled manufacturing jobs became less and less prevalent (Lerman & Schmidt, n.d.).

As the United States endures economic hardship and jobs that were once bountiful for manual laborers and those without a degree from an institution of higher education become scarce, colleges and universities see an influx of students enrolling in institutions of higher education (Lerman & Schmidt, n.d.). Nationally, the enrollment rates have increased by 38% over the past decade (National Center for Education Statistics, 2011). In order to accommodate this influx of students, many institutions now turn to educational technologies to fill in for the gap in lacking resources, including but not limited to teaching faculty, student services administrators, and classroom space. Hybrid courses, those which combine a reduced in-class schedule with an active online discussion component, continue to gain popularity among institutions of higher education. These hybrid courses come at a cost, though, particularly to students without home access to high-speed Internet. Many educational technologies or software require considerable bandwidth in order to operate. Computers or other points of access, such as PDAs, require updated software and constantly changing minimal components to accommodate Internet technologies. Keeping with current technology requires disposable income; access to technology is a privilege often seen as an expectation, particularly for college students. In the case of hybrid courses, continual access to Internet technologies is imperative to one’s success in the course.
Statement of Problem

Students pursue higher education often for reasons of desired economic mobility and access to cultural capital. The caveat for this access involves prior access to digital technologies. Students who arrive at university without a base level of technological fluency are not identified by most institutions of higher education. While support programs exist for traditional students from under-resourced schools or some non-traditional students, technological fluency levels are not accounted for as students matriculate into an institution. Institutions do, however, maintain an undefined and often unexamined level of expected fluency for incoming students.

Further exploration must be done to better understand how the technological fluency expectations an institution maintains affects students’ acclimation and success at an institution. This study aims to explore how students navigate the technological landscape of an institution and what technological fluency expectations, if any, are placed upon students. Land grant institutions, such as that which served as the site for this study, prioritize access for their students, as they are often the stewards of higher education for the citizens of the state in which they are located (Rudolph, 1990). These thoughts led questions that serve as the foundation for the study: (a) How do students navigate the technological landscape of the institution? and (b) What do students perceive the institution expects regarding students’ technological fluency?

Significance of the Study

Faculty and staff of institutions of higher education may fail to acknowledge the gaps in technological access and, consequently, fluency or familiarity with
technology inherent among a diverse student body. Schlossberg (1989, p. 5) claims, “One of the deepest concerns in higher education is to find ways to more fully involve students in learning.” For many institutions, this includes utilizing educational technologies to enhance and encourage interaction outside the classroom. Student technology needs, however, do not always enter the preliminary conversation, as access to and fluency in technology may be assumed of students in academia. McCoy (2010, pp. 1614-1615) explains, “Educators may assume that all college students in the 18-25 age range are technology savvy; this may not be the case,” citing “societal factors such as decreased economic status, quality of secondary education, [and] family composition” as contributing aspects of differences in technology fluency and self-efficacy.

Classroom assignments in disciplines across the university require high-speed Internet access and what many would consider baseline knowledge of computer technologies. Faculty may assign coursework which requires computer technologies without the consideration of technology access and its correlation with socio-economic class; research on faculty perceptions of students’ technological fluency and access is lacking. Students attending institutions of higher education are embarking on a privilege—pursuing education beyond federal and state mandates. The reality is, though, that many of these students understand higher education as a vehicle for economic and social mobility and, therefore, consider higher education mandatory to achieve and/or maintain a particular standard of living.
With that understanding comes an expectation of acquiring the skills necessary to be a competitive graduate in the job market, including information literacy and technological fluency. Heinrichs and Lim (2010) report that employers overall find recent graduates lacking in their competency with information literacy and Microsoft Office applications necessary for their line of work. While students expressed a desire to pursue coursework that enhanced their competencies, many did not do so while in undergraduate study, either by choice or by design of the established undergraduate programs. Without courses to lead students through technological exploration to a point of fluency, students are unable to acquire the technological skills in which they may be deficient, making them less competitive in the job market than those with frequent access to technology.

There exists a need for academic and student support services in institutions of higher education to explore ways in which to address the technological gap for students. Institutions offer myriad resources for students, from writing and math centers to language labs. Though institutions often maintain computer labs, these do not always feature instructional components such as tutors or workshops. The assumption that students matriculate with a level of technological fluency reinforces the lack of student support services regarding development of technological fluency and increased access to technology. Institutions of higher education, particularly land-grant institutions designated to serve the citizens of the state, must understand students’ technological fluency levels and degree of comfort with technology in order to better serve them in their pursuit of higher education.
Overview of Methodology

In order to understand the larger needs and perspectives of students while attaining an in-depth look at specific student experiences, this research employs a mixed-methods study. It is a concurrent mixed-methods model; responses to the quantitative questions informed the qualitative interview questions.

I recruited participants through various e-mail list-servs at the institution serving as the site of this study. In order to cull a diverse participant body, I contacted head advisors for each of the institution’s undergraduate academic colleges and requested a solicitation be sent through each college’s mailing list. Additionally, I cross-recruited through academic support unit list-servs. The solicitation then directed interested participants to an institution-hosted website with a quantitative survey consisting of 16 questions of various formats.

Upon completion of the survey, participants self-selected whether to be considered for the qualitative interview portion of the study. From those interested, I contacted the first three people in each identified level of fluency prior to starting college. The final qualitative sample consisted of four participants, all of whom partook in an ethnographic interview about their experiences with technology in higher education.

Delimitations of the Study

The study is representative of only a portion of students at the study site. Because of the recruitment method, those students for whom technology poses a great barrier were unable to take part. The recruitment method relied upon students’ access
to Internet technology and familiarity with navigating the Internet. This recruiting method also assumed a point of access for roughly 15-20 minutes without Internet interruption. The survey site required updated web browsers and appropriate plug-ins to ensure the survey progressed from screen to screen. Those without updated computer systems may have been unable to take part in the survey because of this.

The study is representative of only the study site, a large, land-grant university located in the Northwest United States. While international and out-of-state students attend the college, a majority of students are residents of the state in which the site is located. Because of this, there may be a less diverse participant population in terms of racial and ethnic background should the survey population be reflective of the population of the state. Some of the questions referenced technologies and/or offices specific to the institution; those unfamiliar with the mentioned offices and technologies may not have participated because of lack of this knowledge.

**Definitions of Key Terms**

This study utilizes terminology to refer to the scope of topics related to digital use in higher education. This list of terms is used throughout the thesis and the definitions that follow are intended to provide a common language to help understand aspects of the study.


Digital immigrant: a person born before the digital world who has come to adopt digital technology at a later point in life (Prensky, 2001).
Fluency: a “native” understanding of the language around digital technology use (Prensky, 2001).

Fluent: those individuals immersed in the language of digital technology; little thought paid to a world without technology (Frand, as referenced in Bennet, Maton, & Kervin, 2008). In regards to the survey in this study, fluent was defined as someone who could easily navigate and who felt very familiar with the educational technology required of their time at the study site.

Proficient: those individuals who may lack the most up-to-date technology but continue to engage with technology on a regular basis. These individuals may have reservations about how to use particular technologies, but will ask when they need help. This definition comes from evaluating Zur and Zur’s (2011) categories of reluctant adopters and minimalists. In the study survey, proficient was described as someone who felt somewhat familiar with the educational technology and encountered some problems with navigation.

Developing: those individuals who do not feel an affinity towards technology and default to non-digital sources for information (Zur & Zur, 2011). In the study survey, developing was described as someone who felt uncomfortable with educational technology, encountered difficulties with navigation, and who had little access to web technology.

Access: this refers to the degree of frequency with which one is able to use technologies when and where one can and desires to (Hargittai, 2003).
Organization of Thesis

This document is organized into five parts, beginning with the introduction in Chapter I. Chapter II contains a review of literature pertinent to the investigation of digital use in higher education. In it I examine the evolution of technology use, the differences in technology use and comfort among various identity groups, the change in college student demographics over time, the focus on technology in education, an examination of the digital work force and theoretical frameworks for the study. Chapter III outlines the research design, including the research questions, method for data collection and analysis, and the limitations of the study. Chapter IV presents the results of the study with an identification of key themes that arose through the analysis of the data. Finally, Chapter V summarizes the data from the study and discusses conclusions based on the data collected. The final chapter also includes possibilities for future research in this research area.
Chapter II: Review of Literature

Technology use has evolved throughout the last two decades. It has rapidly increased on a national and global scale. In many households in the United States it is not uncommon to see at least one, if not multiple technological devices accessing information through the Internet at a rapid pace. One might even venture to say that in technologically-advanced countries, one’s relevance to society is dependent upon one’s interaction with and participation in the digital world. When considering the resources an institution of higher education has to offer, computer technology resources often come into conversation first; an institution of higher education is expected to have and use ample technological resources. Inconsistencies exist, however, which, in turn, affect the readiness of students for the workforce.

Literature in the past decade illuminates the perceived need for technological advancement and digital citizenship of those living in digitally-developed countries (Prensky, 2009; Tapscott, 2009). In addition, scholarly research indicates a stark division between those who feel comfortable in or transitioning to the digital world and those who face barriers to doing so (Harding, 2010). As a means to provide a context for this study regarding students’ experiences navigating technology in a post-secondary setting, literature regarding the growing use and subsequent divide among United States’ college students was compiled. The literature review centers primarily around (a) a look at the evolution of technology use, (b) differences in technology use and comfort among various populations, (c) changing demographics of U.S. college students, (d) the focus of technology in education, (e) students entering a technological
workforce, and (f) foundational theories to exploring technology’s place and purpose in post-secondary education. The cumulative review of literature is intended to provide a context and better understanding of the current research about students’ experiences with technology for educational purposes and provide reasoning for the study on students’ navigation of the technological landscape of an institution.

Evolving Technology Use

In the past two decades, computer technology spread from being an insularly used technology in data information companies and governmental agencies to daily use by the general population of the United States and numerous other countries. It has become pervasive in U.S. society as more people have gained access to computer technology and Internet resources.

The United States Census began tracking home computer use data in 1997. In 1997, 37% of all households owned a home computer and 22% of all households had Internet access (United States Census Bureau, 1999). While the Census Bureau did not ask a question about computer ownership in the 2009 Census, it posed a question regarding home Internet access. In 2009, 69% of all households reported home Internet access, a jump of 51% over the course of twelve years. As of the 2009 Census, the total percentage of households with broadband Internet access was 64% while those with dial-up or other totaled 5% (United States Census Bureau, 2010). Though technology use increased significantly over the past two decades, the U.S. Department of Commerce’s 2010 joint report with the U.S. Census Bureau, Exploring the digital nation: Home broadband Internet adoption in the United States, notes that
roughly a quarter (23%) of all American households did not have any Internet users in 2009, with an additional 8% who use Internet, but do not do so at home (p. 6).

Though the numbers of home computer ownership and home, high-speed Internet access have risen dramatically in the course of twelve years, the quarter of the population that does not have regular connectivity at home bears further consideration. What cannot be parsed out from the Census data is: (a) Where are those without Internet at home accessing this resource?, (b) For what purpose are people using the Internet?, (c) Do the 23% of those who do not use the Internet have access to other computer technologies?, (d) What is the data on students and Internet access/computer ownership? These questions require further investigation to better understand the patterns of division and stratification among those living both in and outside the increasingly digital world.

Differences in Technology Use and Comfort

In 2001, Marc Prensky, a well-known video game developer and technology in education advocate, coined the terms “digital native” and “digital immigrant” to explain the differences in familiarity and use of technology among generations of people. He establishes digital natives as those who grew up speaking the language of digital devices and programs. Alternatively, digital immigrants are “those…who were not born in the digital world but have, at some later point in [their] lives, become fascinated by and adopted many or most aspects of the new technology” (Prensky, 2001, p. 6). Prensky’s classification of these two types of digital users became widely accepted in discussions around education and technology use.
The binary classification, however, does not account for the level of comfort or enthusiasm digital users harbor. Zur and Zur (2011) elaborate on this, identifying three groups of digital immigrants and three groups of digital natives. Among those digital natives, Zur and Zur note there are avoiders, reluctant adopters, and enthusiastic adopters. Avoiders are those who may not have a need for digital access or do not see it as relevant to their daily lives. Avoiders may communicate only via telecommunications and will most likely turn to print sources for information. Reluctant adopters tend to have an e-mail address, perhaps even a Facebook account, and use digital technology on a limited basis. Reluctant adopters see the movement to a digital society as an inevitable occurrence and, therefore, are using digital technology and communication on a survival or need-to-know basis. Enthusiastic adopters support the move to a digital world. These users actively participate in the digital world, using digital communication as one, if not the primary way they interact with others. Additionally, enthusiastic adopters may be active contributors to the digital world, developing digital content for others’ use. These users may be just as, if not more fluent than their younger digital native counterparts (Zur & Zur, 2011).

Among digital natives, those who are digital avoiders are those born within the iGeneration or Y Generation (those born after 1980) who do not have regular access to technology and/or have no affinity for it (Jones & Czerniewicz, 2010). Zur and Zur (2011, ¶ 2) note, “While most digital natives are tech-savvy by virtue of their being born around technology, others do not have a knack for technology and computers, or even an interest or inclination to learn more.” Digital avoiders would be an example
of the aforementioned group. Another subset of the digital native category are minimalists. These users only use technology when necessary and, like reluctant adopters, seek information from venues other than technology. Lastly, enthusiastic participants are those digital natives that “speak and breathe the language of computers,” actively participating with the digital world multiple times each day, contributing and communicating to the digital conversation in myriad ways (Zur & Zur). Though these classifications denote the affinity one has to technology, they do not account, necessarily, for the socio-economic differences that correlate with technology use.

