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EMERGENT TECHNOLOGY AND THE MILLENNIAL GENERATION:
EXAMINING THE PERCEPTIONS OF STUDENTS AND
IMPLICATIONS FOR INSTRUCTION IN
HIGHER EDUCATION

by

Karen Martin-Jones

A dissertation submitted to the graduate faculty
in partial fulfillment of the requirements for the degree of
DOCTOR OF PHILOSOPHY

Department: Leadership Studies
Major: Leadership Studies
Major Professor: Dr. Lisa Gueldenzoph Snyder

North Carolina A&T State University
Greensboro, North Carolina
2011

ABSTRACT

Martin-Jones, Karen. EMERGENT TECHNOLOGY AND THE MILLENNIAL GENERATION: EXAMINING THE PERCEPTIONS OF STUDENTS AND IMPLICATIONS FOR INSTRUCTION IN HIGHER EDUCATION. (**Major Advisor: Dr. Lisa Gueldenzoph Snyder**), North Carolina Agricultural and Technical State University.

The objective of this research was to determine students' perception of technology in higher education. The study participants were recruited from two institutions of higher learning: a small private women's historically black college (School A) consisting of about 740 students and a large public historically black university (School B) consisting of about 10,000 students, both located in a single mid-sized metropolitan area in the southeastern United States. The analysis of the data revealed that there was a significant difference in the personal [$t(384) = 6.952, p = 0$] and educational [$t(326) = 7.470, p = 0$] use of technology by Millennials and Non-Millennials. Additionally, the results revealed a significant difference of Millennials and Non-Millennials perceptions of the technology provided by their college [$t(466) = -4.168, p = 0$]. Lastly, the results revealed a significant difference in students' perceptions of the colleges' understanding of how the student wants to use technology as a learning tool [$t(384) = -2.241, p = .02$]. In summary, Millennials are frequent users of social media, such as Facebook, for personal use. Their interest in personal technology can be reflected in the classroom. Faculty should understand how to effectively use technology as an effective learning tool. Educational leaders can play a significant role in facilitating a technological culture and supporting faculty development.

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This is to certify that the Doctoral Dissertation of

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has met the dissertation requirements of
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DEDICATION

First and foremost, this dissertation is dedicated to my Lord and Savior, Jesus Christ, for keeping me grounded and blessing me to get through this process. To God be the Glory for all the things He has done! To my husband, Jeff, thank you for your love and endless support. Jeff, you have been my best friend, advisor, and a heaven-sent helpmate. You have been a support system like none other; your prayers and words of encouragement have helped me through this process; I thank God for you. To my mother, Phyllis Martin, I love you, and thank God for you and your endless prayers, encouragement, and support. To my beautiful sweet daughters, Ariana, Kennedy, and Taylor, thank you for allowing Mommy time to work on this dissertation and for understanding when Mommy was busy; I love you all. To my wonderful sisters, Kim, Andrea, Kanika, and Adia, thank you for your encouragement and continuous prayers and support. You all are the best sisters anyone could ask for. A special dedication to my beloved sister, Anissa, for always being a role model, I know that you are smiling down on me from heaven.

BIOGRAPHICAL SKETCH

Karen Martin-Jones is a native North Carolinian from Sedalia. Karen graduated from Bennett College with a Bachelor's of Science in Chemistry and has completed a Master's from NC A&T State University in Computer Science. Karen Martin-Jones is an Assistant Professor of Computer Science at Bennett College for Women. She has recently gained an additional responsibility, coordinating a mentoring program for the students. Prior to coming to the Bennett, she worked as a Software Engineer and Configuration Management Team Leader at Lockheed Martin in Beltsville, MD. After spending five years in corporate America, she found herself in the educational arena when she obtained a position at ECPI, College of Technology as an instructor in the Network Security Department. She is a candidate for the Ph. D. degree in Leadership Studies.

ACKNOWLEDGMENTS

I would like to thank my best friend and classmate throughout this journey, Sylvia Burgess; you have been my support, encouragement, and my prayer partner. Thank you so much!! Thank you to my cohort, especially Erma Smith-King, Casey Forrest, and Moses Foxx III.

I would like to thank my Major Professor, Dr. Lisa Gueldenzoph Snyder, for her endless support. She has provided me with guidance and direction as I charted this often dark and lonely journey. She has always given me prompt and continuous feedback and pushed me to levels I didn't think were possible. She has been a motivator, inspiration, and mentor. I will forever be grateful for her encouragement, support, and direction.

I would also like to give a big thank you to my advisors, Dr. Forrest Toms, Dr. Muktha Jost, Dr. Robert Cobb, Dr. Rhonda V. Sharpe, and Dr. Alexander Erwin for their help and support during this time in my professional development.

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CHAPTER 1

Introduction

Higher education has witnessed a dramatic change over the last 30 years in the tools, technologies, and leadership that support teaching and learning (Roblyer & Doering, 2010). The advent of the first microcomputer occurred in the late 1970s and shortly thereafter made its way into education, becoming an integral instructional tool (Roblyer & Doering, 2010). Technological software programs to support effective and efficient teaching and learning continue to evolve in an effort to support a variety of age groups and content areas. Moreover, Web browsers, beginning with Mosaic and continuing today with Internet Explorer have further enhanced computer tools capabilities through the Internet. The pervasiveness of technology provides teachers and students with access to a wealth of information.

Today, the Internet provides many powerful instructional resources including Web 2.0 technologies. This latest generation of emerging technology has transformed the Internet from merely an information-rich resource to an interactive and engaging collaborative tool that invokes innovation through online content creation and sharing through tools such as Twitter and Facebook (Greenhow, Robelia, & Hughes, 2009). Web 2.0 has changed the way educational institutions use technology (Baltaci-Goktalay & Ozdilek, 2010). Web 2.0 technology allows educators to integrate tools that the technically savvy Millennials—the generation born between 1981 and 2001 have grown up with all their life (Black, 2010). Most research on the topic of Web 2.0 technology to

support instruction has focused on the implementation of technology; however, few studies have focused on the way students “react to and use” Web 2.0 technology, which determines the impact that technology has on the students’ learning (Shuell & Faber, 2001, p. 120). Web 2.0 technology provides a means for educators to integrate technology into the curriculum.

Roblyer and Doering (2010) defined the integration of educational technology as a process of addressing the current educational needs of teaching and learning with the most current technological tools and instructional processes. Several factors contribute to the effective and efficient integration of technology including pedagogy, the learner, the instructor, educational leadership, and culture. To support this integration, the International Society for Technology in Education (ISTE) developed standards for students, teachers, and administrators. The National Educational Technology Standards (NET-S) is a framework to assist in the successful integration of technology for PK-12 educators and teacher educators (Roblyer & Doering, 2010). Not only are there standards in place to support PK – 12, colleges and universities are aware of the importance of integrating technology to support learning. Therefore, the Southern Association of Colleges and Schools Commission on Colleges (SACS-COC), the official accrediting and governing body for colleges and universities in the southern states, standard 3.4.12, addresses that higher education should use technology to “enhance student learning” (Commission on Colleges of the Southern Association of Colleges and Schools, 2009). Together administrators and teachers play an integral role in the development of innovative and creative students.

