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Exploring the Digital Divide: A Closer Look at Minorities' View on Technology Use on College Campuses

Shantelle M. Smither

shaney18@siu.edu

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TECHNOLOGY USE ON COLLEGE CAMPUSES

by

Shantelle Monique Smither

B.S. Health Care Management, Southern Illinois University Carbondale. 2010

A Research Paper
Submitted in Fulfillment of the Requirements for the
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Approved by:

Stephanie Pink, Chair

Lashonda Stewart

Sandra Beebe

Graduate School
Southern Illinois University Carbondale
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1. **Introduction**

African Americans and Hispanics are often faced with academic challenges. For some minorities, such challenges are only revealed when students face difficulties in specific subjects in either high school or college. Generally, one does not know how underprivileged he/she is until put into situations where he/she must compete with others endowed with such privileges as superior teaching and adequate funding for technological advancement. As a result, minorities regularly play catch up to obtain such advancements, in order to compete academically with the general population (Maheshwari, 2009). This begs the question of how one is able to compete if never taught the skills needed to conduct research, write an essay, or effectively utilize an Internet search engine.

Some minorities do not understand that computer skills (ability to research, using internet other than social media, word processing) expand beyond the ability to search for and watch videos on YouTube or log into social media networks, such as Facebook and Twitter. While most people only acquire skills related to the latter, college retention rates for minorities suffer. Today students must have above average computer skills to apply to their desired college online.

As the person researching this issue, the harmful effects of the digital divide were witnessed first-hand as an African American college student. As a student at Southern Illinois University Carbondale, we were thrown into a world of technology in each class we attended freshmen year. Some students were able to keep up with the pressures of changing technology, but those who were not adequately trained in high school, struggled to succeed in classes. I observed significantly more minority students in my freshman classes when compared to sophomore year and the numbers were abysmal.

The NAACP has been able to capture the history of retention of minorities in college. According to the NAACP (1998), over 60 percent of African Americans and Hispanic who enrolled in a four-year college would not complete a bachelor's degree within six years. Additionally, minorities comprise just half the percentage of Caucasian's that have completed four or more years of college. Fifty-six percent of minority students who enroll in higher education do not return after their freshman or sophomore year.

According to the most recent statistics, the nationwide college graduation rate for African Americans in 2006 was a dismal 43 percent (Journal for African Americans in Higher Education 2005). This number was 20 percentage points lower than the rate for Caucasian students. In 2010, the rate was 40 percent for African Americans to graduate in a six-year period. This number is 20 percentage points lower than the 63-percentage rate for white students. From 2004-2010 college graduation rates for Hispanics increased from 43.7 percent to 47.2 percent. The only positive news was that over the past six years the African American student graduation rate has remained nearly the same while the Hispanic graduation rate had increased by four percentage points (Advancing to Completion, www.edtrust.org, 2012).

According to Jackson (2001) the privilege of exposure to the most advanced technology before seeking higher education is vital to bridge the gap between academic success and failure. This gap is also known as the digital divide:

> Digital divide is a term coined for the disparity between the "haves" and the "have-nots" in the technology revolution. Many have feared grave consequences for those unable to access the power of the Internet; however, recent reports suggest that this divide is narrowing, rather than expanding (National Telecommunications and Information Administration, 2000).

The digital divide strongly exists in minority serving communities as well as Minority Serving Institutions (MSIs), institutions where the majority of the population is minority (Donthu

& Porter, 2006). MSIs serve nearly one third of all students of color in the nation. This means institutions will be a key player in closing the digital divide, which will result in a stimulated economy (Donthu & Porter, 2006). Providing technological opportunities in these communities and institutions will also provide cultural richness. In addition, technological opportunities level the playing field for minorities that do not have the opportunities before and after starting college level coursework (Institution for Higher Education, 2004).

The challenges and obstacles facing minorities today, has led to the exploration of the research question: How does exposure to and perceptions of computer technology affect the academic performance of minorities from underserved communities on university campuses nationwide?

Typically, minorities have less exposure to computer technology due to inadequate funding, as schools rely heavily on property taxes (White 2006). Thus, schools located in lower-income, underserved neighborhoods generally receive less support. Consequently, when making the transition to higher education institutions, some minorities are unaware of what technology resources are available to them or how to use and access such resources. This lack of knowledge could have adverse effects on their learning ability and grades. Gaining the understanding of minorities' perception of technology on college campuses can result in the development of strategies that can be implemented to help those who may not have the skill set needed to properly or effectively utilize advanced technology.