In time, educational scholars saw Prensky’s binary classification as limiting to those who do not fit neatly into either classification due to differences in social capital. The binary classification was too vague in explaining the factors that contribute to differences in technology access, use, and consequent fluency. Hargittai (2003) explored the contributing factors to fluency, identifying four main elements to what she identifies as “full social access” with technology:

- Financial access, which indicates whether users (individual or whole communities) can afford connectivity;
- Cognitive access, which considers whether people are trained to use the medium and to find and evaluate the type of information for which they are looking;
- Production of content access, which looks at whether there is enough material available that suits users’ needs; and
- Political access, which takes into account whether users have access to the institutions that regulate the technologies they are using. (p. 5)

In Hargittai’s model, users are no longer evaluated for their ability to use the equipment; here, the sociological components that affect one’s access are evaluated as a part of one’s whole level of technological fluency. She elaborates by looking at
other measures of one’s technological use and consequent fluency. These other measures are:

1. Technical means (quality of the equipment)
2. autonomy of use (location of access, freedom to use the medium for one’s preferred activities)
3. social support networks (availability of others to whom one can turn for assistance with use, size of networks to encourage use)
4. experience (number of years using the technology, types of use patterns). (p. 5)

Hargittai notes that these measures and the elements of social access amount to what one might deem “skill.” In identifying these elements and measures of use, Hargittai creates a spectrum for understanding the variation in users’ degree of use and degree of fluency with technology. She does so, noting that viewing “who is a user and who is not” is not a reliable way of evaluating the gap in digital equality.

Hargittai’s (2003) factors for evaluating different levels of technological fluency and skill bear important consideration when examining disparities in technological skill level across social-group differences. A primary factor for differences in technological skill levels is socio-economic class. The stratifications in socio-economic class play a major role in the degree to which one develops and maintains a level of technological fluency. While Prensky (2001) examined a digital divide due mostly in part to age, more recent research points to a divide as a consequence of social and economic capital. Jones, Johnson-Yale, Millermaier, and Perez (2009, p. 245) note that, in reality, the digital divide concerns “differences in access to information and communication technologies.” They elaborate that this
divide creates a “‘social stratification’ between technological ‘haves’ and ‘have-nots,’” an issue that they, among other researchers, believe points directly to individual economic prosperity (p. 246).

The 2010 U.S. Department of Commerce report, *Exploring the digital nation: Home broadband Internet adoption in the United States*, shows the stratification of Internet access by socio-economic class. Of those households with an income of less than $25,000, 36% have broadband Internet access. The percentage of households with an income of $25,000-$50,000 that have home broadband is 61%, almost a 50% increase from the lowest socio-economic classification. Ninety-four percent of those households with an annual income of over $100,000 have broadband access. This Census data and Current Population Survey (CPS) Internet Use Supplement (United States Census Bureau, 2010) shows that which Hargittai notes in her research on the effect of socio-economic status on use and skill with technology.

Another contributing factor to differences in access to Internet and, consequently, development of technological skill and fluency is geographic location. The Census data differentiates between urban (metropolitan) and rural (nonmetropolitan) geographic areas, considering suburban areas as part of the urban category (U.S. Department of Commerce, 2010). The percent of urban households with broadband access is 66%, 15% greater than those in rural areas (51%). This, as Crawford (2011) notes, may be due in part to limited service in rural areas. Crawford comments on this disparity, noting that broadband, or high-speed, access is “a
superhighway,” and “rural Americans must make do with a bike path,” referring to dial-up access or 3G access through a mobile device like a smartphone (¶ 6).

Living in an urban area, however, does not necessarily mean high-speed Internet in the household. Farrell (2005, ¶ 6) notes, “Computer hardware has gone down in price, but high-speed Internet connections can be prohibitively expensive for poor and working-class families, especially in urban areas.” Of those urban households that make less than $25,000, only 38% have high-speed Internet access compared to 95% of those urban households with an annual income of over $100,000. Though the services are available, they are not necessarily affordable.

Race plays a dividing factor in Internet access and potential technological skill development. Overall, White-identified households had the greatest amount of broadband access. According to the study, 68% of all White-identified households had broadband access, as compared to 49% of Black-identified households, 48% of Hispanic-identified households, and 48% of Native American/Alaskan Native-identified households (U.S. Department of Commerce, 2010, p. 9). Even as income for racial minorities rises, the percentage of those with high-speed Internet access still falls behind the rate of White households. Within the lowest socio-economic category for household income ($25,000 or less), 27% of Hispanic-identified households have broadband access, compared to 33% of Black-identified households and 43% of White-identified households. The gap closes as income levels rise, with 89% of Hispanic-identified households in the $75,000 or more category possessing broadband
in comparison to 88% of Black-identified households and 93% of White-identified households of the same income bracket.

Educational background also plays a role in one’s access to broadband, as it may also point to differences in household income. Of those households with a college degree or more, 86% of urban and 75% of rural households have high-speed Internet access as compared to 31% of urban and 22% of rural households with less than a high school degree. Again, racial stratification appears, showing White-identified households at all educational levels as having a larger percentage of at-home broadband access as compared to their racial minority counterpart households.

Eglash (2002) speaks to the significance of these disparities evident in the data. He notes:

The digital divide is just the latest version of a long conversation about haves and have-nots. Whether we are talking about technology, health, education, or jobs, we can create problems if we talk only about absence -- that is, if we reduce one side to have-nots. At the same time, we must not ignore the social causes of such absence. (¶ 16)

As a means of addressing these disparities, in 1997 the U.S. Departments of Commerce and Education distributed grants to develop Community Technology Centers throughout the country (Carnevale, 2002; CTCNet, 2012). These grants, however, were challenged by legislation under the G.W. Bush administration, which threatened a $47.5m cut for Community Technology Centers (Carnevale, 2002). These centers, often in urban and rural areas with a higher concentration of low annual household income, serve as the source of technology education for thousands of Americans.
Disparities exist in America’s public schools as well. According to Hackbarth (2000) as cited by Kaminski, Seel, and Cullen (2003), most elementary school students are allowed less than an hour per week of access to informational technology. This forces students to gain technological skills at home, as opposed to school. This, however, is not possible for all students. Kaminski et. al. note that the National Assessment of Education Progress reported that only 41% of those eighth-grade students who receive free or reduced-lunch have home access to Internet as compared to 72% of those who did not receive lunch subsidies. A study done by Jones et. al. (2009) shows that White college students represented the highest percentage (56%) who began using Internet at home, as opposed to 44% of Black students and 43% of Hispanic students. Jones et. al. note this likely correlates with socioeconomic status. Data suggests an income differential for historically underrepresented ethnic group members in comparison to White-identified people.

Empirical data shows the differences in access to technology, particularly high-speed Internet, which serves the conduit to information access in the digital world. Crawford (2011, ¶ 2) notes, “As our jobs, entertainment, politics and even health care move online, millions are at risk of being left behind.” The disparities in access create a further stratification for many of those already facing barriers to educational and financial equality.

**Changing College Demographics**

The “typical college student” is no longer identifiable. As efforts to improve access to education have become more prevalent and a declining economic state in the
U.S. faces generations of citizens with wavering job security, enrollment numbers and demographics changed (Lerman & Schmidt, n.d.). The image of a student fresh from a suburban high school graduation and headed to college is antiquated. Today, most colleges and universities are seeing the most diverse student body in institutional history. Students of different races, ethnicities, socio-economic classes, ages, and previous educational experience bring unique perspectives and needs to the current world of higher education. Among those students are those who have had consistent access to information technology and those who have not, with a range of degrees of use and fluency among them. These diverse needs correlate with the diversity of experience these students bring to higher education.

The National Center for Educational Statistics (2012) tracked enrollment growth of all U.S. degree-granting post-secondary institutions between 1999-2009. Over the course of those ten years, the enrollment increased 38%, by roughly 5.5 million students with enrollment in public institutions increasing by 27%. The largest increase of the student population comes from those students age 25 or older, an increase the U.S. Department of Education anticipates will continue; during the years 2000-2009, the older-than-average college student enrollment rose by 43%. Many of these students will embark on full-time studies, potentially abandoning jobs for the pursuit of a degree or filling the void of a job once had. While the data does not divide age differences beyond the two age categories of 18-24 and 25 years or older, one may postulate that a significant number of the older-than-average students were
born prior to 1980, the year Prensky (2001) notes as the beginning of the digital native era.

Additionally, institutions of higher education have seen an increase in Students of Color. Overall, enrollment rates for Students of Color have risen slowly and steadily, from 28% of all Students of Color enrolled in degree-granting institutions in 2000 to 34.3% in 2009 (National Center for Education Statistics, 2011). Black and Hispanic student enrollment has increased by 3% over the 2000-2009 time period while Native American/Alaskan Native enrollment has stayed steady at 1%; White student enrollment has decreased by 6% over this time. The increase of Students of Color in institutions of higher education warrants the examination of the degree of access to information technology these students received prior to enrolling in post-secondary study. As indicated in the Census data from the previous section, regular access to information technology through home broadband access is less likely for these students, setting them at a disadvantage relative to their White peers.

These student demographics beg the question of where students learn to navigate information and educational technologies if they do not have prior experience. Digital immigrants and those who have not been afforded consistent access to these technologies enter postsecondary study at a different level than those who have had consistent access. National research found that students perceive technology, especially “anytime, everywhere access with Wi-Fi connectivity as critical to their academic success” (Dahlstrom, deBoor, Grunwald & Vockley, 2011, p. 14).
Do institutions help to bridge the gap between those students who may be considered the digital “haves” and the digital “have-nots” (Jones et. al., 2009, p. 246)?

**Focus on Technology in Education**

Postsecondary institutions largely rely upon information technologies to maintain the day-to-day operations of the institution. From initial applications for admission to financial aid applications to course management systems, today’s college students likely interact with information technologies on a daily basis for their course of study. Most institutions have eliminated paper applications for admission, moving solely to online admissions processes, creating a barrier to those prospective students without reliable access to Internet (Finnegan, Webb, & Morris, 2007). The use of information technologies at institutions of higher education is pervasive.

Course management systems are widely used by institutions throughout the United States. In Morgan’s (2003) study of the University of Wisconsin System (UWS), she identified common course management systems (CMS) used in higher education: Blackboard, Learning Space, WebCT, and eCollege, among others. These systems, Morgan noted, were used by over 80% of the faculty surveyed who taught in-person classes. Faculty who used a CMS did so for reasons of appealing to different learning styles, increasing communication with students, and posting lecture materials and supplemental materials for students. Morgan found that a majority of UWS faculty moved to a course management system to “solve a pedagogical problem or challenge,” seeing opportunity for student growth through the use of these technologies.
Not all faculty, however, found the CMS to be helpful. Those faculty who decreased their CMS use indicated they did so because of usage difficulties (10%) and the amount of time managing the system took. Additionally, some faculty members (16%) decreased their use because of student-reported challenges with the CMS. Morgan added that some faculty noted concern about the support of technology in higher education. Some faculty found that miscommunication by the administrators of these CMSs disrupted their individual course sites. The predominant use of CMSs by institutions of higher education comes with anticipated benefits and occasionally unanticipated drawbacks for both faculty and students. CMSs require Internet access and, depending on the amount of content on the site, a broadband connection for full utility.

The Educause Center for Applied Research (ECAR) (Dahlstrom, de Boor, Grunwald, & Vockley) 2011 National Study of Undergraduate Students and Information Technology elaborates on students’ experiences with CMSs. As CMSs represent a large portion of a students’ interaction with online technology for academic performance, ECAR asked students questions regarding the effectiveness of instruction using CMSs. While faculty in Morgan’s (2003) study note that CMSs allow for greater academic impact and communication with students, the ECAR (Dahlstrom, et. al., 2011) data challenges that notion. A third of all students surveyed noted that their skill development around using a CMS was not at the level they believed it should be. The study noted a direct correlation between students’ rating of an instructor’s effectiveness and the degree to which students perceived a benefit of
using technology in their academic experience; if a student felt the instructor integrated and explained the technology well, the student felt more at ease with using the CMS technology. The study (p. 5) found that less than 25% of students surveyed believed their instructor’s made “effective, frequent, or seamless use of technology.” Dahlstrom, et. al. (2011, p. 25) concluded, “there are opportunities to inspire student participation and interactivity with existing technology, but the technology by itself isn’t sufficient and doesn’t guarantee successful learning outcomes.”

In addition to CMSs, institutions of higher education are trending towards incorporating more hybrid courses to accommodate an influx in enrollment numbers while operating with limited physical space. The most recent national compilation of data regarding hybrid course implementation comes from a 2008 study of distance education during the academic year 2006-2007 at degree-granting postsecondary institutions (Parsad & Lewis, 2008). The study found 34% of all degree-granting postsecondary institutions offer hybrid/blended online classes; they projected this number would grow in the next few years. Hybrid courses are those that blend in-person and online activity for course delivery (Swenson & Evans, 2003). These courses use Internet-based technologies as the seminal technology for course delivery (Parsad & Lewis, 2008). In addition to issues of space, these courses aim to meet student demand for more flexible schedules, give educational access to students who may not have it otherwise, and increase enrollment. Moving to a hybrid, or entirely distance model, is seen by most institutions as a way to increase overall access.
The quality of these courses is largely affected by the instructor’s pedagogical design and student participation and input (Jackson & Helms, 2008). Jackson and Helms identified strengths of hybrid courses as: a students’ increased ability to interact with their instructor, increased processing time for questions and answers, learning from other students’ online comments, and the flexibility to complete assignments. As for weaknesses, Jackson and Helms identified: less student-to-instructor interaction, potential for miscommunication between student and instructor, a loss of learning for auditory learners, and a disconnect among students and their classmates.