Successful system-wide integration of technology into the learning environment requires effective leadership (Davies, 2003). Effective leadership by college and university administrators is critical as education faces a broad range of challenges in the global Information Age (Davies, 2003). Ramsden (1998) suggested the challenges facing higher education are due in part to the mounting pressures of pedagogy related to incorporating technology to address everyone's learning styles, new technologies for teaching, and the need to produce competitive competent graduates. In order for students to become effective and efficient citizens as well as future leaders of society, they must be proficient users of current and emerging technologies (Shelly, Gunter, & Gunter, 2010). Therefore, the culture and pedagogy of higher education should reflect the skills and abilities that students need to "understand systems thinking, work collaboratively, be flexible, innovative, resourceful, and be able to access and apply new information to solve complex problems" (Schoen & Fusarelli, 2008, p. 185).

The culture of an organization is directed by its leadership (Sarros, Cooper, & Santora, 2008). Ramsden (1998) suggested leadership is powerful in that it has the ability to transform the "commonplace and average into the remarkable and excellent organization, thereby influencing organizational cultural change" (p. 12). In higher education, creating a culture of learning that embraces the power that Web technology provides could potentially benefit the instructional needs of the millennial student. The question is whether this technology is actually used to support learning in higher education.

Bennett, Maton, and Kervin (2008) postulated that using technology to educate the Millennials is a major issue for education. Therefore, this study examined students' perceptions of Web 2.0 technology and instructional technology and its implications for instruction in higher education. To that end, the following sections identify the statement of the problem, the purpose and significance of the study, the research questions, definition of terms, and the assumptions and limitations of the study.

Statement of the Problem

Advancements in technology such as the emergence of ubiquitous computing, social networking, and digital information have changed the way in which students interact with content in higher education both in and out of the classroom (Lee & Spires, 2009). Most students are now “wired” to technology at all times. For example, college students often bring laptops to class rather than pen and paper (Glenn & D’Agostino, 2008). Access to information is literally at their fingertips. Between classes, students use iPods and smart phones to communicate via Facebook, Twitter, or texts. In effect, students are physically connected to their digital world (Goode, 2010). The persistent demands from Millennials to use emerging technology as an effective learning tool is changing the way faculty and administrators integrate and provide technology to support education (Lee & Spires, 2009). In fact, Byrne (2010) stated that the longer it takes for schools to integrate technology into the classroom, the further behind American students get from their global peers. According to the 2010 National Education Technology Plan, the United States is no longer the national leader in college completion of young people;

they rank 9th out of 36 developed nations (Department of Education, 2010). In addition, according to *Tribune Business News* (2009), American students lag 10 to 20 places behind Asian and European school systems. As a result, businesses could potentially be impacted by “global competition, productivity, innovation and technological advances” if in fact faculty are not incorporating current, engaging, innovative technology into the classroom (p.1).

A study conducted by Shuell and Farber (2001) revealed students view technology as beneficial to facilitate learning and to increase their motivation to learn. Other research has suggested that Millennial college students are collaborative, technologically sophisticated, and experiential multi-taskers who are team-oriented and concerned about social issues (Friel et al., 2009; Howe, Strauss, & Matson, 2000; Oblinger & Oblinger, 2005). Therefore, educators have a great responsibility to create a learning environment that integrates these attributes to help students engage in active and collaborative learning (Friel et al., 2009).

However, Prensky (2001a) suggested educators from older generations are less comfortable with technology because they did not grow up with it. Therefore, these faculty members are reluctant to integrate or adopt technology as a teaching/learning tool. To ensure the educational benefits of these technologies and to best support the educational needs of the Millennial generation, leaders of higher education have a unique opportunity to support change in their educational culture (Ebner, Lienhardt, Rohs, & Meyer, 2010). The Millennial generation is different from previous generations, and in order for educators to understand how students process, absorb, access, interpret, interact,

and apply information using technology, more research needs to occur (Shelly et al., 2010). Thus, an examination into the generational differences that seemingly exist between the educator and the student is needed. Gaining an understanding of students' perceptions educators are provided with a framework for instructing the digital Millennial student in the classroom with the technology they use daily. Moreover, this study sought to provide a context for addressing this problem by surveying students. The next sections define Web 2.0 technology specifically as it can be integrated into educational environments, identify the Millennial generation and how they learn, and provide a context for leadership in supporting the use of Web 2.0 technology as a cultural shift in educational pedagogy.

Web 2.0 technology. Web 2.0 technology has enhanced the Internet to the extent that it is an interactive, collaborative, communicative, and user-content driven medium (Ebner et al., 2010). Web 2.0 is considered to be a “read-and-write” participatory and collaborative web-based experience where learning can take place in different environments, such as in the classroom, or by blogging with people from countries to learn about their cultures and traditions. Relationships are developed through collaboration via the web interface, such as making friends with others through Facebook or followers on Twitter or by creating a wiki where users can contribute information (Greenhow et al., 2009). The access and experience provides few if any barriers in the sharing of information.

Web 2.0 applications include Facebook, Twitter, MySpace, Wetpaint, Ning, Flickr as well as generic tools such as blogs, microblogs, wikis, podcasts, videocasts, and

mashups. All of these examples promote interconnection among users. For example, Facebook is a social networking site that provides virtual social interaction (Pempek, Yermolayeva, & Calvert, 2009). In 2006, Facebook was used in over 2,000 U. S. colleges and was the seventh most popular site on the World Wide Web with respect to total page views (Ellison, Steinfield & Lampe, 2007). In addition, Web 2.0 technologies allow for shared knowledge creation through the Internet (Ajjan & Hartshorne, 2008). The emergence of Web 2.0 provides effective and efficient possibilities to support innovation through instruction (Batson, 2010). For example, Web 2.0 provides the ability for students to embrace innovation through the development of content as well as upload and share their innovation with others (Greenhow et al., 2009). Thus, Web 2.0 creates an ideal classroom environment for students to engage in participatory dialoging processes through tools like blogs and wikis.