Further exploration of the issues and challenges surrounding access to technology for underserved students is key to the development of strategies that lead to an increase in retention rates and improved academic performance among the minority population. It is imperative that in today's knowledge based economy (Florida 2002) that the digital divide between minorities

(non-white), and non-minorities be closed. This research presents a model designed to explore the perceptions that minorities in low-income communities have of technology. Views of what minorities feel are adequate skill sets needed for the effective use of technology can show a relationship between perception of technology and retention rates. These relationships are identified and explored more thoroughly in the literature review of the paper. This research explores four categories of this question, which will aid researchers in closing the gap within the digital divide. More specifically the question of, how exposure to and comfort with technology has an impact on the retention rates of minority students in higher education institutions will be examined. The following questions will be explored in this paper:

Background Information on the Problem:

1. How has the lack of exposure to technology affected minorities before entering higher education?

2. What are minorities' perceptions of technology and is this affecting their comfort levels?

Current information on the problem:

3. How much is technology currently used by minorities on campus?

4. Do the previous questions ultimately affect retention rates for minorities on college campuses?

The section titled, "What are minorities' perceptions of technology and is this affecting their comfort levels," will discuss distance learning and how it relates to the research question. Distance learning is currently an official method of educating students on college campuses and there are even universities that use only this method (Enoch and Soker, 2010). The following research is critical to bridging the gap that minorities have been challenged with concerning technology and retention rates. Although steps have been made to close the technology gap,

progress has been slow. Minorities still lack the opportunities non-minorities have in the workforce (Donthu & Porter, 2006). Of key concern is the lack of prior exposure and access to, in addition to the perception of technology by minorities on college campuses. Both factors have a positive or negative impact on college retention rates seen among minority students from underserved communities (Eposito 2011 and Buzetto-More et al. 2006).

To further understand these issues, the literature review is divided into two sections. The first section of the literature review provides background information on the state of minorities' exposure to technology. This section discusses the issue of minorities exploring technology and how prior exposure to technology affects them in college. The second section of the literature review focuses on the current state of technology and why it is important to illustrate the relevance of technology on college campuses at this time. A summary of findings from the research in the literature review is provided. An illustration of the model and hypotheses developed from the literature review are then presented. The model designed from the literature review requires further research from those seeking to close the digital divide. The goal of this discussion is to provide further insight into the question guiding this research: How does exposure to and perceptions of computer technology affect the academic performance of minorities in underserved communities on university campuses nationwide? To aid in further discussion a list of terms frequently used throughout this research paper is listed below in Table 1.

Table 1

Vocabulary Term	Description
Race	Minorities or non-Caucasian individuals. The research examines African Americans and Hispanics.
Household Income	Yearly income of a household. Low socio economic status is considered households whose income is below poverty level between ($11,170-$19, 090) depending on number of individuals in the household (Department of Health and Human Services 2012 ASPE.hhs.gov)
Exposure to Technology	Exposure to technology (i.e. Laptops, computers, cellular phones, internet, etc.) can be defined as any exposure to technological devices that contribute to knowledge of any technological advances that may occur. This specific research looked more at the exposure that facilitates learning opposed to recreational use of technology or social media.
Perception of Technology	The perception are the thoughts and views of technology in higher education.
Retention Rates	Ability to remain in college.
BlackBoard/BeachBoard	Electronic class management system designed to assist teachers and students with communication and organization of classes.
Minority Serving Institution	Institutions where the majority of its service constituents and classified as minorities.
Skill sets	List of skills related to a specific subject. In this case, the term will always refer skills related to technology.

II. Literature Review

How has lack of exposure to technology affected minorities before entering higher education?

The lack of and difficult access to technology and the digital divide has plagued

underserved communities. Reported by the NAACP, the plight of this issue stems deep and wide

across our nation and the poorest schools were suffering the most (Jackson 2001). In 2008, the

average number of computers in a school where over 75 percent of the students were at or below

poverty level was 170. This is compared to 195 computers found in middle-income schools.

Fortunately, since 2000 those institutions have gone from having less than 50 percent of those

computers with Internet access to nearly 100 percent (US Department of Education, 2012). As

we entered the new millennium, minorities have incorporated computer and Internet usage into

their daily routine particularly with the development of the smart phone (Costigan, 2012). In

2005, The National Center for Education Statistics reported the number of Hispanic students,

grade 12 and below, utilizing the Internet was roughly 10, 215. The number of African

American students utilizing the Internet was 8,875. These numbers combined still do not reach

the number of Caucasian students in the same age range, grade 12 and below who utilize the

Internet, at 35,145. It can be argued that minorities should receive Internet exposure as early as

possible to give them the advancement needed (National Center for Education Statistics, 2005).