If the purpose of these courses is to improve access to education, what does that mean for students with a low sense of technological self-efficacy? Jones et al. (2009, p. 250) note that a student’s “prior Internet experience” directly affects a student’s sense of Internet self-efficacy. For those students without consistent Internet access prior to attending college, their confidence levels are likely to be lower than those students who had Internet access for much of their lives. Dahlstrom, et. al (2011) found a significant number of students (32% overall) do not believe they have sufficient skills to meet their academic technological needs. These students indicated they would like more specialized instruction on how to use software used in their educational coursework.

Computer resources vary for students by institution and level of affluence. Chen (2009) noted that access to technology at an institution depends largely on the funding availability of the institution; those institutions with large endowments tend to
be private institutions, where affluence is more predominant than public peer institutions. Young (2002) suspected this notion as well, as minority-serving colleges experience a significant gap in technological resources when compared to elite institutions. Young interviewed Former U.S. Assistant Secretary of Commerce Larry Irving, who expressed the growing gap between college technological resources:

I have a real fear that the divide that exists on colleges could be exacerbated. You have major universities that are getting involved in the next-generation Internet, while you have tribal colleges, minority-serving institutions, [and] poor rural colleges that really aren't online and haven't figured out a way to elevate themselves into what the mainstream of our elite colleges are doing with regard to how to use technology for teaching, for learning, for connecting their faculty, and for a host of other purposes. (¶ 16)

Dahlstrom, et. al. (2011) found that mobile technologies, such as iPads and E-readers, are also more common among affluent students, facilitating mobile access to information. This finding reflects disparities in ownership and access by household, as reflected in the previously cited Census data.

Technology use among students varies greatly as a result of prior use/access and levels of comfort. Jones et. al. (2009) reports findings on students’ communication patterns with instructors. Hispanic students were the least likely to use the Internet for communication with instructors (63%) and assignment submission (58%). Hispanic students, in particular, seem most reluctant about using technology, which is likely due in part to a lack of prior access. Jones et. al., citing Slate’s 2002 study, note that students whose first language at home was English feel less anxiety about using the Internet for classes and feel a greater level of comfort than those students whose first language is not English. Irving (as cited in Young, 2002, ¶ 6)
said, “while [Internet usage] growth is fastest among low-income [people] and blacks and Hispanics, the gap is actually getting wider, because they started at a lower starting point.”

This provokes the question of what kind of expectations an institution has regarding a student’s technological capability or fluency. While no explicit research exists regarding institutional or faculty expectations of student technological skill, McCoy (2010, p. 1614) comments that educators frequently believe the “net generation” of students are “technologically savvy.” In order to gain insight into this belief, McCoy (p. 1614) studied undergraduate students perceptions of technological proficiency and self-efficacy, noting, “Even though technology is embedded into everyday life, there are some students who are more proficient in technology use than others. For some, the mastery of a new technological skill is quite an achievement.”

In Grant, Malloy, and Murphy’s study (2009), they found that students’ perceptions of fluency were incongruous with their actual fluency, examining Microsoft Office applications, specifically. They note (p. 154), “There may…be a discrepancy between what higher education and secondary education view as necessary computer application skills for students entering college.” They add that it is the responsibility of universities to adjust curricula to reflect students’ technological skill levels and areas needed for growth. Harding (2010) adds that recent surveys done by university researchers show that students use of technology is often for ordinary functions, and their information inquiry skills are lacking. Harding warns:

It is misguided to adopt classroom techniques simply because ‘digital natives’ find comfort there. Rather when technologies are used to
accomplish specific educational goals, educators may find new teaching and learning successes that may not have been possible in the past. (¶)

Harding, among others, advocate for the effective use of technology to engage students in fostering skills that will help them succeed in their academic pursuits and life beyond graduation.

The focus on technology in higher education comes without established standards made clear to incoming students. Though the Association of College and Research Libraries (2000) developed information literacy competency standards for higher education, these standards rarely enter the classroom discussion or syllabus content. That, however, does not mean that students do not face an expectation of technological skill upon entering an institution of higher education.

**Entering a Technological Workforce**

With economic uncertainties prevalent in the United States, graduating college students look to their institutions to prepare them to be employable beyond graduation. College students are not the only stakeholders in that expectation. Grant, Malloy, and Murphy (2009, p. 144) note that employers expect the same: “Employers demand graduates who are prepared to leverage technology in a scalable fashion to advance the firms’ strategies and operations.” Institutions that assume students learn navigation of technology simply through trial and error are putting their students at a disadvantage during their tenure at college and life beyond graduation.

Institutions often assume access to Internet means understanding of its capabilities. Sonia Livingstone, a professor of social psychology at the London School of Economics, informed Internet researchers that only 33% of those who used
the Internet on a weekly basis learned how to judge web site reliability (Young, 2005). This critical skill is one students often miss, as a result of institutions taking students’ use of the Internet for knowledge and critical skill (Farrell, 2005). Jones et. al. (2009) support this notion, believing education regarding effective Internet use will boost confidence and, ultimately, self-efficacy of students whom had little prior access to information technology.

In addition to understanding and evaluating Internet resources, Heinrichs and Lim (2010) identify information literacy skills relevant to students’ pursuit of professional work after graduation. They identify five core skills for one to be considered technologically literate (p. 153): (a) basic computer skills, (b) advanced computer skills, (c) Internet, (d) research, and (e) presentation. After surveying employers recruiting recent college graduates, Heinrich and Lim saw that many hiring managers found applicants to be poorly prepared in the realm of technological skill. Students want to learn, too, according to Jackson and Owen’s (2002) survey of undergraduates. For those students who do not have these skills, some believe it is the duty of the institution to remediate students on the technology used for the coursework (Ratliff, 2009). Ratliff adds that many students feel proficient with technology, but do not feel as though they are suited for technology use in the academic setting, let alone the professional setting they face following graduation.

Prensky (2009), the originator of the terms “digital native” and “digital immigrant,” recommends a shift towards developing digital wisdom. He claims that the distinction between the two groups will become irrelevant as exposure to
technology increases and that the true testament to one’s prowess over digital technologies will be what one can do with these technologies. He explains digital wisdom as both the effective use of technology to access information and the use of technology to enhance our cognitive abilities. He believes this digital wisdom will be what determines one’s success in an increasingly digital world. Prensky (p. 2) believes those who do not have access to technology, regardless of how wise and critically sharp they may be, will be left out of information that is available “to even the least wise digitally enhanced human.”

While Prensky (2009) argues for a focus on developing digital wisdom, some researchers do not find the focus on changing curricula to meet the needs of digital natives to be founded. Bennet, Maton, and Kervin (2007) argue that empirical and theoretical research does not exist to uphold changing education for the digital world. They warn that doing so would further stratify those without access, making those who are economically disadvantaged because of institutionalized privilege stay in a position of disadvantage. Bennet et. al. ask the question about how one identifies what constitutes adeptness and how, exactly, one would measure it.

These debates surrounding information literacy as part of the college curriculum continue. As students face a declining job market, tangible computer skills appear as a way to make one marketable or more likely to be employed. Questions abound regarding whose responsibility it is to teach students these skills if not explicitly addressed in their coursework. Additionally, though prior access allows one to be familiar with these technologies, it does not guarantee a level of fluency
expected by future employers. Would technological education help to not only bridge the digital divide, but increase the “digital wisdom” Prensky (2009) believes is integral to one’s survival in a digital society?

Theoretical Framework

Two theories interact with understanding the challenges students, those with and without prior access to information technologies. Triandis and Triandis’ Theory of Social Distance (1960) speaks to the degree of alienation those from disadvantaged socio-economic classes and racial categories feel in the presence of a dominant in-group. In regards to technological access and comfort with technology, those with little prior access are expected to conform, or “[adopt] the values of the in-group,” which are those who are comfortable with technology use, most likely as a result of consistent access (Triandis & Triandis, 1960, p. 115). The last part of Triandis and Triandis’ Theory of Social Distance involves insecurity; in this case, those struggling to stay afloat in a fast-paced world of digital “haves,” or what we might consider the “in-group,” will undoubtedly feel a sense of insecurity as evidenced in the literature previously discussed. This informed the study’s questions surrounding how students navigate the technological landscape and what support they find at the institution to help them move to the “in-group.”

The other theory that provides a framework for this exploration is Nevitt Sanford’s (1969) Challenge and Support Theory. Sanford introduces the notion of psychological disequilibrium, where one’s prior understandings are challenged. This, he notes, creates a dissonance as indicated in Triandis & Triandis’ (1960) theory.
Sanford, however, believes this disequilibrium presents an opportunity for the student to grow if the proper support structure is in place. In the case with students with technological deficiencies, the disequilibrium they experience stems from being surrounded by an in-group of those with consistent access to and familiarity with information technology. With proper support, these students can begin to feel a sense of purpose and belonging with their in-group peers.

These two theories jointly informed the current study. These theories provided a theoretical background in the creation of the literature review, survey questions, and qualitative interview questions. Though the study did not intend to test the actual theories, the theories present evaluative factors for understanding students’ experiences navigating the technological landscape of an institution and their perceptions of an institution’s expectation for students’ technological fluency.

Summary

This chapter provides context for the study and chronicles the discussion regarding discrepancies around students’ technological fluency. The literature review considered the following topics: (a) the evolution of technology use, (b) differences in technology use and comfort, (c) changing demographics of U.S. college students, (d) the focus of technology in education, (e) students entering a technological workforce, and (f) the theoretical frameworks for this study: Triandis and Triandis’ Theory of Social Distance and Sanford’s Challenge and Support Theory. This literature review examined past research to better understand the complicated nature of the digital divide debate and how to address those technological disparities among college
students. That which is missing from the research is a comprehensive look at K-12 access to technology, state-by-state requirements of technological literacy development, and a comprehensive review of those institutions that offer technological support outside of curricular studies. This study intends to add to this body of research by examining the perceptions students have regarding an institution’s expectation of technological fluency and how students find and navigate an institution’s technological landscape.
Chapter III: Research Methodology

I conducted this study to understand the collective and individual experiences students have with educational technology during their university experience. The study explores the ways in which students learned how to use technology expected for course work and their perceived development of technological fluency upon entering the university. This mixed-method study, which generated data via electronic survey and qualitative, one-on-one interviews, was informed by previous studies regarding perceived levels of technological fluency.

This chapter explains the research methods employed during this study, explaining nuances and details of the various elements of the study such as (a) research questions, (b) research design, (c) study site, (d) participants and sampling, (e) data collection, (f) data analysis, and (g) limitations of the study.

Research Questions

The foundation for this research stems from one main question: (a) How do students navigate the technological landscape of an institution? Additional supplementary questions included: (a) How does one’s prior experience and fluency with technology affect initial university study? (b) What expectations do students perceive an institution has regarding their technological fluency? (c) What challenges do students encounter with technology used for university pursuits? and (d) What support does an institution provide to help students overcome technology challenges? Due to a gap in research regarding institutional and faculty expectations of students’ technological fluency, these ancillary questions drew upon existing literature
regarding the digital divide and institutions’ uses of technology. These topical areas informed the literature review in order to provide a more comprehensive examination of the student perceptions and experiences of technological fluency needs at an institution of higher education.

**Research Design**

This study operates through an anticipatory/participatory lens. I became interested in the topic upon seeing students struggle at different points in their college careers due to limitations with technological fluency. It became evident then that there are students who do not feel as empowered as their technologically savvy peers in the higher education setting. As such, I observed this research as a possible area to raise awareness. Structuring this study through an anticipatory/participatory lens, rooted in critical theory, allowed for research focused on bringing about change (Creswell, 2007). By employing this approach to the research, the study unpacks presumed fluency disparities that arise between students, particularly those of different generations and exposure levels to technology. I postulated students with a perceived high level of fluency would not see a need for change and those who felt limited in “self-development and self-determination” within the technology-heavy structure of higher education would find some degree of emancipation in sharing their individual contexts (Creswell, 2007, p. 22). I approached this research with a lens of critical theory, aiming to counter potentially hegemonic notions of students arriving at an institution of higher education with technological aptitude (Bronner, 2011). Embarking on this research provided an opportunity to explore and present the voices
of those who find themselves situated in “the culture of modern life” (Bronner, 2011, p. 4). I am primarily focused on the ways in which students with low perceptions of technological fluency perceive the landscape of higher education and how they seek assistance when a problem with technology arises. While I hope to show some generalizations, I understand that implicit within the participatory/anticipatory paradigm is the retention of individual experiences within a system. Within this system, individual experiences vary according to numerous factors including, but not limited to: receipt of support services, major choice, and social connectedness.

The purpose of this study was to examine the student experience in a technology-rich and technology-dependent environment. Due to the anticipatory nature and critical theory rooted inquiry in this study, it is best supported by a concurrent transformative mixed methods design. The study sought to understand both the individual and collective experiences of students’ through exploring their perceptions of personal and institution-imposed expectations of technological fluency for participation in higher education. In doing a mixed-methods study, collection of individual narratives and collective thoughts were possible through qualitative interviews for the former and random quantitative survey for the latter (Creswell, 2009). To elucidate the significance of this study, it is important to note that previous studies on students’ perceptions of technological fluency issues draw conclusions from strictly quantitative data, allowing only for generalizable data indicative of the collective of the sample body.
Study Site

The site at which this study took place is a large, public land-grant institution in the Pacific Northwest. The study site will be referred to as State University (SU) from this point forward in the study for the sake of retaining confidentiality of participants and the study site. This site is designated a Carnegie I Research University, a ranking indicating top national research activity, according to The Carnegie Foundation for the Advancement of Teaching (2010). Because of this ranking and its land-grant designation, SU was selected with the intent to procure a significant sample size of diverse experiences among students at the institution. In choosing a land-grant institution, inquiry regarding access became more relevant to the study. The student population at SU would offer a wide array of perspectives based on the institution’s mission on providing access to its students and serving as the final institution for several community college feeder schools.