Web 2.0 technologies align with President Obama's initiative entitled "Educate to Innovate" (Office of the Press Secretary, 2009), which is designed to develop a generation of innovative 21st Century individuals with global perspectives (p. 1). The 2006 Programme for International Student Assessment (PISA) and the 2009 National Assessment of Educational Progress (NAEP) identified a gap between the U.S. and other countries' standardized test averages (The White House, n.d.). The U.S. is failing to be competitive, and the President's initiative attempts to close the gap. According to President Obama, "reaffirming and strengthening America's role as the world's engine of scientific, discovery, and technological innovation is essential to meeting the challenges of this century" (Office of the Press Secretary, 2009, p. 1). The President has collaborated

with a number of other high-powered constituents, such as the MacArthur Foundation, Time Warner Cable, and Sesame Street. These organizations have joined together in an attempt to address the growing problem to “motivate and inspire” young people to excel in the Science Technology Engineering and Math (STEM) disciplines (p. 1). The use of emerging technologies can be used to help motivate and inspire the Millennials.

Educating a generation of innovative, globally competitive students in higher education is a major concern for Microsoft Corporation. In an interview hosted by *Innovate* editor-in-chief James L. Morrison, Microsoft Vice President, Ralph Young, stated that higher education holds the key to resolving many of the issues present in the world. Morrison stated that Microsoft’s vision for higher education in the 21st Century “is driven by the conviction that technology will help remove limitations, foster innovation, and enable both students and teachers to live up to their full potential” (Morrison & Young, 2009, p. 1). Web 2.0 technology provides educators with a platform for creative innovation to occur through a cost effective means because many of the Internet tools are free.

Millennial learners. The pervasiveness of technology has changed the way in which institutions of higher learning respond to the technically savvy students entering college campuses. The Millennials, net generation, or digital natives, as they have been labeled, are defined as a generation who have always grown up with technology, can’t imagine life without it, and are highly proficient in its use (Jones, Ramanau, Cross, & Healing, 2010; Prensky, 2007). Millennials are the traditional-aged students currently enrolled in colleges and universities ranging in age from 18 to 30 (Hoyert & O’Dell,

2009). The influx of the Millennials entering colleges and universities has caused institutions of higher learning to assimilate to the technological demands of the student in the form of access to and services provided through technology both in and out of the classroom.

According to the 2009 Pew Internet Project (Jones, & Fox, 2009) 90% of Millennials and 87% of Gen Xers use the Internet, compared with 79% of Baby Boomers and only 40% of the Silent Generation. These data suggest an increase in use from each successive generation. These data further documents the generational difference between Millennial students and educators' ability or willingness to integrate emerging technologies to support teaching and learning. As a result, researchers have begun to examine the generational differences and similarities that exist among the generations (Kennedy, Judd, Churchward, Gray, & Krause, 2008).

In general, the intergenerational digital divide has become a buzz phrase in relation to technology and the generational gap (Kennedy et al., 2008). However, recent studies suggest more research needs to occur to assess the intergenerational divide and the impact it has on educating the Millennials (Jones et al., 2010; Kennedy et al., 2008; Salajan, Schonwetter, & Cleghorn, 2010). Prensky (2001b) identified instructors from the older generations—GenX, Boomers, and the Silent generation—as reluctant to embrace technology and are “struggling to teach” a Millennial “population that speaks an entirely different language” (Prensky, 2007, p. 2). Prensky further suggested that the disparity that exists between these generations is “the biggest single problem facing education today”

(p. 2). Educators' lack of technical skills present an obstacle to effectively teach Millennials whose use of technology is so pervasive (Kennedy et al., 2008).

Additionally, Millennial students are hands-on learners. They use technology to make meaning of information. Web 2.0 technology can potentially provide students with the skills necessary to “understand systems thinking, work collaboratively, be flexible, innovative, resourceful, and be able to access and apply new information to solve complex problems” (Schoen & Fusarelli, 2008, p. 185). Educators can use constructivist teaching methods to integrate Web 2.0 technologies to both support students' hands-on learning as well as their proclivity for technology. Constructivism is defined as learner-centered, active, experiential, problem solving learning through social and collaborative interaction (Huang, Rauch & Liaw, 2010). Therefore, learning is the result of constructed meaning. What a student “brings” cognitively to the learning environment is very important to constructivism as it determines what and how knowledge is constructed by the learner (Winn, 2003). Student-centered instruction actively engages students through self-directed learning and collaborative inquiry (Law, Pelgrum, & Plomp, 2008). In effect, constructivism occurs through social negotiations in which social situations encourage collaboration and tolerance of other viewpoints (Lowerison, Sclater, Schmid, & Abrami, 2006). Millennial learners are uniquely driven by social interaction; therefore, constructivism is an appropriate methodology to engage them in the learning process. Nonetheless, Batson (2010) emphasizes that it is not the technology itself, but the importance of a shift in the mindset of the educators to be leaders of innovation in an effort to motivate the students through tools they are accustomed to utilizing.

Leadership in educational culture. Leadership plays a critical role in determining the culture of the university. The culture of the organization impacts organizational outcomes, such as creating a culture of innovation (Sarros et al., 2008). In addition, leadership in higher education influences change and innovation through culture (Damanpour & Schneider, 2006). In order for higher education to create a climate of technological innovation, a transformational style of leadership is needed that “motivates followers to perform and identify with organizational goals and interests” (Sarros et al., 2008). The amount of encouragement and support faculty receive, the greater the chance that innovation will occur, thereby developing a culture of technological innovation. Educators play a vital role in ensuring the learning environment is one in which technological innovation and knowledge can occur through a student-centered approach, making the focus the student and not the lecturer (Ramsden, 2007).

Purpose and Significance of the Study

Steffl-Mabry, Doane, Radlick, and Theroux (2007) stated that “the technology of the computer has changed the landscape of education: redefining teacher’s roles and responsibilities, expanding students’ learning and communication spaces, and providing new educational and social opportunities” (p. 299). According to Pedretti, Mayer-Smith, and Woodrow (1998):

as with any new educational innovation, the impact of the changes that accompany the introduction of the technology on all stakeholders needs to be considered. In a technology-enhanced classroom, where teaching and learning

may be dramatically changing, the voice of those affected most...must be heard (p. 570).

Although a handful of studies have been conducted that relate to issues affecting African American Millennial students (e.g., Bonner, Lewis, & Bowman-Perrott, 2009; Burley, Barnard-Brak, & Marbley; 2010; Drezner, 2009; Henry, 2008; Mattai, Wagle, & Williams, 2010), none were found to date that investigated African American Millennial students' perceptions of information technology as a support to their education. Despite attempts at articulating characteristics of Millennials, few studies have examined students' perceptions at historically black colleges and universities (HBCU's). Furthermore, limited research has examined specifically Millennial students' perceptions of technology at HBCU's. Kennedy et al. (2008) posited that more research needs to occur to determine the extent to which students' daily technologies are adapted to their learning environment. Also, students' perceptions of technology can generate data that may be useful for university leaders in their efforts to support cultural shifts that embrace technologically supported teaching and learning.

Therefore, the purpose of this study was to understand the perceptions of African American Millennial students. Their perceptions of instructional technology provide a context for the use of technology as a learning tool in higher education. In addition, with such a diverse population of students in higher education, an in-depth examination of their perceptions enables educators in higher education to address their specific needs and helps to prepare them for the workplace (Black, 2010).