In a study by Calvert et al. (2005), parents were asked to explore how children advanced

with technology after being exposed at an early age. Parents were interviewed about the media

habits of their six-month to six-year-old children. Children exposed to computers showed

consistent increases in computer usage occurred with initial exposure gained from utilizing a

computer on a parent's lap at age 2.5. This resulted in a quick graduation to independent

computer and mouse use at around age 3.5. Although there were almost no gender differences in

early computer usage patterns, socio-economic status and ethnicity were evident. The study

showed families with higher incomes and education levels were more likely to own computers

and have Internet access at home. Latino and African American families were less likely than

Caucasian families to have Internet access at home, with Latinos being least likely of the three to

have access in the home (Calvert et. al., 2005). Parents perceived computers favorably for

children's learning, which was not uncommon as technology such as Leapfrog, was geared towards young children. A relationship between an increase in non-game computer usage and an increase in the likelihood of reading were identified (Calvert et. al., 2005). This research supports the belief that although most college students were proficient enough to navigate through social media cites, these skills were not applicable to success in college (Esposito et. al., 2011). The relationship here was similar since computer games for children are somewhat equivalent to social networks for adults (National Center for Education Statistics, 2005).

Buzzetto-More et al. (2010) conducted a 3-phase study at a public and a private historically black university in Maryland. The hypothesis in Phase 1 that was most relevant to having prior exposure to technology was that minority students were unlikely to be counseled about computer related majors prior to college. In Phase 1, Buzzetto-More (2010) concluded that students from both universities came to college with little to no knowledge about computer science or information technology. However, they were able to link income as a limiting factor for acquiring this knowledge. Individuals attending the private university had greater access and exposure to technology before attending college because their socio-economic status was higher than those at the public college.

Phase 2 yielded similar results when a survey was distributed at the public university. The survey was provided to students enrolled as computer science majors and results reported students were not given enough technology skills before entering the computer science department at their school (Buzetto-More et al. 2010).

What are minorities' perceptions of technology and is this affecting their comfort levels?

According to the ACT (American College Testing) Report (2010), college retention rates for African Americans were dependent on a myriad of variables, which correlated with technology usage. In a survey conducted by ACT in 2008-2009, a series of questions were asked which related to minority students college retention rates. Students were asked to identify if the university they attended considered technology a variable of retention. The survey's analysis supported the argument that technology was a variable in college retention and grade point average because 36 percent of students named both variables. This suggested students felt online support service had a positive impact on their grades. In a separate report (ACT Report, 2010) with data specific to Hispanics, the percentage for online instructional support was much higher at approximately 60 percent. Low socio-economic status among minorities was mentioned on the list of 54 variables and programs that contributed to attrition of minorities on college campuses (ACT Report, 2010).

College retention rates for minorities have always been significantly lower than whites (Krieg 1995, Buzzetto-More et. al., 2010). There were several variables that contributed to this disparity including finances, failing to maintain in good academic standing and not receiving the support from staff and university needed to succeed (Krieg, 1995).

The model developed for this paper will exhibit the relationship between the three variables previously mentioned: technology, economic status, and ethnicity/race. Currently, research on minorities' access to technology was broad. However, it is hypothesized from this research that the variables previously explored are interrelated and each influence perception and exposure to technology on college campuses. A negative perception in minorities' eyes can create an entirely different paradigm of technology resulting in failure to bridge the gaps of the digital divide (Goode 2010).

In order to explore perception further, Donthu & Porter (2006), conducted a study to examine why Internet use was different among age, education, income and race. The study sought to determine attitudes and perception of how the Internet related to other variables, not including cost. The study used a modified version of the Technology Acceptance Model (TAM), which explored perception of technology in regards to ease of use, effectiveness and how it influenced attitudes toward technology (Donthu & Porter 2006).

Donthu and Porter (2006) explained the two paradigms of technology acceptance and adoption. The first paradigm explained there were two drivers and two inhibitors to an individual's desire to utilize new technologies. The two drivers were innovativeness and optimism, meaning if an individual expected to succeed in the use of new technology they must be willing and have an open mind about it. The inhibitors were discomfort and security; meaning use of technology may be inhibited if the individual does not have adequate comfort levels in their abilities to utilize such technology. The second paradigm described how technology's characteristics affect an individual's perceptions (Donthu & Porter 2006).

Using a survey instrument, data was collected and through analysis, Donthu & Porter (2006) were able to prove twelve hypotheses, in which six supported this research. The hypotheses were:

H1: An individual's attitude toward Internet usage is positively associated with their use of Internet.

H2: The higher an individual's perception of access barriers associated with using the Internet, the less favorable their attitude toward Internet usage.

H9: Perceived usefulness associated with the Internet is lower for individuals who have lower incomes.

H10: Perceived usefulness associated with the Internet is lower for individuals who are Hispanic American and African American.

 H11: Perceived access barriers associated with the Internet is higher for individuals with lower incomes.

H12: Perceived access barriers associated with the Internet is higher for individuals who are Hispanic American and African-American (Donthu & Porter, 2006, p. 1002).

The previous study by Donthu and Porter (2006) helped to answer the question regarding what minority's perceptions were toward technology and the positive relationship between perception and use of technology. One can also suggest from the study that individuals with lower incomes had different perceptions of technology (Donthu and Porter, 2006). This study was unique because it helped to identify those perceptions of minorities that were negative toward technology and recommended ways to change those perceptions to reflect a more positive attitude.