Participants and Sampling

The participant pool was composed of predominantly undergraduates and few graduate students studying a variety of disciplines at a public, research institution. As publications regarding the digital divide among students and the influx of non-traditional aged students into university study become more prevalent, this study sought to draw a range of participants involved in university study to illuminate the experiences these students have in a technology-focused setting. For example, at SU students are unable to apply for admission without Internet access. This study, informed significantly by Hargittai’s (2003) exploration of the social and
technological access spectrum, allows the opportunity to give voice to students in the process of becoming what they perceive as technologically fluent, giving insight to issues for further exploration at SU.

The 216 participants for the quantitative portion of the study were recruited from the student population of SU. To solicit participation, I contacted the organization of academic advising chairpersons for each academic department and requested an e-mail soliciting participation to be sent out to their respective college’s e-mail list-serv. Additionally, I contacted an organization of academic support services chairpersons and asked the same of those in that organization. Reaching out to these organizations allowed the widest-reaching sample possible at the institution that fell within the researcher’s resources. A link to a survey hosted on the SU’s survey website was sent in the e-mail. Upon clicking, a participant was led to a screen explaining the study and limitations of participation (Appendix A). Within the survey (Appendix B), participants maintained the ability to decline answering any of the questions. Additionally, a final question at the end of the survey solicited participation in a qualitative interview if interested and selected based on an established criterion.

After random sampling collected generalizable data, I employed purposeful sampling for the qualitative portion of the study to better “understand the central phenomenon” of the study (Creswell, 2007, p. 204). By doing so, the qualitative interview sample would illuminate the experiences of those perceiving varied personal fluency levels. Within those participants who volunteered to be part of the qualitative study, participants were identified for selection based on their variation among three
established fluency levels: developing, proficient, and fluent. From those categories, I selected the first two to respond in each level in; the size of the qualitative interview sample was due in part to limited time resources.

I contacted selected participants to confirm their interest and provide for them the Informed Consent Form (Appendix C) for their participation in the semi-structured interview. From this, participants had an opportunity to address and questions that arose prior to partaking in the interview and determined their interest in continuing participation with the study. Once participants confirmed continued interest, I arranged interview times and a confidential location in which to meet.

**Data Collection**

The quantitative data was collected via a survey site hosted by SU. This was done to ensure participants of the validity and confidentiality of the study and to minimize apprehension over commercial interest in the study. The survey site remained open for three months. In order to maintain confidentiality in the study, the e-mail validation option on the survey site was disabled.

Those who participated in the qualitative portion of the study participated in one-on-one interviews. These interviews were conducted in the institutions’ library study rooms, ensuring confidentiality and relative ease of access for participants. I stayed on the institution’s campus as it is “the site where participants experience the issue or problem under study” (Creswell, 2009, p. 175). This provided a logical connection for many participants, as questions regarding the institution’s resources referred to several of those available within the SU’s library. The one-on-one
interview mitigated peer influence that may have appeared in other types of qualitative data collection.

Prior to commencing the interview, participants received two copies of the Informed Consent Form (Appendix C); each signed one copy for the study’s records and kept one copy for their personal records. In the review of the Informed Consent Form, participants inspected the purpose of the study and were allowed time for questions before the interview began. Once the interview started, I followed a set of semi-structured interview questions (Appendix D) with room for elaboration and probing. Interviewees, prior to participating in the interview, were informed of their right to ask for clarification of any question and to refuse to answer any question. The interview questions were designed to extract participants’ personal reflection on challenges prior to, upon matriculating, and during their course of study at the institution. The audio-recorded interview was semi-structured, allowing room for participant questions, clarification, and elaboration. Student colleagues reviewed the interview questions for clarity.

I transcribed each one-one-one interview verbatim in order to retain the true narrative of each participant. This was done after all interviews were conducted. After collecting data from the one-on-one interviews, I coded the data sets by theme. Due to the relatively low-risk of the study and limited time resources, I did not perform member checking. At the interviews, I asked participants if they would be interested in receiving a transcript of the interview; all replied no.
Data Analysis

Quantitative and qualitative data were analyzed independently and then compared to facilitate a more comprehensive view of the inquiry in the study. Quantitative data was coded by independent variables established on the survey site, such as: class standing, gender, first-generation status, computer ownership, high-speed Internet access, age, and time lapsed between high school graduation and matriculation to higher education. This parsing of information was done to explore and analyze the differences in experiences based on the aforementioned factors. With each piece of quantitative data, I picked key ideas each question explored. After analyzing the data, I identified percentages relevant to the key ideas and noted those on a separate document.

To code qualitative data, I reviewed the interview transcripts, searching for common themes and terms discussed in every interaction. With the qualitative interviews, I created short-hand codes based on the common terminology of both the questions posed and the answers given. These short-hand codes were compared with those codes used for the quantitative data analysis, ensuring alignment in the data analysis. The alignment of these codes provided the foundation for the five themes that became evident in the data.

Due to the two data sources, the study data will be presented with the quantitative data and qualitative data occurring concurrently. The analysis first presents the quantitative data relevant to the theme, followed by an exploration of the
theme in the qualitative data in relation to each interview participant. Presenting the
data in this way provides a qualitative narrative to the quantitative data for each theme.

**Limitations of the Study**

**Electronic solicitation and response bias.**

Creswell (2009, p. 151) writes “if nonrespondents had responded, their responses would have substantially changed the overall results.” Because participants were solicited using electronic communication, it is possible that those participants whose perspectives may be most marginalized in the discussion over expectations of technological fluency were not represented. Additionally, soliciting participation through electronic sources may have been difficult for those who wanted to take part in the study due to issues of access, insecurity, and fear of information leaking. While this study explored perceptions around technological fluency, it operated from a required standpoint of enough familiarity with technology to learn of the survey through e-mail and pursue participation through web browsing and web form submission.

**Researcher presence.**

During the one-on-one interviews and informal field note collection, some participants may have felt limited in their responses due to perceived biases about the researcher. These possible perceived biases may have caused participants to manipulate or conform ideas to what they perceived the researcher wished to hear (Creswell, 2009). Additionally, soliciting one-on-one interview participation via e-mail may have caused apprehension for participants due to the semi-permanent record
inherent in e-mail communication. In regards to informal field notes, some participants may have felt unprepared to answer some of the questions but felt a pressure to do so because of the researcher’s presence.

**Personal investment.**

As the researcher who devised the study protocol, I did not enter the study with an objective stance. The study was born out of experience with students who did not feel they had the level of technological fluency necessary to feel successful in university study. Additionally, because the study operates through an anticipatory/participatory paradigm, it is clear that my beliefs impact the design of the study.

My interest centers on student success. Because I work with students from lesser-resourced high schools or personal lives and have seen the impact these circumstances had on academic confidence and success, I wished to study how students from across an institution, not just those like the students I see who are enrolled in academic support programs, perceived the technological landscape and expectations of an institution. I entered the study design with assumptions regarding the expectations placed upon students.

However, I understand the pursuit of inquiry. The survey questions were designed to allow students who feel supported and fluent with technology to give their input just as much as a student who does not. The interview questions and field notes questions were broad enough to allow myriad perspectives to find voice in the study.
I withheld my personal opinions on the subject when interviewing participants both formally and informally. When questioned about why I was interested in this topic, I resorted to the discussion in recent literature about a notion of a digital divide among students. I responded that it was something worth studying at a specific site, hence my inquiry into the experiences of students at SU. Participants were assured that their voices would be accurately represented and I intend on doing so to the best of my ability, recognizing that there is no objective truth in the study.
Chapter IV: Results from the Study

The intention behind this study was to better understand how students experience and navigate the technological landscape of an institution and the perceived expectations of technological fluency placed upon university students by their university instructors and assigned coursework. This chapter presents the results from the research study informed by research questions that correlate with the study’s intended exploration. These questions also address from where students learn to use the technologies needed for their success with university study and what resources students utilize to complete coursework. Lastly, the study explored disparities in perception of fluency level and student opinions on access provided by university resources to help augment technological fluency levels.

The study employed a mixed-method research design, operating through an anticipatory/participatory research lens. The study site was a large, public, land-grant institution in the Pacific Northwest noted for having a high level of research activity. The first part of the mixed-methods study involved an online survey drawing from a random sample. The second part of the study consisted of four one-on-one, semi-structured interviews involving participants who volunteered at the end of the online survey. Though the intended qualitative sample size was set at six—two participants from each of the three categories of fluency prior to attending the institution—four participants were able to meet during the time allotted for qualitative interviews. These participants spoke about their perceptions of technological expectations, use and availability of technology resources at SU, and technology challenges encountered
while involved in university study. As the study intended to identify patterns that may affect perceptions of fluency but not meant to serve as generalizations, the mixed-method design afforded space in the research questions.

This study centered on one main question: How do students experience the technological landscape of an institution? Supplementary questions included: (a) How does one’s prior experience and fluency with technology affect initial university study? (b) What expectations do students perceive the institution has regarding their technological fluency? (c) What challenges do students counter with technology used for university study? And (d) What student-perceived support does an institution provide to help students overcome technology challenges?

This chapter compiles the data collected from the 216 respondents from the online survey and the one-on-one semi-structured interviews with four participants. The quantitative data was collected via the study site’s online surveying tool. Quantitative data analysis consisted of running cross-tabulation queries on SPSS, a data-analysis program, using independent variables as the control variables. Qualitative data was collected through interviews of approximately fifteen to twenty-five minutes in length. Analysis of the qualitative data involved identifying thematic consistencies between the four interviews. From this identification process, in tandem with support from pieces of the quantitative data, five general themes arose: (a) differences in students’ perceived levels of technological fluency (b) institutional expectations of students’ technological fluency, (c) variance in institutional training on educational technologies, (d) importance of personal computer ownership and Internet
access, and (e) understanding individual technological needs. The quantitative and qualitative data gleaned through the study explain and inform these themes. Given the nature of the questions with relation to the quantitative and qualitative data, certain themes were more prevalent than others in the different data formats.

While this study is not intended to present concrete generalizations, this chapter is organized around these five themes, with data differences appearing due to participant background factors. These factors include: (a) age, (b) first-generation student status, and (c) class standing at the university. Interview participant responses are woven throughout each thematic section, as are quantitative data sets.

**Participants**

The quantitative data compiles the answers of 216 respondents, ranging from first-year students to graduate students. The qualitative survey consists of four participants, from varied academic experiences, who volunteered to partake in the qualitative study. The participants represent a range of experience, as some participants entered SU directly following high school graduation while others pursued study at other institutions or pursued professional work experience prior to matriculation at SU.
Figure 1. Participant Demographics by Age

Figure 2. Participant Demographics by First-Generation Status
Figures 1, 2, and 3 and Table 1 are provided as informational reference points. As mentioned previously, this study incorporates quantitative data as a means of recognizing patterns and draws upon qualitative data to provide a narrative to the
topics of discussion; these data are limited to the study site and the experiences of those who participated.

**Rube.**

Rube is a junior majoring in Engineering with a focus on Information Systems. He is a transfer student who attended a community college prior to study at SU. He is a non-traditional student: he is older-than-average and is the first in his family to attend college. He rated his fluency level prior to matriculation as proficient and his current fluency level as fluent.

**Shelly.**

Shelly is a 2nd-year graduate student majoring in Education. She was a non-traditional student in her undergraduate study and considered herself so for graduate study. Shelly attended SU for her undergraduate work as well and worked professionally for several years before entering SU as an undergraduate student. She rated her fluency level prior to matriculation as developing and her current fluency level as proficient.

**Alden.**

Alden is a first-year student majoring in Business. He is a traditionally-aged student, having entered SU three months after high school graduation. He is a first-generation student. Alden takes classes at both SU and a nearby community college, which will be referred to as NCC. He rated his fluency level prior to matriculation and currently as fluent.

**Andrew.**
Andrew is a senior majoring in Business. He is a non-traditional student: he transferred from a nearby community college (NCC), is older-than-average, and is the first in his family to attend college. He rated his fluency level prior to matriculation and currently as proficient.

**Exploration of Themes**

**Differences in students’ perceived levels of technological fluency.**

Students enter university study with wide-ranging levels of perceived technological fluency rooted in a variety of factors. The quantitative data indicated disparities in perceived fluency, dependent on factors like first-generation status, age, and time lapsed between high school graduation and university study. While the quantitative data did not include a question on whether or not one’s perceived fluency level prior to entering SU affected one’s success, the disparities in perceived fluency are relevant. Fifty-one percent of traditional students, in this case those who are not the first in their family to attend college, rated their level of fluency at the highest, fluent, whereas only 41% of first-generation students, those who are of the first-generation in their family to attend, rated themselves as fluent prior to matriculation. Additionally, 14% of first-generation students rated themselves at the lowest level, developing, as compared to only 4% of traditional students. In regards to time lapse between high school and university, 15% of those with ten or more years of time lapsed rated themselves at the developing level as compared to 4% of those matriculating directly after high school. Though the participant pool for those 40
years and older was small, it is important to note that 33% of all of those respondents rated themselves at a developing fluency level prior to matriculation.

While the quantitative survey did not explicitly question whether or not incoming fluency level played a role in academic success, the qualitative interviews explored this idea. Interview participants first answered: How would you describe your level of technological fluency upon entering the university, before commencing coursework? A follow-up question asked of the qualitative interview participants was: How do you feel that having the level of fluency you identified upon entering the institution affected your first few terms at SU?