Research Questions

This research study addressed the following three research questions:

1. How do students use Web 2.0 technology?
2. What are students' perceptions of technology in higher education?
3. What differences exist among students' demographics (e.g., age, class standing, and gender) in relation to their perceptions of the use of technology in the higher education classroom?

Definition of Terms

The following terms are used throughout this research study:

- **Constructivism** (*Social Constructivism*) is defined as the emergence of knowledge as learners construct meaning from information and participatory learning (Okojie, Okojie-Boulder, & Boulder, 2008). Learning is a social and active process in which the learning process is student-centered as opposed to teacher-centered (Lowerison et al., 2006).
- **Culture** is the “tacit understandings, boundaries, common language, and shared expectations maintained over time by members of an organization” (Aiman-Smith, 2004, p. 1).
- **Emergent technology** is the latest, innovative, and cutting-edge technology infiltrating society.
- The **Intergenerational Divide** is defined as the division that exists between the Millennials (current traditional-aged college students) and other generations

(Generation X, Boomers, and Silent Generation). Most educators represent the older generations and are often more reluctant to embrace technology and, therefore, are “struggling to teach” the Millennials who “speak an entirely different language” (Prensky, 2007, p. 2)

- **Leadership** applies to higher education administration consisting of department and division heads, deans, provosts, chancellors, and presidents.
- **Nontraditional students** are learners who are older than 23 years of age (Hoyert & O'Dell, 2009).
- **Microblogs** such as Twitter are defined as popular communication tools that allow individuals the opportunity to quickly respond to comments from followers with short messages (Ebner et al., 2010).
- **Millennials** (or *Net Generation* or *Digital Natives*) are defined in this study as individuals born between 1977 and 2001; they are the first generation that grew up with technology (Ajjan & Hartshorne, 2008; Black, 2010, Prensky, 2007).
- **Social Networking Sites** are tools that allow collaboration, knowledge sharing, and interactions with users who share the same interests. Examples include Facebook and MySpace (Usluel & Mazman, 2009).
- **Traditional students** are students ranging in age from 18 to 23 years of age (Hoyert & O'Dell, 2009).
- **Web 2.0 Technology** allows for the communication, collaboration, and shared thoughts and ideas among multiple users on the Internet. Examples include Facebook, Twitter, YouTube, Flickr, and GoogleDocs (Greenhow et al., 2009).

Assumptions and Limitations of the Study

This study is based on the assumption that the survey participants (students) will answer the survey questions honestly and completely. It is also assumed that the participants will understand the Web 2.0 technology listed in the survey instrument. The generalizability of the study is limited to the population from which the survey participants were drawn. This includes individuals matriculating at HBCU's within a single regional area of the Southeast. Also, this study explored only students' perspectives of technology.

Summary

This study seeks to address students' perceptions of Web 2.0 and instructional technology in higher education. Web 2.0 technology is considered to be a "read-and-write" participatory, collaborative web where learning takes place in different environments, and relationships are developed through collaboration (Greenhow et al., 2009). Web 2.0 technology allows users to construct their own knowledge, share, and provide feedback through the web, thereby supporting collaboration and communication with multiple users.

Millennial learners are the technically savvy individuals entering colleges and the workplace that have grown up with technology (Prensky, 2001a). The intergenerational digital divide has prompted researchers to investigate the effective use of technology as an instructional tool. The intergenerational divide suggests that older generations (Gen X, Boomers, and Silent) who are not as familiar or as comfortable with technology, are

struggling to teach the Millennials, who are also known as digital natives. Leaders include faculty, academic directors, chairs, division heads, deans, provosts, chancellors, or presidents of universities who influence the culture of technological innovation. The significance of this study is to add to the body of knowledge regarding how students perceive emergent technologies to support pedagogy and their use of technology in higher education.

CHAPTER 2

Literature Review

The relationship between academic leadership and educational technology can be a critical element in providing effective instruction for students, especially the Millennial student who has grown up with technology. The importance of understanding Millennial students is a fundamental component to understanding how they learn and how they should be taught (Black, 2010). The purpose of this study was to examine students' perception of technology and its implications for instruction in higher education. To gain a more in-depth understanding of technology in education and to support the conceptual framework it is necessary to explore the current literature relevant to this study. First, pedagogical strategies (educational technology history, learning theorists, student-centered learning, Millennial learners) are examined. Next, literature on Web 2.0 technologies (blogs, microblogs, wikis, social networking) is reviewed. Finally, literature on academic leadership (culture, leadership models, and transformational leadership) is explored.

Pedagogical Strategies

Educators come from different backgrounds with varying views on pedagogy in educating students in the use of technology. "Teaching takes place within the context of educational philosophies based on theories of how people learn" (Rovai, Wighting, Baker, & Grooms, 2009, p. 8). In order for educators to integrate technology into the

curriculum an understanding of the learning styles is required, especially for educating the Millennial learner. For the purpose of providing background information and in setting the context for this study the history of educational technology, learning theories, student-centered learning and Millennial learners have been addressed in this section.

History of Educational Technology

Although multiple perspectives have evolved throughout history to shape educational technology, tools such as the printing press that were not initially intended to impact education changed the educational system by providing individuals with information from around the world through written words (Koh & Lim, 2008). As a result educators began to examine more closely the educational system and educational philosophies of learning. Although the concept of educational technology is not new, the modern technologies are new and have changed the dynamics of how technology is integrated in the classroom (Roblyer & Doering, 2010; Saettler, 1990). Roblyer and Doering (2010) suggested that four perspectives have evolved to shape current practices in the field educational technology. These include audio visual, instructional design, instructional computing, and vocational training.

First, the audio visual and communications perspective of educational technology emerged as a more effective means for providing instruction through media than the traditional method of listening to lectures and reading books. In the 1930's, instructors in higher education began to deliver content in the form of slides and films. In the 1950's, The Federal Communications and Commission set aside 242 channels for educational

purposes, this prompted many corporations like the Ford Foundation to invest an estimated 170 million dollars in educational television. Thus, these open stations provided a means for the television to make its way into the educational arena as the single most intriguing way to delivery instruction (Reiser, 2001a). Unfortunately, delivery of instruction through television was short lived primarily due to the poor means of delivery. Many of the programs simply involved teachers delivering instruction which was similar to the traditional classroom setting. In addition, the reluctance of many educators to embrace the concept as well as the inability of the television medium alone to adequately satisfy the needs of the learner. The visual learning focus led to the second perspective, addressed instructional systems and design. This perspective evolved after WW II when military and industry trainers were tasked with preparing large numbers of personnel efficiently. From this perspective developed the belief that human and machine could be merged together to accomplish the goal of effectively developing and producing training materials. This created the relationship between higher education research and training professionals, thus, giving rise to the behavioral and cognitive theories, such as constructivist or directed learning. In the 1950's, a third perspective emerged with the advent of the high-speed electronic digital computer (EDC). This instructional computing perspective changed the dynamics of the educational environment by exponentially increasing the computational abilities. In 1980, technology education increased the need for vocational training to prepare students for the working world through hands-on experiences using math, science, technology, and the humanities.