Distance Learning

 Distance learning and its relationship to the perception of technology on college campuses was examined. "In no area of education do we see a greater impact of technology than in the field of distance learning" (Burgstahler, 2005, p. 4). Distance learning courses taught online typically presents a steep learning curve to students who have not had training on using a computer. "If students are undertaking distance-learning courses that require knowledge of computers, then the students must be taught, at a minimum, the fundamentals of operating the system of choice of the distance-taught course" (Galusha, 1997, p. 6). Students who have a

technological background or have taken computer-based courses tend to have a greater understanding of how distance education classes operate and feel more comfortable in that setting. According to Galusha (1997), the problem with distance learning was lack of formal training for computer usage before allowing students to take online classes. This resulted in students becoming confused and the dropout rate for distance learning to increase (Galusha 1997). In order to prevent this, classes or training need to be required for teaching students the basics of computer usage prior to allowing them to register for a distance education class (Eposito, 2011).

Most of the research found focuses on distance learning and how well individuals perceived the benefit of it. However, if you do not have a working knowledge or comfort with computers to succeed in these types of courses your perception may be a negative one (Maheshwari 2009). Negative perception can lead to lack of motivation or any other variable listed in the ACT Report, 2010 (i.e., failed core classes, inability to pass math and science classes, inability to complete assignments) that leads to minorities leaving college prematurely.

"The last barrier related to the situational aspect of adult learners in an online program was the technology itself. Students not having the time, experience, ability to learn the appropriate technological functions, or access to the necessary equipment often experience frustrations leading to anger, increased costs or failure" (Hillesheim, 1998, p. 43). It was proven through several studies conducted by (Bhattacharjee 2009, Burgstahler 2002, Enoch & Soker 2006) that students were more comfortable with technology tend to be more comfortable with distance learning. With the proper training this resistance or discomfort tends to go away. According to Felix (2001) students will always resist the use of new technology so introductory classes or materials must be supplied before introducing them to a new subject. A study of the

success of online environment studying (distance-education) Song et al. (2003) showed that 75

percent of 356 participants stated that their comfort with online technology influenced their

success of online learning. This was compared to 62 percent stating motivation to learn as an

influence of success of online. Finally, 62 percent also reported time management as an influence

for online success (Felix 2001). This showed comfort with technology was a very important

factor when considering taking an online or distance education course (Song et al., 2003).

One must also have a working knowledge of such systems such as Blackboard or

Beachboard that are used as teaching supplements in distance learning and traditional classroom

environments (www.blackboard.com). These programs help teachers and students communicate

via the web where teachers can send homework and tests and students can submit assignments

and check progress electronically (www.blackboard.com). Programs like these are becoming

increasingly popular because it eliminates paper waste and helps students and teachers keep the

coursework organized and accessible

The question arises of whether distance learning is able to equally cater to all members of

an increasingly heterogeneous student population. In other words, does distance learning

contribute to the 'inclusion' of traditional students who may also be minorities (i.e. facilitate

their learning experience) or does it, on the contrary, cause 'exclusion' (i.e. create new barriers

for these students) (Armstrong, 2000; Attewell, 2001, Enoch & Soker 2010). Those who

consider distance learning as a means to reach formerly disadvantaged, underserved students

argue that the different forms of information and communication technologies, in particular

distance learning, provided easier access than more traditional delivery methods (Enoch & Soker

2010).

Muilenburg and Berge (2005) examined the difficulties that students faced when taking online courses and studied how different demographics view the difficulties. Many of the difficulties respondents experienced were administrative/instructor issues, social interactions, academic skills, technical skills, learner motivation, time and support for studies, cost and access to the Internet, and technical problems. The findings of the study were that Asians and Hispanics rate these difficulties higher than Caucasian and African American students (Muilenburg and Berge, 2005).

Furthermore, the distance learning delivery method brings high quality study materials and top academic lectures to the students' home or work- place for those who cannot attend classes on campus (Dennis et al 2005). There was a relationship between minority college students and self-motivation. It was concluded the more motivated students were willing to learn and succeed more than others (Dennis et al 2005).

How much is technology currently used by minorities on campus?

The Alliance for Equity in Higher Education conducted a study in 2004 that assessed the technology needs of college institutions serving high numbers of minorities. The mission of The Alliance for Equity in Higher Education was to "promote greater collaboration and cooperation amongst colleges and universities that serve large numbers of students of color in order to enhance economic competitiveness, social stability, and cultural richness" (Institute for Higher Education Policy 2004). They have alliances with organizations representing people of color including but not limited to: American Indian Higher Education Consortium, Hispanic

Association of Colleges and University, and National Association for Equal Opportunity in Higher Education" (Institute for Higher Education 2004).

A survey of 320 MSIs conducted by the Alliance for Equity in Higher Education, provided meaningful data that explored the perceptions of technology by minority students on college campuses. The Institute for Higher Education (2004), suggest anticipated challenges MSIs may have with IT, and provide potential solutions. Ultimately, this will help to close the divide.