Rube considered himself “quite an adept consumer-level computer user with hobby interests,” adding that he is “an amateur computer technician,” making him “one step above an avid consumer.” He noted he bought his first home computer in 2002 and used technology for a variety of personal reasons, such as online bill paying and personal research. Rube, a non-traditional student because of his age, transfer status, and first-generation status, said his interest in computers allowed him “to do roughly 90% of the things that [his] instructors wanted [him] to access.” He noted he felt comfortable using the technology because of his computer ownership and intended career path in information systems.

Shelly explained that she used computer technology for her profession prior to entering SU. She said, “I worked in an administrative role prior to, so I spent a lot of time working on Excel stuff and I think that my Excel skills are really pretty decent. I would say between intermediate and advanced.” In regards to her transition into SU,
she said it was an easy transition because of her prior exposure to software like the Microsoft Office suite, which she used daily for her profession. She noted that she did not have to learn any new programs at first, which made the transition easier.

Alden talked about not knowing the technicalities of a computer, but knowing how to use it. He stated, “I know a lot about the actual usage of a computer, but not a lot about the technological side of it.” He explained how knowing how to use the computer technologies “definitely helped.” His usage prior to matriculation to SU was mostly for social networking. He also noted prior scholastic experience with technology: “Obviously in high school we had computer classes. You had your mandatory Word, Excel, all those.” He had daily access to the Internet, which, he noted, helped him to feel comfortable with navigating websites and online technology.

Andrew noted he had daily access at his prior institution, NCC, because he worked there as well. He described his level of technological fluency when he first came to SU as “functioning illiterate,” adding that he thinks he is actually “intermediate to advanced intermediate.” Prior to university study, he used web technology primarily for social networking and some communication with team members. Upon thinking back to his “first few terms” at SU, Andrew said his fluency level “made [his] first few terms at [SU] more successful. So much of the coursework has to do with knowing how to be connected and knowing how to navigate.”

The prior experience and perceived levels of fluency the participants brought with them upon matriculation to SU ultimately influenced their perceptions of success in the first few terms. They noted that because of their prior exposure and familiarity
with technology, the college transition seemed easier. Shelley, who identified herself as developing in the survey and “between intermediate and advanced” in the interview elaborated more on the vacillating perception of fluency in the challenges she experienced, which shall be discussed in this chapter.

**Institutional expectations of students’ technological fluency.**

The quantitative data supporting this theme is minimal. Survey participants were not directly asked about whether or not they perceive an expectation. Rather, the survey asked participants if their academic major required coursework to be done via computer/Internet technology. 210 of 216 respondents said yes, that their coursework does require the use of technology. The qualitative interviews, however, served as a more in-depth look at this question, allowing this theme to arise.

Rube recalled his experiences in an introductory level class required of his major. He stated, “I felt that I was expected to be ready to go on these educational technologies here.” His experience in the introductory level class resulted in withdrawing from it twice, mainly because of technology issues. He explained:

> I don’t think we get enough notice of the requirements or time to [prepare for what is expected]. We’re expected to download something in 10 minutes and immediately start our first lab and it’s very inconvenient. My major complaint about technology here is in computing; it seems to be all over the place for the beginner and it’s difficult to assemble it into a functioning student package. That’s my experience. It's been difficult for me.

Rube, who indicated he felt comfortable and at ease with technology, realized the expectations of his technology usage changed upon commencing his coursework.
Shelly said yes, she felt there was an institutional expectation of students’ technological fluency. Her concern was surrounding access. She said:

I think that the institution has an expectation that everyone has access to technology. That being said, I don’t think that the institution considers that many students may not have access or their access or [that SU] considers the student’s ability [to use and navigate technology].

Though she indicated she owns her own computer and has consistent Internet access at her place of residence, Shelly recognized, through some of the students with whom she worked, that the institution assumes access to technology.

Alden noted that an expectation of navigation skills existed for students at SU. He began his first-year with taking only one class, a seminar directed at and restricted to first-year students, at SU; his other classes met at NCC. He recalled the first-year seminar instructor reviewing SU’s course management system (CMS): “The way [the instructor] taught it was kind of like students already had some knowledge of it and I had none. I had no idea what [CMS] even was. There was a bit [of an expectation].” He talked about the classes for which online coursework was used, such as a humanities course and a physical fitness course. He noted that one of his instructors who posted quizzes online would ask if anyone had any trouble after the quiz was due. Alden felt comfortable asking questions if he felt confused.

Andrew noted age difference as playing into the institutional expectations of fluency he perceived. He said, “I think the younger generation probably has a leg-up on me.” He said he “certainly” feels like there is an expectation of technological
fluency for students and postulated an expectation of employers that students graduate with a high level of fluency. He said:

> When you’re leaving [college], I think employers expect you to be very proficient in Microsoft Office. I’m not sure they even want your resume to point to that because it’s just an expectation that you are able to navigate that [program].

He noted that he needs to use the Microsoft Office suite “for almost every [assignment] that needs to be turned in.” Andrew also discussed access issues at SU’s library because of the closing of one of SU’s main computer labs: “With the increase in students on campus and the closing of the lab, there’s a crunch. …I don’t even bother looking for a computer unless I come in at 7am because it’s going to be pretty full.” He explained that as being part of the reason he uses his own personal computer for a majority of his coursework.

The interview participants echoed the quantitative figure of those who are required to use technology for their course of study. The narratives offered by the interview participants, however, elucidate the degree to which students perceive an institutional expectation of students’ level of technological fluency. Shelly and Andrew added that expectations of technological access play a significant role in overall expectations of fluency. Without the resources to develop fluency, the interview participants asked, how does one meet the perceived institutional expectation?

**Variance in institutional training on educational technologies.**

A check-all-that-apply question on the quantitative survey asked participants if and from where they received instruction regarding how to use educational
technologies they would need in their first term at SU. Because of the nature of the check-all-that-apply question, participants were able to select more than one answer, making parsing out data by independent variables less relevant. Therefore, the discussion of the quantitative data results around this question will look at the overall participant pool, rather than examine this theme by independent variable; percentages presented will not necessarily reflect those respondents who chose more than one answer. Additionally, an open-text response provided an optional area for participants to provide brief narrative regarding where and how they learned to use these technologies. A supplementary question followed this. For those who said, yes, they did receive instruction, the following question asked participants to indicate whether or not they found the instruction helpful.

The data corresponding to these questions showed a variety of ways students learn to navigate the technologies needed for their university coursework. The highest response rate corresponded to the answer, “No [I did not receive instruction]. I needed to learn and figured out [how to use/navigate the technology] and figured it out for myself.” Out of 216 participants, 89 (41%) chose this response. The open-field text responses elaborated more on this, with one participant stating, “I learned it on my own,” and five other participants entering in a similar narrative regarding learning it themselves. The second largest response rate corresponded to the answer, “Yes, I learned through a course I took.” Sixty-four out of 216 participants (30%) said they learned how to use these technologies through a formal course. In the open-text box, some elaborated that they briefly learned about the course management system (CMS)
their professor used, while others indicated their first-year seminar class provided directions for how to use both the CMS and the university-run student account management systems. Additionally, one participant noted that professors did not always use the same CMS, creating some navigation complications for that student.

The third largest response rate corresponded to the answer, “Yes, a friend helped me,” with 56 out of 216 participants (26%) choosing this response. The open-text narratives supported this, as three respondents noted that they learned how to use the technologies at a minimal level in class and developed a deeper understanding of these technologies through peer assistance. The answer that generated the lowest response rate was, “Yes, I learned at a workshop,” with 21 out of 216 (10%) choosing this answer. Out of those who indicated they received some sort of instruction, whether through a course, a workshop, a friend, or a university employee, 78% said that the instruction was, in fact, helpful.

The narratives provided in the four qualitative interviews reified this variance in where and how one learns to use the educational technologies necessary for university study at SU. Rube, having matriculated to SU from a community college, did not participate in a first-year seminar and found his first term at SU to be minimal. He noted that he received “brief instructions on how to go to [SU’s main CMS].” He echoed the comments of one of the quantitative responses, noting that he had an instructor that did not use the SU-sanctioned CMS, and “[he] found that inconvenient.” He added that he felt his instruction on how to use university resources
“was minimal.” Rube added that he believes this affected his performance in a class he has repeated thrice.

Shelly noted that most of her training occurred in one class and through her graduate teaching assistantship. I asked her if she received training upon entering the university and she responded, “No.” She elaborated that she received training through her assistantship of SU’s student management system as she was working with confidential student data as a part of her assistantship. “Other than that,” Shelly noted, “I think I did have one day of training in the library and that was through a Sociology class as an undergrad.” She noted that though she received this training, she could have benefited from additional training “because it was a little bit overwhelming.” She noted the navigation of the library’s website at SU “can be pretty daunting,” and feels she did not receive ample instruction on how to navigate the technologies used for each class.

Alden’s experience varied from Rube’s and Shelly’s. He received instruction in two settings—his first-year seminar class and at NCC in a computer applications class. Additionally, his major at SU features a class required of all students in which “half [of the course content] is a computer applications class.” Alden did note, however, that the navigation of SU’s CMS came in his first-year seminar class with an assumed basic knowledge of the system; he, however, did not know what the system was. Alden explained, though, that he asked questions and the instructors were receptive to explaining it. He said, “They always had an answer for me.”
Andrew commented briefly on his experience with learning educational technologies at SU. He said his training was minimal, noting there was no real training, “Other than perhaps an instructor [giving] you some tips on navigating [SU’s CMS] or something to that effect.” He said that there was some navigational instruction, but nothing that was “comprehensive.” He noted his comfort with technology made his time at SU easier and he did not see the instruction of these technologies as pressing for his experience.

Both the quantitative and qualitative data indicates a variety of experiences regarding how students learned, if at all, to navigate and use the technologies they would use in their coursework. For those students who had access to a class that offered an introduction to SU’s CMS and/or student management system, a majority found it helpful. Those students who did not elect to take a first-year seminar and those who transferred into SU may not have been exposed to navigational instruction of those systems. Additionally, participants like Rube indicated some of the more advanced technologies needed for class assignments were not thoroughly explained or taught. The disparities in training and instruction on how to navigate and effectively use the technologies needed for coursework affected some students more than others, and some respondents sought out support from peers over SU personnel.

**Importance of personal computer ownership and Internet access.**

The quantitative data showed a critical mass of the participants owned a computer and had access to high-speed Internet at their place of residence. Out of 216 participants, 214 own a personal computer. The participants answered a question
asking what kind, if any, Internet access they had at their place of residence; 204 have high-speed Internet access, four have dial-up or low-speed access, and 8 have no Internet access. The quantitative data showed the majority of those surveyed have high-speed Internet and a functioning computer in their possession. While this does not necessarily show the importance, it shows the frequency with which those attending a university have access to these technologies.

The qualitative interviews elaborated on the importance and convenience of owning one’s own computer and having access to Internet resources. Rube, when asked if he perceives an advantage for those who own their own computer with high-speed Internet access, said, “The amount of footwork for people who don’t have computers is phenomenal.” He recalled, when his laptop’s video card failed, having to “make a grievous amount of trips from my residence to the library to use the computing facilities.” He explained that he uses the Internet almost daily to “examine campus resources” that may serve him in his university pursuits.

When asked about the advantages she perceives those with at-home computer and Internet access have over those without it, Shelly responded, “Where can I start?” She explained that she finds it helpful to have her work laptop with her during meetings because she can easily take notes or look something up that can help the meeting progress. She commented, “just the access and the convenience. I think that people that have their own computer and have access to Internet all the time have the answers and can get the answers right away.” She explained that she does everything from track her grades to post on discussion boards for her classes, all of which are
done through SU’s CMS. She reiterated that not having access to Internet and computer technologies can hinder students’ performance and keep them from “the information they need right away.”

Though Alden talked about using SU’s technological resources often, frequently he resorts to his own computer and Internet, stating, “If the library’s full and you can’t get on a computer, what do you do?” He explained that “if you have your own computer, it’s on your time,” which makes saving and transporting documents and projects easier for busy students. He added, “You definitely have an advantage [owning your own computer] because you have more mobility and more options.” Alden elaborated on how one without access to those technologies may feel:

Now, most everything is online. You go to get a job, application’s online. Go do an assignment—oh, your grade’s online. Test is online. If you don’t know how to use that, you’re in the dark. Students who have that knowledge base have a huge advantage because we’re getting into a digital age, and everything is on the Internet, on a phone, on a computer. So if you don’t have that, you’re not as relevant.

Alden spoke about being unable to imagine having to rely on only SU’s resources to get his work done. Though he found those resources to be helpful, he did not think he could rely on them solely.

Andrew echoed the notion of convenience behind having one’s own computer and Internet access. He noted:

For myself, it makes it a lot easier to do my coursework when it fits into my life. Outside of work and family responsibilities, it’s much easier to log in and double-check what assignment is due tomorrow and banging it out an hour before bed. Whereas if I didn’t have my own computer and access, I would be pretty much strapped.
He explained he accesses SU’s website daily to look into new developments on the institution’s campus and find out about campus activities. Andrew noted access at home allowed him to prepare for the following day, not only in terms of academic work, but involvement as well.

A majority of those who participated in the study have personal access to a computer and Internet resources. These voices spoke to the convenience and degree of ease brought about by personal computer ownership. Participants noted the heavy use of SU’s computer resources as being a reason for wanting to own a personal computer and have Internet at their place of residence. The qualitative interviews elaborated on the advantages one whom owns a personal computer has over one whom does not possess a personal computer.