Researchers began to study how people learn, and modern developments such as inquiry-based learning emerged. Throughout the educational field, many learning theories were developed to understand not only specific “learning goals,” but the “process of learning” (Koh & Lim, 2008, p. 102). Today, technology is indigenous to the Millennials and Web 2.0 technologies are causing educators to revisit learning theories to engage the Millennials. The authors state that two learning theories that have dominated the educational arena are the behaviorist learning theory and cognitive information processing.

Learning Theorists

The theoretical foundation of the constructivist and inquiry-based learning models are derived from several renowned proponents of the constructivist concept including: John Dewey, Lev Vygotsky, Piaget and Jerome Bruner. The concepts and beliefs are derived from a combination of multiple concepts such as social activism, scaffolding, and stages of development (Roblyer & Doering, 2010).

Behavioral learning theory. BF Skinner was one of the widely recognized behavioral learning theorists. Skinner’s operant conditioning theory, whose basic tenet focuses on reinforcement learning (Saettle, 1990). He believed that the teaching machine encourages learners to become active participants in the learning process because humans are forced to think through a process to develop the answer before putting it into the machine. Skinner’s principles are based on Pavlov, a Russian physiologist, who viewed learning as an involuntary response to some outside stimuli (Roblyer & Doering, 2010).

This concept emerged from Pavlov's conditional research with dogs who salivated at the sound of a bell because they related the sound with food (Saettle, 1990).

Cognitive information processing and constructivism. Piaget and Bruner are known for the cognitivism or cognitive information processing, whereby when information is received and processed, learning occurs and changes the cognitive structure of the mind (Koh & Lim, 2008). Traditional educational models have merged behaviorist and cognitive theories to form the constructivist learning theory. Constructivism is a student-centered approach to learning. Constructivism "is not a unified theory, but rather a conglomeration of different positions with varying emphases" (Tynjala, 1999, p. 364). Constructivism rejects the notion that knowledge is passive rather than active. Also, in the constructivist framework, the role of learning allows students to function in the environment in which they are comfortable (Grabe & Grabe, 2007). In addition, Hannafin and Land (1997) posited that constructivism occurs through the assimilation of knowledge where one perceives the value and meaning of learning, whereby existing knowledge and current knowledge connect to construct understanding and meaning of the problem, accordingly.

John Dewey. John Dewey was an influential educational psychologist who made a significant impact on the concept of student-centered learning (Roblyer & Doering, 2010). He believed that learning occurred through social experiences. Dewey felt that education provides growth through knowledge acquisition by integrating hands-on activities to real world problems. In addition, he believed that learning should be experiential and collaborative. He further believed that education develops relationships

and an understanding of culture and one's place in society. He viewed school as a community and extension of society. Dewey believed students should be allowed to "construct, create, and actively acquire information" (p. 382). In addition, Dewey believed that student-centered learning is a process that occurs whereby the educator plays the role of a facilitator of learning. Both Dewey and Vygotsky believed that education was a social process (Shelly et al., 2010).

Lev Vygotsky. Roblyer and Doering (2010) stated that Vygotsky developed the concept of how culture and cognitive processes shape an individual. He also believed in two levels of cognitive development in which children (novice) and adults (experts) view the world differently, known as the Zone of Proximal Development (ZPD). ZPD is defined as the distance between what a person can learn independently and what a person can learn from adult guidance or influence from more knowledgeable peers. Vygotsky is known for the scaffolding concept in which the instructor is responsible for determining where a student is cognitively and building on it. Utilizing virtual reality or visual technology provide a means to support learning by building on what the children already know using examples and real life experiences that addresses the individual needs of the student. According to Vygotsky, learning occurs through the collaboration of multiple perspectives of others (Shelly et al., 2010).

Jean Piaget. Jean Piaget is credited for his work on the stages in which children develop, sensorimotor (birth-2 years), preoperational (2-7 years), formal operations (7-11 years) and formal operations (12-15 years). Throughout each of the stages Piaget believed that children develop in each stage through interaction with their environment.

When children find themselves in an unfamiliar situation (disequilibrium) they assimilate to the surroundings by integrating past experiences into the new situation (Wadsworth, 1984). In effect, he believed that children's view and experience of the world was shaped by their experiences and cognitive development and reasoning occurred in each stage Roblyer and Doering (2010).

Jerome Bruner. According to Roblyer and Doering (2010) Jerome Bruner followed many of the principles of Vygotsky and Piaget, in that Bruner believed that intellectual development occurred at different stages for children. However, unlike Piaget Bruner believed in active involvement. He supported the concept of making education relevant, through active participation and providing "discovery learning environments" in which students were able to have options and develop relationships through interaction and participation. He believed that if children were able to explore research and construct their own reality they would be more apt to remember the information.

Student-Centered Learning

According to Hannafin and Hannafin (2010), many web-based learning tools can be used to address the student-centered approach. National Educational Technology Standards (NETS) for students emphasizes six key components students should experience through the use of technology:

- Creativity and Innovation
- Communication and Collaboration
- Research and Information Fluency

- Critical Thinking, Problem Solving, and Decision Making
- Digital Citizenship
- Technology Operations and Concepts (Roblyer & Doering, 2010).

They believe that these standards are essential in an effort to produce effective, efficient, and innovative technological Millennials.

In addition, Weimer (2002) defined learner-centeredness by four conceptual domains:

- Balance of power, shifted toward the student
- Role of the teacher, shifted from teller to designer
- Responsibility for learning, shifted from the instructor to the student
- Purposes and processes of evaluation, shifted to better promote learning (p. 38)

Learner-centered environments “foster engagement, collaboration with peers, and experiential learning of complex information” (Hannafin & Hannafin, 2010, p. 13).

Millennial students are social and learn through constructivist learning approaches, which encourage the use of technologies they are most familiar with, Web 2.0 technology (Oblinger & Oblinger, 2005).

Roblyer, McDaniel, Webb, Herman, and Witty (2010) believed that with the social and interactive nature of interactions with and among students through the use of social networking sites such as Facebook, instructors can increase the overall quality of engagement in a given instructional setting and, thus create a more effective learning environment.