The findings from the survey showed that most MSIs had a solid foundation of IT services and were utilized for providing administrative services to faculty and students. It also showed that MSIs were proven successful at providing Internet access, email access and exemplary electronic library resources (Institute for Higher Education 2004). However, although MSIs were able to provide a good foundation for students, the gap still lies with access and exposure. The findings from the study showed these institutions were statistically lower in having students that actually owned laptops (ownership being 47 percent at MSIs compared to 79 percent at other institutions). MSI's also failed to provide Internet services in the residence homes that most students were required to live in their freshman year in college. This study found that students were not pushed to utilize email services that were provided because teacher's use of technology was low (Institute of Higher Education 2004).

These findings could be caused by a number of variables not just exposure or perception, but age, and resistance to change. It may be an assortment of several barriers because the study showed usage of IT services and email systems was low despite incentives (Institute of Higher Education 2004). Two distinct barriers mentioned in the literature were funding issues and high turnover rate in the IT departments of these institutions (Institute of Higher Education 2004).

III. Findings

Do the following sub-questions ultimately affect the academic performance of minorities in underserved communities in university campuses nationwide?

1. How has the lack of exposure to technology affected minorities before entering higher education?

2. What are minorities' perceptions of technology and is this affecting their comfort levels?

3. How much is technology currently used by minorities on campus?

4. Do the previous questions ultimately affect retention rates for minorities on college campuses?

According to the literature, there is indeed validity to the proposed research model (Figure 1). Some relationships are more interconnected than others based on the literature found exploring each relationship, but should be explored further by researchers to close the digital divide in the future. Stated previously, MSIs are able to provide a good foundation for technology use on college campuses, but the gap lies still in access and exposure. The literature review revealed that the number of students owning laptops was 47 percent at MSIs and 79 percent at other institutions (Costigan & Perry, 2012). They also hindered academic success by not providing Internet services in residence homes where most students are required to live during their freshman year in college (Costigan & Perry, 2012).

The majority of students with selected characteristics including those explored in this research still do not use the Internet even when they do have access to it, which means the value of "access" was diminished. Those with less access to technology include students whose family income is under $20,000, students in poverty, students whose parents have less than a high school credential, African American and Hispanic students, and students in households where

Spanish is the only language spoken which is also known to be a factor for attrition in college universities (US Department of Education 2005).

Through a mixed method approach, surveys and case studies, (Goode, 2010) developed a study designed to explore the relationship between college students at home and educational computer skills, their knowledge of technology, and how this shaped their attitudes and perceptions towards technology. To summarize the data in (Goode, 2010), those individuals in the lowest quartile of technological proficiency were compared to those individuals in the highest quartile of technological proficiency. When asked if they agreed or strongly agreed with the statement, "I love working computers," 38% of the respondents were the least technology savvy answered strongly agree or agree, compared to individuals that were more technology savvy at 85%. When asked if they were "Interested in a technology rich major", only 22% of the respondents in the lower quartile answered, agree or strongly agree, compared to the 49% who answered the same in the higher quartile of technology proficiency. When asked, "I am interested in a technology-rich career," only 3% of the respondents from the lowest quartile answered, agree or strongly agree, whereas 47% of respondents in the highest quartile responded they were interested in a technology rich career (Goode 2010).

Computer access and ability were shown to be directly linked to success in higher education (Goode 2010). The study conducted by (Goode 2010) focused on determining what factors contributed to access to technology and usage. Goode (2010) concluded that minorities used technology less than Caucasians and suffered at the university level because of it (Goode 2010). Goode (2010) also described how students with the "lowest levels of technological proficiency actually avoided courses with heavy technology components, while the "techiest" students reap the academic and social rewards, including time and money, of knowing about

technology" (Goode 2010, p. 615).

Goode (2010) addressed all four subcategories of the research topic at hand and all of her findings were consistent with the research model developed. Minorities have been underprivileged when faced with technological advancements and utilized technology incorrectly when exposed to it early. Goode (2010) argued previous exposure to technology prior to college was the key to successful technology-friendly college career but not all exposure was good exposure. Goode (2010) gave a testimonial of what she calls a "technologically under-prepared student" who also happened to be Latina. The student described how she was given a computer by the age of 11 but did not reap any benefits from it because she did not have access to the Internet while at home.

Goode (2010) did not give insight on the actual retention rate of these individuals and how it applied to technology. Research by The Journal for African Americans in Higher Education (2007) helped place the retention research question into better perspective. African Americans and minorities do have a significantly lower retention rate than Caucasians. Research revealed even though retention rates for Caucasians are higher in most cases, there are some exceptions where minorities' retention rates were higher in some universities. According to the Journal for African Americans in Higher Education (2007), there were only five prestigious universities across the country [Mount Holyoke College, Smith College, Wellesley College, Pomona College, and Macalester College] that had a higher graduation rate for minorities than Caucasians. The study included fifty-six prestigious universities (Appendix A). Technology use was a factor in these low retention rates for minorities. In some colleges, it was a major factor and others it was less significant (African Americans in Higher Education, 2007).