**Understanding individual technological needs.**

I derived this theme from select questions on the quantitative survey, followed by questions in the one-on-one interviews. The survey asked participants the following questions: (a) If you had difficulties understanding how to use a particular educational technology or program, do you feel like you would know where to go to learn more about it? (b) Do you think an on-campus center, similar to a writing center, focused on educational technology usage and orientation would be helpful to you? and (c) If you answered yes to the previous question about a technology center, please elaborate with comments in the field provided.

Out of all participants, 45% noted that they were certain they would know where to go for help with difficulties on educational technologies; 55% answered
“maybe” or “no.” Of those surveyed, 23% of all first-generation students responded no, that they would not know where to go to seek help. Additionally, over 50% (56%) of all those in majors that require technology for the major coursework display uncertainty (maybe or no) about where to seek additional help on educational technologies.

The age range with the highest percentage of certainty is the 30-39 category, with 59% of the respondents saying yes, they know where to seek help. 23% of all participants ages 18-21 responded that they would not know where to seek help. Those participants above the age of 40 were the least certain, with 44% of ages 40-49 and 67% of ages 50 and above responding that they would not know where to seek additional help. Time between high school and college also showed to be factor in this knowledge: those with less than a year lapsed between high school and college showed a 59% level of uncertainty (responses of maybe/no), the largest percentage of uncertainty among all categories of time lapsed between schoolings.

Some supporting and some conflicting data emerged in response to the question about whether or not a technology center would be helpful to participants. Out of all participants, 41% said that a technology center would be helpful. Those within the age range of 18-39 showed the least support, with over 50% responding no, a center would not be helpful. All those aged 50 and older and a majority of those aged 40-49 said yes, it would be helpful. First-generation students showed more support (47%) than traditional students (37%). Those with the least amount of time between high school and college said no (64%); this is the same group that displayed
the highest level of uncertainty about where to seek help. When looking at class standing, first-year students (42%) and seniors (43%) showed the most interest in a technology center. Both of the participants who do not own their own computer felt a technology center would be helpful.

The open field responses following the question about whether or not a technology center would be helpful elaborated on participants’ ideas around the utility of this type of resource. Several participants responded:

“Currently, I learn how to use particular education technology as I am required to use it, for a class. It would be very helpful to learn how to use it beforehand.” “If a center is created it would definitely help me with a couple programs I would like to be more proficient at doing.” “There are things I still am a little fuzzy on using (like Excel) and having help for that would probably be a good thing.” Respondents often noted the utility of a technology center for first-term students, including transfer students. One respondent wrote, “It might be useful for freshmen and transfers. I feel like upperclassmen wouldn’t use it as much unless they needed help with specific programs.” Another respondent commented, “I think an orientation to gain knowledge about the different technology on campus would be very useful, especially when you are just starting out at the university.” Non-traditional students and their advocates voiced their opinion on the usefulness of a technology center: “I think this would be helpful for all non-traditional students, including those students from socioeconomic backgrounds in which they may not have had access to educational technology.” “Technology-challenged students who came from backgrounds with little to no
familiarity with computers such as students from rural or older-than-average students would surely take advantage of this center.” “Since I am a non-traditional student I did not learn these things in high school like most other students did. I still struggle with some types of media.” In the midst of several supporting comments, one participant did not see a technology center as being a good use of university resources. The participant wrote, “I believe the resources currently exist and no new expenditures are necessary in a restrictive budgeting environment.” A majority of the comments spoke to the usefulness of a technology center should SU decide to open one.

The qualitative interviews probed participants about technological challenges they experienced while participating in coursework at SU. Rube’s first challenge was in his first math class at the institution: “My first math instructor had his own website and he did his own thing, which is different from [SU’s CMS] and I found that inconvenient.” He went on to describe about one of his computing classes by stating:

There are a variety of protocols that we have to download to our computers and then our program writing machine—we have to download that and then download this other file transfer protocol and then our coursework is on another separate website from the publisher and then there’s the instructor’s website. I hated it. All of these four different web access points were for one class and it was confusing.

Rube did note, however, that most of his technological challenges have been his “own personal equipment failures” and for those “[he] know[s] how to get help.” He noted his hobby interest in computing technologies as helping him to understand his personal machines better.
Shelley felt as though she still struggled with technological challenges related to her coursework and involvement after six years at SU. She stated, “I don’t think I’ve overcome these challenges. I’m still working with these challenges.” One challenge she noted was around navigational issues, on SU’s website and on Blackboard. Regarding the website, she said,

Sometimes it’s I don’t know how I even got to certain pages or sometimes I don’t know where to find certain things on [SU’s] website…I was searching for the diversity page a couple of months ago and it took me forever and a day to figure it out because it was just buried under all sorts of different links and stuff like that so sometimes it’s just luck.

Shelly also explained the navigational challenges she has experienced with the online course management system (CMS) with which SU has a contract. “[SU’s CMS] is not a site that I really like to go to. Because it’s just so unfriendly.” She explained that she uses it to double-check syllabi or to look for class notes. Shelly claimed, “Most of my professors don’t really use [SU’s CMS] to post my grades up.” She added that she has had to use the discussion section of the site for class requirements, saying, “Even the discussion threads initially were somewhat daunting in trying to figure out how to work them.” Shelly’s experiences speak to the navigational issues that arise for students on institution-sanctioned web technologies.

Alden did not have as many challenges with technology, due in part because he “know[s] a lot about the actual usage of a computer.” He noted he is aware of resources to access through SU and through NCC, where he did a majority of his first term coursework. He did, however, comment about Blackboard: “I know Blackboard—once you know how to use it, it’s really easy, it’s really nice. Learning
how to use it is a pain. It’s really hard to learn how to navigate everything.” He reiterated Shelly’s comments about navigational issues on the dominant system used for many courses at SU.

Andrew sought assistance from various resources on campus to help him with his technological challenges. He said that in his academic college, “they’ve always got somebody [in the computer lab] who’s able to help you with tech issues in the lab.” He explained a majority of his technological challenges have been with time management around assignments and the temptation of social media. He said:

   It’s so easy when you’re online and doing some coursework to say, ‘Oh, I’m gonna jump over here and see what my friends are up to.’ Next thing you know, an hour’s passed and you haven’t gotten any studying done.

Andrew noted that his experience at NCC helped him understand the Microsoft Office suite and all its functionality, making his transition into SU coursework more comfortable.

The narratives from the quantitative survey and qualitative interviews illuminate varied technological needs among students. The quantitative data illustrated concern for first-year (including transfer) students and non-traditional students learning to navigate a new institution’s chosen technologies and services. Additionally, it generated support for a technology resource center to support students in their technology needs. The qualitative interviews elaborated on the challenges students experienced while participating in coursework at SU. Those challenges largely involved navigational issues on web technologies used for coursework.
**Conclusion**

This research centered around the following question: How do students experience the technological landscape of an institution? The question provoked the following subsidiary questions: (a) How does one’s prior experience and perceived fluency with technology affect initial university study? (b) What expectations do students perceive the institution has regarding their technological fluency? (c) What challenges do students counter with technology used for university study? and (d) What support does an institution provide to help students overcome technology challenges? Through quantitative and qualitative data collection, five themes became apparent.

The chapter organized data collected through a mixed-methods design, composed of an online survey drawing from a random sample and four one-on-one, semi-structured interviews with participants who volunteered at the end of the quantitative survey. Both quantitative and qualitative data was organized by each theme: (a) differences in students’ perceived levels of technological fluency (b) institutional expectations of students’ technological fluency, (c) variance in institutional training on educational technologies, (d) importance of personal computer ownership and Internet access, and (e) understanding individual technological needs.

The results of this research explored the experiences and perceptions of the participants, students attending SU, a large, public, land-grant institution. While the research presents themes that may represent generalized student experiences, it reflects only those participants at SU. The results in this chapter are intended to provide those
at SU with a better understanding of students’ experience with technology and perceptions of technological expectations at SU. The following chapter will explore these results through the lens of previous written literature on students’ perceptions of technological fluency and expectations of technological instruction from an institution, in addition to identify the limitations to the study that emerged with the results.
Chapter V: Discussion and Conclusion

This final chapter reviews the purpose and intent of the study—exploring students’ navigation of an institution’s technological landscape and students’ perceptions of the institution’s expectations of students’ technological fluency. Through the use of a quantitative survey with 216 respondents and four qualitative interviews, five themes became evident in the study, exposing the varying perspectives of students’ interactions with technology in postsecondary study. This concluding chapter will examine those themes in relation to the previous literature providing context on students and technology and showing significant need for this study. The chapter will first present a summary of the study prior to addressing the themes identified in the previous chapter. Following this, the chapter will discuss the study’s findings within the context of the theoretical frameworks, Triandis and Triandis’ (1960) Theory of Social Distance and Sanford’s (1969) Theory of Challenge and Support, in addition to the research questions posed in the study itself. Finally, the chapter will address the limitations of the study and opportunities for additional research.

Summary of Study

This study intended to reveal student experiences navigating the technological landscape of an institution. Operating largely under an anticipatory/participatory lens, the study was born out of a desire to effect change for those students who did not feel empowered by the institution’s use of technology to facilitate and deliver instruction. The data collection produced five themes which addressed the research questions: (a)
differences in students’ perceived levels of technological fluency (b) institutional expectations of students’ technological fluency, (c) variance in institutional training on educational technologies, (d) importance of personal computer ownership and Internet access, and (e) understanding individual technological needs.

**Discussion of Study Results**

As a complement to the literature about the digital divide and the focus on technology in education, the results of this study proffer a more profound understanding of students’ experiences navigating an institution’s technological landscape and students’ perceptions of an institution’s expectations of student technological fluency. Prior research centered largely on the evolution of technology use in schools without looking at student perceptions of and navigational experiences with educational technologies. Select past research debated an existence of a digital divide among some socio-economic groups. The results presented in Chapter IV provide both quantitative data of over 200 university students and individual narratives that elaborate and reify the themes presented. This segment will revisit the themes and offer a general discussion relevant to the literature.

**Differences exist in students’ levels of technological fluency.**

The degree to which students felt comfortable using and navigating educational technology varied by independent variables. Those students who demonstrated the highest level of comfort were those who had prior family members attend college. Of these students, 51% rated themselves as fluent at educational technologies, 10% higher than those students considered first-generation, or from the
first generation in their family to attend college. Additionally, students who entered university directly after high school graduation indicated a higher level of fluency than those with a significant (10+ years) time lapse between high school graduation and matriculation at SU.

Where this data became more magnified was in the qualitative interviews. Interview participants, on the whole, indicated that the degree of their fluency directly impacted their academic success in the first few terms at SU. Rube and Andrew perceived that their more advanced technological knowledge helped them to perform well academically in their first few terms. Shelly and Alden explained that although both were somewhat unsure of some of the technologies, their prior access helped them to feel more successful in using the technology needed for their coursework.

Prior research data supports this data to some extent. In their study about Internet self-efficacy, Eastin and LaRose (2000) found a positive correlation between participants’ prior access to the Internet and the degree of their self-efficacy with Internet technologies. They found that as participants gained more experience with Internet technologies, their degree of comfort rose and levels of technology-induced stress declined. McCoy (2010) echoed these notions a decade later, finding that those with home access scored higher in technology proficiency than those who relied on computer access in school or another location. Jones, Johnson-Yale, Millermaier, and Perez (2009) elaborated on this study, finding that students with increased access to computer technologies at home felt more adept at using Internet technologies overall.
Asking two questions that addressed degree of prior access to digital and Internet technologies and socio-economic background could have better explained differences in students’ perceived levels of fluency. Hargittai’s (2003) model of differential use vs. differential access examines the inequities to technological access based on financial, cognitive, and political access, three areas which may be affected by socio-economic status. Additionally, a question on the degree of prior access would also be supported by the Eastin and LaRose (2000) examination of self-efficacy. Asking these two questions in this study would have helped to better understand how disparities in access affect levels of perceived fluency.

Through this data collection, it became clear that students enter university study with varying degrees of perceived fluency. Though the study did not explore the psychological effects of low perceptions of fluency, it does bear considering how prior access affects perceived fluency and how perceived fluency, in turn, affects academic progress. Each interview participant, all of whom owned their own computers and had at-home broadband Internet access, noted that home ownership presented them with perceived academic advantages over their peers who do not have home access to broadband Internet and/or a computer.

**Students perceived institutional expectations of their technological fluency.**

An assumed level of comfort and knowledge with the technology used for university coursework was evident to participants in the qualitative data. The quantitative data offered indirect support, as survey participants were asked to identify if computer technologies were required for their major coursework; 97% of
respondents said yes. This theme arose primarily by asking the interview participants if they perceived an expectation of fluency and if they received instruction on how to use technologies in each class for which they would be used.

Rube, a student majoring in Information Systems, found a difference between his experience in a community college setting and the university setting, noting a different level of knowledge expectation; he said, “at university level, I do believe we’re expected to know how to use computing systems.” Shelly added that her main perception was around institutional expectation of access to these technologies, noting that not all students have similar access. Shelly also noted that her transition into SU seemed easier as a result of having had training through her profession prior to being a student. Shelly warned, “We can’t assume that everybody is on the same level.”

Alden also noted an expectation of understanding, recalling sitting in his first-year seminar in which the SU-sanctioned course management system (CMS) was mentioned and he claimed, “I had no idea what [the CMS] even was,” indicating part of the expectation of technological fluency may be understanding the jargon of the digital world. Andrew said he “certainly” felt there was an expectation of fluency upon entering and that it was most likely indicative of the professional world’s expectation beyond college graduation.

This data again ties back to participants’ prior access to technology. Though each of the participants indicated some challenges with navigating aspects of the educational technologies at SU, they also noted the benefit of having had extended
prior access to technology. The base knowledge with which they came into the institution made the transition easier.