Millennial Learners

Also known as digital natives or the Net generation, Millennials are individuals born between 1977 and 1997. Millennials are the first generation to grow up surrounded by home computers, video games, and the Internet (Prensky, 2001b). Prensky posits that the ubiquitousness of technology has changed the way Millennials think and process information. He believes that there is a difference in how Millennials process information from their predecessors in this digital age. “As children of the Baby Boomers, the Internet is the medium of choice for [Millennials]” (Leung, 2004, p. 334). This is the generation that is referred to as the new emerging young population born after the time when digital technologies began to be embedded in social life sometime in the 1980’s (Jones et al., 2010).

A study was performed by Leung (2004) to determine how the attributes of Millennials impact Internet addiction. The study consisted of data from a sample of 699 [Millennials] between the ages of 16 and 24. It revealed key points that indicate that Millennials are generally technology savvy and emotionally open on the Internet (Leung, 2003). Interestingly, the results revealed that young female [Millennial] students tended to show a greater Internet addiction than males. In addition, the results suggest that there is a strong connection between Millennials addiction to control and simulation games. The findings also suggest that students addicted to the Internet spend most of their time for social engagement, while non-addicted students use the Internet mainly as an information gathering tool. A gap appears to exist between interactive technology use and education, in which the widening gap between young people’s everyday technology

world inside and outside school impacts the educational systems (Van den Beemt, Akkerman, & Simons, 2010).

Lee and Spires (2009) believe that although students appear to bring different learning styles to the classrooms, educators must understand the social context in which technology is impacting the way Millennial students analyze, interpret and gather data. The role of technology in the classroom lies not only with the student, but it also relies heavily on training teachers on the integration of technology. According to Leonard (2000), Bill Gates made a speech about the future of technology for Generation I, the children born after 1994. He compared the significant impact the television made after World War II to the enormous global impact that the Internet has made on world. In addition, he addressed the importance of teachers understanding how to integrate technology and the critical role they play in educating such an advanced society.

According to an Educause (2005) report on *Educating the Net Generation*, the following characteristics describe typical Millennials:

- Gravitate toward group activity
- Are fascinated by new technologies
- Are racially and ethnically diverse
- Are focused on grades and performance. (p. 5)

Stapleton, Wen, Starrett, and Kilburn (2007) provide an in-depth perspective on generational differences in a study about generational differences in online class use. The study consisted of 966 asynchronous online students from a large Midwest university in the United States, from different generations. According to the study, Millennials have

higher technical expectations of the online course; they expect constant feedback and communication from faculty and students and are more comfortable communicating in discussion forms than the other generations. In addition, the findings suggest that Millennials have difficulty in planning and sticking to their schedule in an 8 am to 5 pm time frame due to their concept of technology being available anywhere and anytime of the day. Finally, the findings from this study reveal that in relation to the online class, perceived satisfaction, learning, and motivation from the various generations are more similar than different. The authors suggest that all the generations represented believe that learning in the online course was not solely a matter of the technological factors but, quality instruction using technology in the online course.

Stapleton et al. (2007) stated that although discrepancies exist within the generational classification differences in the literature one common theme appeared to resonate, Millennials are consistently classified as the newest members of the Net Generation entering higher educational institutions, born in or after 1982. Stapleton et al. further stated that there is a need for colleges and universities to understand unique characteristics that Millennials possess and accommodate to the needs of this generation. In addition, Stapleton et al. described the following 10 themes as characteristics present within the Millennial generation:

- ***Fierce independence***: sense of autonomy derived from being an active information seeker and creator of information and knowledge.
- ***Emotional and intellectual openness***: value the openness of the online environment, like anonymity, and communication through numerous tools.

- ***Inclusion***: view the world in a global context and move toward greater inclusion of diversity, free expression and strong views: assertive and confident resulting from access to information.
- ***Innovation***: constantly trying to push technology to its next level and interested in using technology to solve real problems, preoccupation with maturity: strive to be more mature than their predecessors.
- ***Investigation***: curious and seek discovery.
- ***Immediacy***: wants things instantly and are not willing to wait.
- ***Sensitivity to corporate interest***: the “try before they buy” generation.
- ***Authentication and trust***: tech savvy individuals interested in using technology to research, verify, and validate information.

According to Prensky (2007), there is a distinction between [Millennials] and older generations in that Millennials grew up in a digital world whereas older generations did not grow up surrounded by technology, therefore the concept of technology is a new innovation. Moreover, individuals who have grown up in this technological era are thought to be engaged only in and through technology. Technology is considered their most responsive means of engagement. Web 2.0 emergent technology affords digital natives with the opportunity to embrace the very characteristics of which Howe et al. (2000) speak. The ability to work in groups, embrace in new technology as well as focus on grades and performance through the very means of communication that they use on a daily basis. Many of the Millennials are accustomed to being wired and not having the

ability to turn themselves off digitally in or out the classroom (Stapleton et al., 2007).

Wherein, this same mentality pervades the workplace.

Although technology has begun to permeate the college campuses the persistent resistance from faculty to embrace and integrate technology continues. The National Center for Education Statistics studied technology use in teacher education programs and found that faculty reluctance remains a major barrier to effective integration of technologies in teacher preparation (Roblyer et al., 2010). The study revealed that around 73% of the faculty stated a lack of interest as an impediment. This contradicted the students' results, which revealed a willingness of students to integrate technologies. Collectively, the results provide important data concerning students and faculty use of technology. In sum the results revealed that students in higher education were willing to use technology in the classroom whereas faculty members were not.

Pedagogy Strategies for Millennial Learners

Pedagogical strategies for the Millennial learner are collaborative, active, social, and engaging. The following literature provides insight into the impact that technology has on engaging the Millennial learner. A 2009 study sponsored by Project Tomorrow, a nonprofit educational organization whose focus is on preparing innovative, engaged, global students for this twenty-first century, conducted a national initiative entitled Speak Up (Project Tomorrow, 2010). The study surveyed 299,677 K-12 students, 26,312 parents, 38,642 teachers, 1,987 preservice teachers, and 3,947 administrators representing 5,757 schools and 1,215 districts including public (97%) and private (3%) schools. The

results conclude that students, regardless of demographics such as socio-economic status, grade, gender, etc., stated that emergent technologies are not being utilized in the classroom and is causing them to be disengaged with the learning experience. According Project Tomorrow (2009), the findings suggest that the digital disconnect continues to exist between what the students want and what the teachers are providing.

However, although the literature states there is disconnect between students wants and what teachers provide, one study reports the effectiveness technology provides increased students ability to learn and understand concepts. A study conducted by Shuell and Farber (2001) of 728 students revealed that 85% of the students reported the use of technology helped them learn the material and understand the concepts. Three-fourths of the students stated that technology increased interaction and motivation to learn the material with the instructor. In addition, over half of the participants indicated that technology improved interactions with their peers for the course.

The use of technology may change teaching methods and approaches to learning as well as attitudes, motivation, and interest in teaching and learning subjects (McKeachie & Hofer, 2002). The constructivist learning approach is the process of knowledge construction, the person's own learning process, leads to the application of process-oriented learning in a Web 2.0 environment. As a result, more attention is given to the matter of the learner's own attitude as well as the opinions of others (Ebner et al., 2010).