IV. Model and Proposed Hypotheses

Extensive research was conducted on the research question, "Do the perceptions of computer technology affect the academic performance of minorities on university campuses nationwide?" Figure 1 provides a graphic representation of the relationships found in the literature regarding the independent and dependent variables.

Figure 1 (Model)
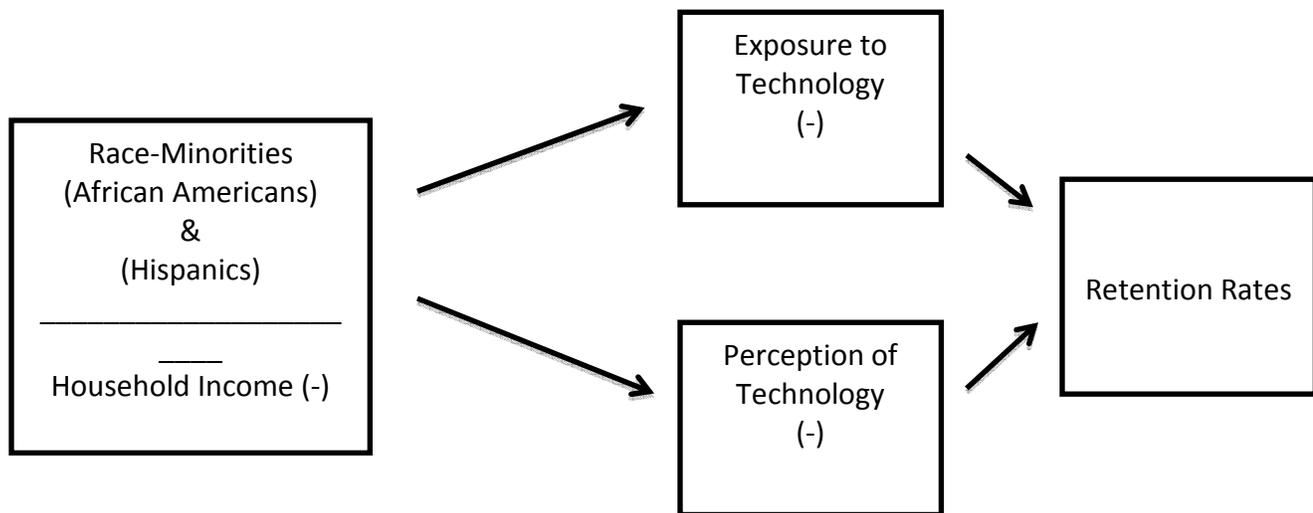
From this model, six hypotheses were developed:

H1: Minorities are more likely than non-minorities to have less exposure to technology before entering college.

H2: Students from lower income households are more likely than students from higher income households to have a lower perception/comfort level with technology.

H3: Minorities are more likely than non-minorities to have a lower perception/comfort level of technology.

H4: Students from lower income households are more likely than students from higher income households to have less exposure to technology.

H5: Student with less exposure to technology exposure are more likely than students with more explore to technology to have lower retention rates in college.

H6: Students with lower perception/comfort level of technology are more likely than students with higher perceptions/comfort level of technology to have lower retention rates in college.

Research was complete on each aspect of the model examining the relationship of each independent variable and the dependent variable. As illustrated above in the model, the key independent variables identified in the literature are race and household income. The literature asserted that race categorized as minorities (African American and Hispanics) or non-Caucasian individuals and household income were the two independent variables (Goode 2010). The model also highlights the two major intervening variables, which are exposure to technology and perception of technology and their relationship to the two independent variables. The model supports that a negative perception or low comfort level for technology affects minority students academically and furthermore a positive perception and or comfort level can also have a positive effect on minorities' academic performance. Finally, the model represents the link between exposure to technology and perception to academic performance, i.e. retention to the previous variables mentioned.

V. Conclusion

This research study was conducted to explore schools serving underserved communities and students of color that provide inferior academic technology experiences for students. The findings of US Department of Education (2005), Goode (2010), Song, Singleton and Koh (2003), among others reveal that university students have inevitably integrated technology into their social and academic lives and without a working knowledge of technology; it can become harmful to academic success. There is a range of knowledge students possess about technology, but minority students are at the low end of the spectrum (US Department of Education, 2005).