This is an area of research previously unexamined. While there are multiple studies about students’ use of technology for university study (Jones et. al., 2009; Ratliff, 2009; Allen & Seaman, 2007) and the perceived benefit of technology use for university coursework (Dahlstrom, de Boor, Grunwald, & Vockley, 2011; Grant, Malloy, & Murphy, 2009), I was unable to find research on students’ perceptions of what was expected of their technological fluency level.

This also remains an omission in the quantitative portion of this study. Though participants were asked to identify whether they found computer and Internet technologies to be imperative to their coursework, there was no explicit question about students’ perceived expectation of students’ level of fluency. This remains an area to be further investigated, as these perceptions likely play a significant role in students’ academic self-efficacy.

Institutional training on educational technologies varies.

This theme became the most evident through the data collection. The quantitative data showed that students learn how to use and navigate educational technologies in a myriad of ways. A majority of respondents noted they learned through self-exploration without the support of the institution. Multiple open-text responses echoed this. Participants also learned to use the educational technologies needed for their time at SU through a course they took; the open-text comments indicated SU’s first-year seminar series focused on instruction of these technologies.
Lastly, a predominant way students learned to use the technologies was through peer assistance. Workshops and one-on-one help from an institutional representative were among the least likely ways students learned to use the technologies they would need for their time at SU.

The qualitative interviews supported the quantitative data. Andrew and Rube talked about receiving minimal instruction on the CMS used by SU, whereas Shelly recalled brief instruction on navigating the library’s resources. Alden received instruction through the first-year seminar he took, noting that instruction was minimal until he began asking questions.

Alden’s experience asking questions relates once again back to one’s understanding of fluency. Because of his prior access, it may be that Alden’s computer and Internet self-efficacy was higher than that of his peers without extended prior access (Eastin & LaRose, 2000; McCoy, 2010). In turn, Alden knew the questions to ask and had a degree of confidence in his ability to understand the answers to the questions. Without that level of self-efficacy, it is likely a student would not know where to start in asking questions or feel confident enough to express a lack of knowledge.

The percentage of students who learned a technology on their own (41%) are likely to be more fluent at computer technologies than those students who sought help. McCoy (2010) notes that this likely comes as a result of home computer access. Hargittai’s (2003, p. 822) notion of “autonomy of use” explains this likely connection. She notes that autonomy of use is “the freedom to use technologies when,
where, and how one wishes,” giving way for exploration and trial-by-error mastery of online skill (p. 822). Hargittai (p. 828) notes that “those having more experience with technologies and more exposure to various communication media will benefit more from the Web by using it in a more sophisticated manner.” Such is the case with those students who have prolonged exposure; they learn the questions to ask, the troubleshooting to try, and the resources to seek.

Those students who learned educational technologies through peer assistance have a key component to their fluency development—a social support network. Hargittai explains that having this social support network is integral to technological skill development for various reasons. The reason most connected to this response in the study is that social networks of Internet and digital technology users create problem support networks. If one struggles with a technology or concept within the technology, drawing upon the experience of peers provides “a source of new knowledge via advice and recommendations” (p. 830). Hargittai believes these networks allow individuals to learn these navigational skills much quicker and to proceed in a more knowledgeable way.

Instruction in a first-year seminar provides a solid foundation for the building of a student’s technological fluency. Dahlstrom, de Boor, Grunwald, & Vockley (2011) found that those technologies instructors use well are more valued and better understood by students. In their study, 52% of their respondents strongly agreed that learning effective technology use helps them with accessing resources and institutional information in addition to making students feel more productive. By creating a space
that fosters inquiry and support for navigation of technology, students will be able to acquire and hone the skills needed to be successful with technology use in college. Creating consistent and intentional technological educational environments will enhance students’ productivity.

**Personal computer ownership and home Internet access is advantageous.**

A majority of participants (99%) surveyed indicated they own a computer for personal and scholastic use. Of those participants, 95% have access to broadband (high-speed) Internet at their place of residence; an additional 4% have home access to dial-up Internet and 4% have no home access to Internet. This data may have been skewed by the recruitment of participants via e-mail, however it is indicative of the prevalence of home ownership among today’s university students.

The qualitative interviewees indicated similar patterns. All of the qualitative interview participants owned a personal computer and had broadband Internet access in their place of residence. When asked if owning a computer and having home Internet access presented an advantage, all four respondents responded yes. Rube recalled a time when his computer crashed and he “had to make a grievous amount of trips from [his] residence to the library to use the computing facilities,” adding, “The amount of footwork for people who don’t have computers is phenomenal.” Andrew concurred, noting not only does it allow him to attend to his schoolwork when his schedule permits, it also allows him to carry less with him to campus each day. Shelly spoke to the immediate access to information she perceives she gains over those who do not own their own computer and have home Internet access. She added that when
she does not have her computer, she feels it is a hindrance in terms of her productivity. Alden went so far as to say that without digital technology ownership, one is "not as relevant." He believes constant computer and Internet access "makes things easier," giving him many options to access information needed for his coursework.

Past research supports the participants’ perceptions. McCoy (2010, p. 1616) reports that home computer ownership correlates with a higher level of technological fluency, noting a "significant difference" between those with and those without home computer access. This, in turn, provides students with greater competency in "evaluating, managing, and using information," according to Kaminski et. al. (2003, p. 36), aspects of technological fluency that have increasingly become an accreditation outcome for institutions.

Part of this continual access involves students’ abilities to explore and discover resources integral to their academic success. At SU, the institutional website serves as the hub for learning about campus resources. Dahlstrom et. al.’s (2011, p. 10) showed that 52% of all students surveyed "strongly agree" that access to technology equates to access to resources and helpful information. Crawford (2011, ¶ 2) echoes this notion, explaining that "as our jobs, entertainment, politics and even health care move online, millions are at risk of being left behind." Without regular access to dynamic information offered through institutional web technologies, students will, undoubtedly find a significant gap in their awareness of opportunities at and updates to the institution.
Home computer ownership and Internet access also provides students with ample time to hone their technological literacy skills. University of California-Irvine associate professor of education Mark J. Warschauer, as cited by Farrell (2005), explains:

In terms of using more sophisticated literacies to produce knowledge, those skills aren’t so easy to catch up on. It’s more challenging to master the skills to use technology to find and critique information and those skills are developed through long-term access to technology and very good education on how to use it. (¶ 11)

Because these skills take time to develop, those students at university who have continued exposure and access to computer technology will likely be more adept at using the technology required of their coursework. The extended exposure proves invaluable in skill development over time.

Students have individual technological needs.

Participants indicated that their needs regarding technology are not uniform. While several (45%) respondents feel comfortable with knowing what resources to seek for assistance with educational technologies, 55% expressed some uncertainty. Nearly a quarter (23%) of first-generation students stated they did not know where they would seek help; participants aged 40 and higher (44% of those 40-49 year olds and 67% of 50 years or older) also noted a lack of certainty on where to seek help. Additionally, those students who matriculated less than a year following high school graduation expressed a high level of uncertainty. While some participants responded that they did not know where to access help, some respondents noted they may or may
not know. A majority of all students using technology for their major indicated that they absolutely did not know or were uncertain about where to access help.

Following the question about whether or not students would know where to access help was a question about whether or not a center, similar to a writing center or math laboratory, would be helpful to students. Out of all students, 41% said yes, it would be helpful, with those ages 40 and over showing the most favorable response. Additionally, first-year students and seniors indicated a greater interest in a technology center than those in their second or third years. Following this question, participants were allowed to add comments about the addition of a technology center. Some participants identified specific programs with which they struggle and would like to master prior to graduating and joining the workforce.

These sentiments echo Heinrichs and Lim’s (2010) exploration into information literacy and Microsoft Office competencies. They examined the technology deficiencies students and employers note post-graduation. Though information literacy standards are emphasized in current literature from information science researchers, Heinrichs and Lim found students graduating with sub-par preparation for the demands of a technological workforce. McCoy (2010, p. 1614) points to the culprit: “Educators may assume that all college students in the 18-25 age range are technology savvy; this may not be the case.” Once again, disparities in prior use and proper instruction of information technologies produce inconsistent preparation for those graduating from institutions of higher education unless remedial help is available (Ratliff, 2009).
Students may not necessarily know that their skills are in need of remediation; this is a possible answer to the 59% of respondents in this study that did not see a technology center as necessarily useful. Grant, Malloy, and Murphy (2009) found that students perceived they had a much higher skill level on Microsoft Office applications than what was actually true of their skill level; while many could perform the most basic tasks, more advanced tasks were less likely to be completed correctly, even by those students who perceived themselves to be fluent.

The qualitative interviews echoed these findings and the differences in student technology needs. While Shelly rated herself as currently fluent, she noted the struggles she continued to have, saying, “I don’t think I’ve overcome these challenges.” She attests much of this to inconsistencies with technology use among her instructors. Alden initially stated he does not encounter much trouble with technology, but later elaborated on navigational issues with SU’s CMS. Rube noted he feels at ease with technology, but recalled a class where he felt behind in the first class meeting because of the speed with which he was expected to download and prepare materials for the course’s use. Andrew felt comfortable seeking out assistance with technology and noted that when he has, it has proved helpful.

Though this study did not assess students’ perceptions of fluency and their actual fluency, this theme begs further consideration. Students who do not know the standards of digital literacy may not have an accurate perception of their fluency level. These students may find a technology center beneficial to developing an awareness of their own skill level and the areas in which they are currently deficient. This theme
serves as an indicator of the diversity of experience with technology and does not serve to understand student technological preparation in a generalizable fashion.

**Discussion of Findings**

From the results of this study, five general themes arose related to students’ experiences with technology use in higher education: (a) differences exist in students’ levels of technological fluency, (b) students perceived institutional expectations of their technological fluency, (c) institutional training on educational technologies varies, (d) personal computer ownership and home Internet access is advantageous, and (e) students have individual technological needs. These themes speak to the complexities of students’ experiences with technology use at the university level. To better understand the importance of these themes in a wider context outside of the study site, two theories, Triandis and Triandis’ (1960) Theory of Social Distance and Sanford’s (1969) Theory of Challenge and Support, will be employed to investigate the correlation between these themes and the research questions.

**Theory of social distance.**

Triandis and Triandis’ (1960) research provided a theoretical framework for this study to better understand how those without access to technology may feel pressure to conform or “[adopt] the values of the in-group,” namely those with a higher level of technology fluency and technological access (p. 115). Triandis and Triandis identified social class as a more significant factor of social distance than nationality or religion, with race being the only more prevalent factor. As indicated by
national data reviewed in Chapter II, access to technology is unequal among different racial groups and socio-economic groups, as these factors are likely inter-related.

**Theory of challenge and support.**

This theory, seminal to postsecondary educators, served as additional framework for this study in order to examine how students receive support in the wake of their challenges with technology. Sanford roots his theory in psychology explaining an individual’s constant seeking of equilibrium. As environmental factors present challenges, an individual experiences tension and strives to release that tension by seeking and attaining equilibrium. Sanford notes the importance of providing support to those students experiencing a challenge, those in disequilibrium, in order for students to overcome the challenge and further their development.

**Research questions.**

The research questions created for this study were meant to explore the way students experience an institution’s technological landscape. These questions stemmed from my inquiry into what disparities might arise for students as they enter a technology-heavy institution. Additionally, I wanted to learn about how students learned to navigate the technologies they used for coursework. I entered the study with an anticipatory/participatory framework due to informal conversations with students whom expressed a desire to see change around technology use by the institution.

The seminal question of the study was specific to student experiences: How do students experience the technological landscape of an institution? The study largely
determined that students operate through the lens of prior experience with technology. Students noted significant use of technology by the institution and noted that their level of fluency upon entering the institution played a large role in their experience upon matriculating. Those students who indicated less confidence also indicated a greater need for support.

A foundational question for this study that served as a complement the primary question questioned the institution’s role: Does an institution promote access for students through its use of technology? Student participants noted a disparity in the kind of educational technology training they received while at the institution, experiencing barriers to success because of the digital language barrier. The Theory of Challenge and Support (Sanford, 1969) would indicate that best practice involves identifying the challenges and providing support to guide students through to a point of feeling equilibrium or content in their academic livelihood. The research found that several students, regardless of their perceived level of fluency, did not receive the educational support.

The ancillary questions of the study spoke further to students’ experiences with the institution’s use and education of technology: (a) What level of fluency with and exposure to technology do students bring with them to post-secondary study? (b) How do students perceive an institution’s expectations of their technological fluency? (c) How does an institution address the “digital divide” for its students? Regarding the first question, the data suggested an operational level of fluency with which most participants came to college. This data may be due in part to electronic recruitment
methods and may not necessarily be an accurate snapshot of the whole student body, as those without regular access may not have been able to participate to the fullest extent. Students responded to the second question that there was an expectation they perceived upon matriculation. From technical jargon that was used to minimal instruction, students found that a baseline level of technological literacy was assumed. For those who may have been on the “immigrant” (Prensky, 2001) or developing side of the digital divide, these students either sought help or slowly overcame the challenges they encountered. These students noted, again, an expectation to conform or else waver in a place of insecurity due to technological deficiencies (Triandis & Triandis, 1960). While a significant portion of participants indicated that they may be part of the “in-group,” the narratives indicated that even those who do feel technologically competent experience bouts of insecurity around the expectations they perceive (Triandis & Triandis, p. 115).

Limitations of the Study

There are numerous limitations to this study within both the design and analysis of the research. The limitations of this study are related largely to time and resource constraints to the study and research design.