According to Oblinger and Oblinger (2005) constructivist learning theory is associated with contextual, active, and social engagement to support learning. Students

understand the context, through active engagement and socialization with others like peers experts or by working in teams. Through the hands-on collaborative, social learning process, learning becomes active and real, thus invoking innovation.

Web 2.0 technologies can provide an environment of active learning through collaboration, cooperation, and participation. The collaborative and cooperative pedagogical influences that Web 2.0 technologies offer can make learning become an active and engaging process. Learning to think requires the learner to communicate and think through writing and doing, where others respond to their thoughts (McKeachie & Hofer, 2002). Providing students with the supplemental instructional Web 2.0 technologies such as wikis and social networks educators can create interactive, collaborative learning experiences for students using a media they are familiar with (Ajjan & Hartshorne, 2008). Researchers have found that collaborative learning help students retain information better than when students work individually (Greenhow et al., 2009; Zhang, 2009). Creating a participatory environment in which students are provided the opportunity to engage actively in the learning process allows student to retain information (Ajjan & Hartshorne, 2008). Because Millennials are considered to be the technically savvy generation in which technology is second nature, incorporating technology into the curriculum provides a medium to engage students using the technology they use on a daily basis (Kennedy et al., 2008).

Georgia State University and Enteraction, a social gaming development company, have partnered to integrate texting in the classroom (BizEd, 2010). A professor asks questions in class and has student's text their answers. The texted answers appear on the

screen in class, and students can engage in the learning process using their cell phones. In addition, the questions are placed on the professor's Wiki website where they dialog, and interactive collaboration continues outside of class.

Web 2.0 Technologies

The concept of "Web 2.0" emerged as the dot.com era began to dissolve and new ways in which technology applications were being adapted and adopted to accommodate to the demands of users (Davies & Merchant, 2009). The Web 2.0 term was coined by O'Reilly (2005), an author and publisher of media and technology content. The term was not initially meant to label a specific piece of technology, rather to describe a phenomenon that was occurring during this post dotcom era (Davies & Merchant, 2009). However, the term has since permeated society (O'Reilly, 2005). According to Alexander (2006), Web 2.0's definition is one in which few can agree on. The term often describes a "heterogeneous mix" of old and familiar practices and technologies to produce emergent ideas. The emergence of Web 2.0 technologies has provided a means of connecting people to each other based on their abilities, interests, and personalities. Greenhow et al. (2009) state that today the term is defined by a "read-and-write" web. They further stated that the "read and write" web is not new phenomenon, but one which has existed since the inception of listservs, groupware, and web-based communities. Today, wikis, blogs, and social networking sites are used to link people with common interests in web-based communities just as other media from the past did. Web 2.0 technologies build upon these communities and add a level of openness that listservs and groupware failed to

create. This openness of Web 2.0 technologies makes it a dynamic tool for instruction (p. 247). Web 2.0 is considered to be a “read-and-write” participatory, collaborative web where social digital technologies enable formal (i.e. classroom) and informal (i.e. home) environments of activities to occur. Web 2.0 is both a platform on which innovative technologies have been built and a space where users are as important as the content they upload and share with others (p. 247).

According to Lee and Spires (2009), information obtained from a Pew survey on teens’ Internet use revealed interesting data. The first Pew survey (2009) that assessed teen use of Internet technologies occurred in 2000 and based on a sample size of 17 million reported that 73% of all teens were using Internet technologies. The most recent study conducted in 2007 reported an unprecedented 93% of teens use the Internet. The study also revealed that over a six year time period teens consistently utilized social networking sites in addition to high use of blogging and information sharing applications.

Web 2.0 technologies encompass a wealth of applications such as Facebook, Twitter, MySpace, Wetpaint, Ning, Flickr as well as blogs, wikis, podcasts, videocasts, microblogs, and mashups. These tools promote the interconnection of users through the following features: “(a) user-defined linkages between users and content, (b) simple mechanisms to share multimedia content, (c) prominent personal profiling, and (d) inter-technology applications” that provide connections through other sites (Greenhow et al., 2009, p. 247). The following sections describe several popular Web 2.0 tools.

Blogs. Davies and Merchant (2009) define blogs as logs on the web in which the owner as well as other bloggers have access to and can comment on comments on a

regular basis. In effect, blogs are central to the concept of Web 2.0 in that they are webpages that are accessed and updated frequently the most recent information several times a day(Alexander, 2006). The ability of authors to create and update blogs creates an environment that empowers the readers to write, promoting the read/write web concept. Blogs allow for users to be both viewers and creators of content. Ajjan and Hartshorne (2008) stated that the opportunity that blogs provide for educational purposes are vast in that they provide communication to occur on topics in history, politics, science and a wealth of other topics.

Wikis. Wiki's are tools that allow for collaboration and communication of information from users creating or editing webpage content (Shelly & Frydenberg, 2011). Users are provided with the opportunity to interact by adding, removing, or editing content. The best example of a wiki is Wikipedia (Ajjan, & Hartshorne, 2008). Wikipedia is setup in the form of an encyclopedia in that users can add content and sources about different topics. However, with the ability for multiple users to add content, the veracity of the information may not be accurate or valid. The benefits gained from the multiple uses wikis provide in the educational arena is its ability to support learning through collaboration and editing from a group and peer reviewed perspective (Ajjan & Hartshorne, 2008).

Microblogs. Ebner et al. (2010) define a microblog as the newest form of online communication blogging in which users express their thoughts to followers in 140 words or less. Microblogs provide users with the ability to share their thoughts globally and allow other followers the opportunity to comment back. The most popular microblogger

is Twitter. Twitter is a real-time information network powered by individual posts that lets users share brief bursts of information. The delivery of posts can be limited to friends in the senders circle or open to all. All users can send and receive tweets via the Twitter website, or external applications such as ones mobile smartphone. In addition, the authors stated that many advantages can be gleaned from utilizing microblogs in education. First, constant feedback is provided and secondly, responses are short and limited. Although, microblogs provide positive possibilities, there are in fact negative drawbacks to the use of microblogs. For example users can only text in short responses not allowing the user to focus in depth on a specific topic. Also privacy of information can prohibit the exchange of information (Ebner et al., 2010).

Ebner et al. (2010) stated that collaboration and communication by means of weblogs and wikis enhance traditional education in a new and exciting way. Ebner et al. conducted a case study on microblogging in higher education, part-time and full-time students enrolled in a class in which they were asked to blog with one another on a group project for 2 to 3 weeks. The results revealed that microblogging can be viewed as a communication tool that can be used to support learning in an informal learning environment outside of class, allowing for learning to continue outside the classroom through this newest form of communication (Ebner et al., 2010).