The ability to learn while teachers utilize technology can also influence minority students' perception of technology. It is imperative that this process of familiarizing oneself with is not occurring while already at a university attempting to learn university coursework. Learning new technology skills in college that one should have learned in high school may hinder the ability of minority students to receive a university level education. The study also describes how students with the lowest levels of technological knowledge actually avoid courses with heavy technology factors because of low comfort levels (Goode, 2010). Meanwhile, their counterparts gain the academic and social rewards, including better employment opportunities with higher pay, by having technological advancements. Computers and technology are directly relevant in 60 percent of the jobs in today's workface task. Therefore, being technologically savvy can result in more and better employment opportunities (Bryjolfsson &McAfee, 2011).

College retention rates for minorities have always been significantly lower than whites (Krieg 1995, Buzzetto-More et. al., 2010). There are several variables that contribute to this disparity including finances, failing to maintain in good academic standing and not receiving the

support from staff and university needed to succeed (Krieg, 1995).

This research seeks to illustrate the plight of minorities and low-income students only, but it shows that when given the resources minorities and low-income students can excel just as well as their Caucasian counter parts. The opportunity to be exposed to the best technology is deserved by all, but not achieved by all. This research paper enlightens us on our understandings of how the technological stance of students affects entry into college as well as retention. The research also educates us on how different technological backgrounds influence attitudes and perceptions of technology knowledge. This study aims to shed light on the ways in which technology can bridge the digital divide. This will allow some students the opportunity to engage in academic technological experiences gaining further skill sets, while denying others. These skills are needed for higher education and university settings: a technology-intensive community.

Recommendations

The results from the research conducted for this paper illustrate an urgency needed in developing K-12 policies in MSIs. The research also applies to all institutions that prepare for the academic technology knowledge and attitudes expected of university students. This would require a needs assessment to be done either regionally or statewide to determine technology needs for that particular area. After those needs are identified then the proper curriculum can be developed to insure that individuals not limited to minorities, receive the computer skills necessary to succeed. Additionally, elementary and high schools have a role in preparing this

population. The responsibility of the university is supporting the technology needs of its students. We need to start implementation of these policies in elementary school to insure that individuals are ready upon leaving high school. The nation should put more effort into the technology needs of minority students, but should begin to approach the issue holistically. Although this paper examines minorities only, this issues stems far beyond this scope. Individuals with disabilities, non-traditional students, as well as the aging population are also affected by the digital divide (Bhattacharjee, 2009).

This research addresses opportunities for further exploration into the overall attitudes toward technology and the use of computers. If more research and insight is given about the slowly closing digital divide, educators and policymakers will make it a priority to address this severe imbalance of knowledge. From a public administration perspective, this imbalance can affect the quality of employees at any agency, because it can become increasingly difficult to grow an agency if the students are not coming out of college prepared. New policies on this matter will result in the preparation of all of students for the digital demands of college life, which will eventually level the playing field in employment stimulating the US economy (Donthu & Porter, 2006).

REFERENCES

Bibo, E.W., Engle, J., & Nguyen, M. (2012) *Advancing to Completion: Increasing degree attainment by improving graduation rates and closing gaps for African American students*. Retrieved from http://www.edtrust.org/sites/edtrust.org/files/Advancing_AfAm.pdf

ACT, Inc. (2010). *Mind the Gaps: How College Readiness Narrows Achievement Gaps in College Success.* Iowa City, IA: ACT

ACT, Inc. (2010). *What Works in Student Retention? Fourth National Survey. Four-Year Colleges and Universities with Twenty Percent or More African American Students Enrolled.* Iowa City, IA: ACT

ACT, Inc. (2010). *What Works in Student Retention? Fourth National Survey. Four-Year Colleges & Universities with Twenty Percent or More Hispanic Students Enrolled.* Iowa City, IA: ACT

Bhattacharjee, B. *Dissertation Abstracts International Section A: Humanities and social sciences*, *69* (7-A), 2009, 2494. [Dissertation] Retrieved April 28, 2011 from Business Source Complete, EBSCOhost.

Blackboard: technology and solutions built for education. Retrieved from http://www.blackboard.com, 31 October 2012.

Brynjolfsson, E.& McAfee, A. (2011). *Race Against the Machine: How the digital revolution is accelerating innovation, driving productivity, and irreversibly transforming employment and the economy.* Lexington, MA: Digital Frontier.

Burgstahler, S. (2002). Distance Learning: Universal design, Universal access. *Educational Technology Review, 10 (*1), 32-61. Retrieved from http://www.editlib.org/p/17776

Buzzetto-More, N., Ojiabo, U., Rustagi, N. (2010). Unlocking the barriers to women and minorities in computer science and information systems studies: Results from a methodical study conducted at two minority serving institutions. *Journal of Information Technology Education*, 9, 115-131.

Calvert, S. L., Rideout, V. J., Woolard, J. L., Barr, R. F., & Strouse, G. A. (2005). Age, ethnicity, and socioeconomic patterns in early computer use: A national survey. *American Behavioral Scientist,* 48(5), 590-607.