Time restrictions posed a significant limitation. Due to the length of time allowed for the completion of a Master’s of Science in College Student Services Administration, the design of the study was limited in the following areas: recruitment methods, study site, sample size, and demographic consideration.
Due to these time restrictions and resource constraints, recruitment for participants occurred via electronic forums. In doing so, the sample population was limited to those who had somewhat regular access to a computer and Internet, as evidenced by the data. Those who participated, therefore, likely skewed the level of fluency to a higher level than if recruited via paper or telephone. Additionally, in order to manage time and resource restrictions, the study utilized one study site; the study could have produced more of a significant return of data had multiple institutions taken part in the study. Furthermore, conducting the same research at an institution that was not classified as a Research I institution may have returned significant differences in the data. These considerations, again, were limited by the time and resource constraints of the study.

As a means to protect the confidentiality and reduce the potential for non-response, demographic data for the participants was not collected. This is a flaw in the research design, as this data could have been used to draw significant conclusions about disparities among those from different socio-economic and racial backgrounds. Aside from age and gender, key demographic data was omitted from the quantitative survey. Though the data provided initial insight into the posed research questions, more significant conclusions regarding disparities among students’ technological experiences may have been drawn.

**Implications for Practice and Opportunities for Further Research**

This study intended to inquire into students’ experiences with the technology use they experience and, consequently, expectations they perceive while pursuing
university coursework at a land-grant institution. The intent was to better understand if students perceived an institutional expectation of their technological fluency, if students perceived difficulties with technology and how, if at all, they were able to overcome those difficulties through the aid of the institution. The data resulted in five apparent themes that described students’ experiences with developing technological fluency at the university level through prior fluency, education, personal ownership, and evolving technological needs. Though these themes loosely point to areas for improvement at the study site, they also provide areas for consideration in future research and practice.

The first aspect for institutions to consider is assessing incoming levels of technological fluency. If land-grant institutions such as SU serve to provide access to education for all students, they must understand at what level their students enter the institution. While transcripts, standardized test scores, and placement tests for subjects such as mathematics indicate student performance and ability in myriad subject areas, many institutions do not currently assess incoming students’ technological literacy. In order to set students up for success, it is imperative to understand what deficits a student has in order to serve as a starting point for remediation. Additionally, institutions need to identify what aspects of fluency are critical to a student’s success at the institution.

Additionally, recognizing the dynamic nature of developing fluency or literacy of any type is crucial. Many institutions maintain writing centers or science instruction centers to provide additional skill building in order to better understand the
language of the subject. Providing educational services for the development of one’s technological fluency is vital to promoting technological self-efficacy and, ultimately, academic self-efficacy in an increasingly digital landscape. These educational services would need to address diverse needs of individual technology users and these services would need to be promoted widely to incoming students. If technology education services existed, it would provide an avenue for students at varied levels to hone their skills to best fit their academic technological needs.

Institutions must examine the assumed expectations they uphold. This involves asking, for each course that is taught and that uses educational technologies: (a) Have students had an opportunity to learn to navigate these technologies in prerequisite courses? (b) Is there a structure built in for students who are struggling with using the technologies? and (c) Do these technologies serve to enhance or hinder student participation and comprehension?

This study began to address areas of concern around students’ technological fluency, however, several questions remain. These questions that follow are recommended areas for additional research to expand the body of knowledge and context around this subject:

• What are the institutional perceptions of incoming students’ technology acumen?
• What are the faculty perceptions of incoming students’ technology acumen?
• What, if any, is the role of first-year seminar classes in acclimating incoming students to the technological expectations required of academic pursuit at the
institution? Additionally, should a first-year seminar class that addresses these issues be required of students?

• How do transfer students, those new to the institution but usually not privy to first-year acclimation courses, learn about the technological resources available to them? Additionally, how do these students learn about an institution’s culture around technological use and fluency expectations?

• What students do not pursue higher education as a result of deficiencies in technological fluency or a lack of access to computer and web technology?

• What are the challenges distance-education students face in the course of their study? What resources are available to these students if not living within reasonable distance of their home institution?

• How are various learning styles promoted or inhibited by the extensive use of technology in higher education?

• How frequently do students find a need to upgrade the computer and web technology they use for university coursework?

• How does level of fluency influence academic performance and progress?

• How do the technological experiences of those attending community colleges differ from those attending four-year institutions?

Concluding Thoughts

I pursued this study because of my informal observations of student challenges with using technology for educational purposes. After extensive conversations with students about the technological difficulties that produced poor academic results, I
wondered how they understood the technological environment of the institution. This study clarified for me that it is unreasonable to assume students are comfortable with technology, as disparities in technological access persist that hinder students’ experiences in an institution of higher education. As someone dedicated to educational equity, I hope that this study serves as a starting point for future conversations about addressing the message institutions send to their prospective and current students regarding technology use and expectations of technological fluency.
Bibliography


APPENDICES
Appendix A: Explanation of the Study & Limitations

Project Title: Students’ Experiences Navigating an Institution’s Technological Landscape

Principal Investigator: Larry Roper, Vice Provost of Student Affairs, Oregon State University

Student Researcher: Allyson Dean, graduate student, College Student Services Administration

Thank you for your interest in participating in this research on how students use and experience technology in a university setting. This initial survey will serve as a study data set and determine qualifying factors to take part in an interview process.

Privacy Information

If you are chosen for an interview, the interview will be audio recorded and used as data for the study. The information you provide during the study will be kept confidential to the extent permitted by law. In accordance with the regulations, all study related documents will be securely stored by the P.I. for three years post study termination.

The security and confidentiality of information collected from you online cannot be guaranteed. Information collected online can be intercepted, corrupted, lost, destroyed, arrive late or incomplete, or contain viruses.

Do I have a choice to be in this study?

You should take part in this study only because you want to volunteer. You will not lose any benefits or rights that you would normally have prior to volunteering. You may skip any questions that you do not wish to answer.

If you have any questions about this research project prior to proceeding, please contact Larry Roper at 41.737.3626 or larry.roper@oregonstate.edu or Allyson Dean at allyson.dean@oregonstate.edu.

If you have questions about your rights as a participant in this study, please contact the Institutional Review Board (IRB) Human Protections Office at or IRB@oregonstate.edu.
*Disclaimer: By clicking the “Continue” button below, you acknowledge you are at least 18 years old and have attended Oregon State University for at least three academic terms.

Continue Button
Appendix B: Transcript of Online Survey

Question: What is your age?

a) 18-21
b) 22-29
c) 30-39
d) 40-49
e) 50 years or older

Question: Are you a first-generation student (the first in your family to attend college)?

a) Yes
b) No

Question: How much time lapsed between your graduation from high school and your enrollment at OSU?

a) Less than a year
b) 1-3 years
c) 4-7 years
d) 8-10 years
e) More than 10 years

Question: What is your class standing at the university?

a) First-year
b) Sophomore
c) Junior
d) Senior
e) Graduate student

Question: Do you own your own computer (desktop and/or laptop)?

a) Yes
b) No
Question: Do you have high-speed Internet activity at your place of residence?

   a) Yes  
   b) No  
   c) I have dial-up/lower-speed Internet

Question: Does your academic major require coursework to be done via computer/Internet technology?

   a) Yes  
   b) No

Question: In your first term at the university did you receive instruction about how to use educational technologies such as Blackboard, ONID, OSU blogs, and Powerpoint? (check all that apply)

   a) Yes, I learned through a course I took.  
   b) Yes, I learned at a workshop.  
   c) Yes, a university employee helped me.  
   d) Yes, a friend helped me.  
   e) No, I did not need to.  
   f) No. I needed to and figured it out for myself.  
   g) Other (write response in field provided)

Question: If you answered “yes” to the previous question, did you feel that the instruction you received helped?

   a) Yes  
   b) Somewhat  
   c) No

Question: How frequently do you use campus resources (such as Student Media Services laptop check-out, library computers, computer labs on campus) for your schoolwork?

   a) Every day.  
   b) 3-5 times a week  
   c) 1-2 times a week
d) Bi-weekly  
e) Monthly  
f) Rarely/Never

Question: If you had difficulties understanding how to use a particular educational technology or program, do you feel like you would know where to go to learn more about it?

a) Yes.  
b) No.  
c) Maybe.  

Question: Do you think an on-campus center, similar to the Writing Center, focused on educational technology usage and orientation would be helpful to you?

a) Yes.  
b) No.  

If you answered “Yes” to the previous question, please elaborate with comments in the field provided:

Question: Rate your level of familiarity or fluency with web/educational technology prior to coming to university.

a) Fluent (very familiar, could easily navigate, very few problems with web/educational technology)  
b) Proficient (somewhat familiar, some problems with navigation and understanding web/educational technology, general understanding of web technology)  
c) Developing (not familiar, many difficulties with web/educational technology, difficulty navigating, very little access to web technology)

Question: Rate your level of familiarity or fluency with web/educational technology currently.

a) Fluent (very familiar, could easily navigate, very few problems with web/educational technology)
b) Proficient (somewhat familiar, some problems with navigation and understanding web/educational technology, general understanding of web technology)

c) Developing (not familiar, many difficulties with web/educational technology, difficulty navigating, very little access to web technology)

If you would like to be considered for the qualitative (interview) portion of the study, the researchers will need to know how to contact you for an interview. Below, please enter your contact information into the field provided.

Thank you for your time and interest in this research project!
Appendix C: Informed Consent Document

Project Title: Students’ Experiences Navigating an Institution’s Technological Landscape

Principal Investigator: Larry Roper, Vice Provost for Student Affairs

Student researcher: Allyson Dean, graduate student, College Student Services Administration

WHAT IS THE PURPOSE OF THIS STUDY?

You are invited to participate in a research study that will focus on students’ experiences with using technology for education at an institution of higher education. The results of this study will be used by the student researcher to write a Master thesis as part of a Master of Science (M.S.) degree in College Student Services Administration at Oregon State University.

This research aims to explore the various educational technologies students utilize for completion of coursework and the venues through which they become acclimated to these technologies at [Admission]. By participating in this study, you will be helping us to understand how to improve the experiences of students coming from different levels of familiarity with technology.

WHAT IS THE PURPOSE OF THIS FORM?

This consent form offers information you may need to help you decide whether or not to participate in this study. You may ask any questions about the research, including the process, possible risks and benefits, your rights, and any other areas of concern. When you feel as though your questions received answers, you may decide whether to participate.

WHY AM I BEING INVITED TO TAKE PART IN THIS STUDY?

You are being invited to take part in this study because you identified that you are a student at [Admission], you are at least 18 years old and you have been attending [Admission] for at least three academic terms.
WHAT WILL HAPPEN DURING THIS STUDY AND HOW LONG WILL IT TAKE?

This study asks that you participate in a one-on-one interview with the researcher. The interview should last no longer than 90 minutes and will be scheduled to take place during spring quarter of 2011.

WHAT ARE THE RISKS OF THE STUDY?

There are minimal risks in this study. You may choose to refuse to answer any question without explanation. The researchers will avoid asking questions that evoke deep, personal reactions.

WHAT ARE THE BENEFITS OF THIS STUDY?

There are no foreseeable benefits to you as a participant. Data from this project may aid student and academic affairs professionals in understanding how to better serve incoming students whose experiences with technology in education are similar or different from your own.

WILL I BE COMPENSATED FOR PARTICIPATING?

If you complete the audio recorded one-on-one interview, you will receive a $5 gift certificate to a local business.

WHO WILL SEE THE INFORMATION I GIVE?

The information you provide during the study will be kept to the extent permitted by law. You will be assigned an identification code that will be used on all data forms to ensure your anonymity. Should the results of this project be published, your identity will not be revealed. In accordance with the regulations, all study related documents will be securely stored by the P.I. for three years post study termination.

AUDIO RECORDING

You will be audio recorded during your interview. The recording will be transcribed by the researcher or by a professional transcription service contracted by the researcher. Should the researcher contract a professional transcription service, your identity will remain unknown to the service. All audio recordings will be destroyed after a period of no more than three years after the completion of this study.
DO I HAVE A CHOICE TO BE IN THIS STUDY?

You should take part in this study only because you want to volunteer. You will not lose any benefits or rights that you would normally have prior to volunteering. Should you decide not to participate in this study, your decision will have no effect on your time and progress at Oregon State University.

By participating, you reserve the right to skip questions or ask for clarification if you misunderstand the question.

QUESTIONS ABOUT THE STUDY?

If after reading this, you have questions about this research project, please contact Larry Roper at 541.737.3626 or larry.roper@oregonstate.edu or Allyson Dean at allyson.dean@oregonstate.edu.

If you have questions about your rights as a participant in this study, please contact the Institutional Review Board (IRB) Human Protections Office at or IRB@oregonstate.edu.

Your signature below indicates that this research study has been explained to you, that your questions have been answered, and that you agree to take part in this study.

______________________________
Participant’s name (printed)

________________________________________________
Signature of Participant Date
Appendix D: Interview Questions Provided to Participants

1. Prior to coming to this university, how often did you have access to web technology? Describe where you accessed web technology and for what you primarily used it.

2. How would you describe your level of technological fluency upon entering the university?

3. Do you own your own computer, use computer resources owned by the university, or both? Do you have high-speed Internet in your place of residence?

4. When you entered the university, did you receive training in the educational technology you would use during your time here? If so, where did this take place and was it helpful?

5. Describe some of the ways you have used technology for your university coursework and other university needs (i.e. registration, financial aid status, etc.).

6. Did you feel there was an expectation that you understood how to use these technologies? Did you receive instruction on how to use technologies in each class for which they were used? Please explain.

7. What challenges have you experienced with using educational technologies? How did you overcome these challenges?

8. What advantages do you perceive those with their own computer and Internet access have over other students who do not possess a computer and/or Internet access?

9. How often do you use online technology to learn about campus resources and involvement opportunities?

10. Have you sought technology support from university services in your time here? For what? Did it help?