Clinedinst, M. (2004). *Serving the Nation: Opportunities and Challenges in the Use of Information Technology at Minority-Serving Colleges and Universities*. Washington, D.C: The Institute for Higher Education Policy

Costigan, S., Perry J.S. (Eds.) (2012). *Cyberspaces and global affairs*. 242. Burlington, VT: Ashgate Publishing Company

DeBell, M (2005). Rates of computer and internet use by children in nursery school and students in kindergarten through twelfth Grade: 2003. *National Center for Education Statistics, 1111,*

Dennis, J.M., Phinney, J.S., & Chuateco, L.I. (2005). The role of motivation, parental support, and peer support in the academic success of ethnic minority first-generation college students. *Journal of College Student Development*, 46 (3), 223-236.

Enoch, Y., & Soker, Z. (2006). Age, gender, ethnicity, and the digital divide: University students' use of Web-based instruction. *Open Learning,* 21(2), 99-110.

Esposito, M., Impagliazo, D., Podell, R., Bracchio, B. & Morote, E.S. (2011). Do Perceived Levels Of Technology Training In High School And Computer Access In College Meet The Coursework Demands Of College Students?. In *Proceedings of World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education 2011* (pp. 608-616).

Galusha, J. M. (1997). Barriers to learning in distance education. *Interpersonal Computing and Technology, 5,* 6-14.

Goode, J. 2010. Mind the gap: The digital dimension of college access. *Journal of Higher Education 81*(5), 583-618. ERIC, EBSCOhost (accessed April 29, 2011).

Jackson, J. H. (2001). *NAACP Call for Action in Education*. Baltimore, MD: NAACP Education Department. Retrieved from http://www.eric.ed.gov/PDFS/ED474666.pdf on Oct 3, 2011

JBHE Weekly (2007). Black Student College Graduation Rates Inch Higher but a Large Racial Gap Persists. *Journal for African Americans in Higher Education,* 4(2) Retrieved from http://www.jbhe.com/preview/winter07preview.html on November 22, 2011

Krieg, R. M. (1995). Information technology and low-income, inner-city communities. *Journal of Urban Technology*, *3*(1), 1-17.

Maheshwari, S. K., Pierce, A. L. & Zapatero, E. G. (2009). Understanding the lack of minority representation in graduate programs in computer science and information technology: a focus group study of student perceptions. *Academy of Information & Management Sciences Journal* 12, *1*(2): 71-90. Retrieved April 29, 2011 from Business Source Complete: EBSCOhost.

Martinez, M., Klopot, S. (2005). *The link between high school reform and college access and success for low-income and minority youth*. Washington DC: American Youth Policy Forum.

Muilenburg, Lin Y., & Berge, Zane L. (2005). Student barriers to online learning: A factor analytic study. *Distance Education,* 26(1), 29-48.

Noeth, R.J., & Volkov, B.B. (2004). *Evaluating the effectiveness of technology in our schools: ACT Policy Report*. Washington, DC: ACT.

Porter, C.E., Donthu, N. (2006). Using the technology acceptance model to explain how attitudes determine Internet usage: The role of perceived access barriers and demographics. *Journal of Business Research* 2(3) , 999-1007.

U.S. Department of Commerce, Census Bureau, Current Population Survey (CPS), October 2010. (Table prepared September 2011.)

White, J. L., Altschuld, J. W., & Lee, Y. (2006). Cultural dimensions in science, technology, engineering and mathematics: Implications for minority retention research. *Journal of Educational Research & Policy Studies*, 6(2), 41-59.

APPENDIX

Appendix A

List of 56 universities used in the study done by the Journal for African Americans in Higher Education (2007). (Listed by the smallest gap in African American-Caucasian graduation rates to the largest gap)

Mount Holyoke College
Smith College
Wellesley College
Pomona College
Macalester College
Washington University
Hamilton College
Vanderbilt University
Wake Forest University
Amherst College
Bryn Mawr College
Grinnell College
Harvard University
Oberlin College
Williams College
Brown University
Columbia University
Emory University
Princeton University
Wesleyan University
Yale University
Calif. Inst. Of Technology
Davidson University
Johns Hopkins University
Northwestern University
Stanford University
Rice University
Trinity College
University of Chicago
University of Virginia
Swarthmore College
University of Pennsylvania
Vassar College
Bucknell University
Dartmouth College

Georgetown University
University of Southern California
Claremont-McKenna College
Cornell University
Haverford College
Tufts University
Univ. of N. Car.-Chapel Hill
University of Notre Dame
Mass. Inst. Of Technology
Univ. of California-Los Angeles
Washington and Lee University
Univ. of California-Berkeley
Carnegie Mellon University
Colby College
Bates College
Middlebury College
University of Michigan
Carleton College

Duke University
Bowdoin College
Colgate University

VITA

Graduate School
Southern Illinois University

Shantelle M. Smither

shaney18@gmail.com

Southern Illinois University Carbondale
Bachelor of Science, Health Care Management, May 2010

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Major Professor: Stephanie Pink