Social networking sites. Brown and Adler (2008) stated that “social learning is based on the premise that our *understanding* of content is socially constructed through conversations about that content and through grounded interactions, especially with others, around problems or actions” (p. 18). Since the introduction of social networking

sites, millions of users have been attracted by them and have integrated them into their daily practices (Boyd & Ellison, 2007). The author defines a social networking site as web-based services that allow individuals to 1) construct a public or semi-public profile within a bound system, 2) articulate a list of other users with whom they share a connection, and 3) view and traverse their list of connection and those made by other within the systems. (p. 2)

Shen and Khalifa (2008) stated that online communities refer to Internet-connected collectives of people who interact over time around a shared purpose, interest, or need. Shen and Khalifa further stated that online community participation in the form of postings is the “pulse” for generating content and building relationships. Online interactions do not necessarily remove people from their offline world but may indeed be used to support relationships and keep people in contact, even when life changes move them away from each other (Ellison et al., 2007). Through social interaction in virtual environments, social networking sites foster innovation and collaboration (Pempek et al., 2009).

Kennedy et al. (2007) state that Facebook is a social networking site in which users can create and customize profiles. Facebook was created in 2004 and had a reported 30 million users in 2007. According to Pempek et al. (2009), users are allowed to designate friends and an individual who is invited to be a member’s friend may either accept or reject the offer, thus providing individual control over one’s list of friends. In addition, the authors state that Facebook allows users to collaborate and communicate with “friends” online. In 2006, Facebook was used at over 2,000 United States colleges

and was the seventh most popular site on the World Wide Web with respect to total pages viewed (Ellison et al., 2007).

Academic Leadership

Davis (2003) suggested that many of the financial, governance, diversity, content, planning, assessment and technology challenges facing academic leadership in higher education will require change of some sort, whether minor or major. The Millennials are a generation of students who arrive on campus with the same expectations that they are accustomed to receiving in their daily lives; having better, high quality, variety service “that satisfies their definition of a good education” (Owen & Demb, 2004, p. 636).

Culture. Aiman-Smith (2004) defined “culture as a process that starts with leadership, is reinforced with the accumulated learning of the organizational members, and is a powerful (albeit often implicit) set of forces that determine human behavior” (p. 1). He posits that culture is more than the tacit understandings and shared experiences. Koh and Lim (2008) premise that culture plays an integral role in education, and should not be ignored when understanding and implementing technology. A research study focused on implementing technology to enhance teaching at a community college concluded that higher education should create an environment or culture that is technologically advanced and empowers students to be lifelong learners through knowledge acquisition (Owen & Demb, 2004). Williams (2008) stated that “if schools are to overcome some of the current problems” (p. 223)—and to bridge the cultural generational gap between the teachers and [Millennial] students—school leaders must

not only make well informed decision, but decisions that address the Millennial students technically innovative abilities.

According to the research analysis group, Economist Intelligence Unit (2008), technology will continue to have a major impact on higher education. The education research firm conducted a study to assess the use of technology in higher education and in the workforce. The study sample consisted of 289 executives, of which 189 came from higher education and 100 from corporate settings. Just over one-half ($n = 154$) of the respondents were from the U.S., and the remainder were from Europe ($n = 69$), Asia-Pacific ($n = 43$), and other parts of the world ($n = 23$). The participants were comprised of board members; corporate-level respondents, private-sector respondents, professors, deans and other faculty members accounted for those individuals surveyed. The results revealed that 63% of the individuals surveyed stated that over the span of the next five years the innovation of technology will have a major impact on the methodologies related to technology. In effect, technology has the power to transform schools from lecture-based instructional environments to technologically driven active collaborative learning spaces (Zucker, 2009).

Transformational leadership in higher education. Northouse (2007) defined transformational leadership as a process of transforming and developing followers to their fullest potential. Bass (1985) posits that the transformational leader changes the culture of the organization. According to Ramsden (2007), effective educational leaders work together to create an environment that is collaborative. Transformational leadership is defined by Burns (1978) as a relationship where both the leader and the follower are on

one accord and have the ability to transform one another. In addition, Burns believes that transformational leadership occurs when individuals engage in relationships that allow leaders and followers to motivate each other to higher levels of achievement. A key component of transformational leadership is the motivational component.

Transformational leadership in higher education has the motivational potential to bring out hidden talents and abilities that have been submerged, through the process of simply valuing the person (May, Chan, Hodges, & Avolio, 2003). Students and educators alike benefit from the qualities the transformational leadership model exudes, in that the concept of transforming the followers' attitudes, beliefs and values motivates them to exceed beyond expectation by the transformational leader (Rafferty & Griffin, 2004).

James McGregor Burns, a world renowned researcher and major contributor to transformational and transactional leadership in the field of leadership studies, describes transformational leadership as a process of "transforming leader" (Couto, 1995). He states that a transformational leader shapes, alters, and elevates the motives, values, and goals of followers, thereby evoking a significant change within in the leader.

Furthermore, transforming leadership "is a relationship of mutual stimulation and elevation that converts followers into leaders and may convert leaders into moral agents" (Burns, 1878, as cited in Wren, 1995, p. 103).

Bernard Bass, a world-renowned contributor to the field of leadership and founding editor of the scholarly magazine entitled *The Leadership Quarterly*, on the other hand, believes that the transformational leader can potentially create an environment in which the leaders motivates the follower to go beyond the leaders expectation (Wren,

1995). In essence, Bass believed that transformational leaders ultimately change or transform the individual following. The concept is reciprocal, wherein the follower transforms the leaders, and leaders transform followers through engagement and interaction with one another (Wren, 1995). Thus, creating a relationship in which transformational leaders display strong moral values and ideal which result in motivating the follower to contribute for the greater good.

Conger and Kanungo (1998) believed that the transformational leadership model should be built upon four behavioral components that every transformational leader should possess: “(1) charisma (2) inspiration (3) intellectual stimulation, and (4) individualized consideration. Northouse (2007) stated that several factors impact leadership:

- Leaders who are respected by their followers and act as strong role models for followers by providing vision and mission for the follower.
- Leaders who express high expectations to the follower, and inspire them through motivation and thereby creating a sense of commitment to and inclusion in the vision. Leadership that “stimulates followers to be more creative and innovative and to challenge their own beliefs and values as well as those of the leaders and the organization” (p. 179).
- Leaders who provide a supportive climate in which they listen carefully to the individual needs of followers. In this level “leaders act as coaches and advisers” (p. 179).

Mission/vision of the leader is a necessary component for leadership and for the followers “buy in” to the vision. The ability to transform an individual, in turn, has the potential based on the transformational leadership characteristics and qualities to transform an organization and produce a motivated, innovative, effective environment. An environment built on the belief that individuals within the organization are on one accord, in the effective instruction of the Millennial learner.

Leadership within higher education is a topic that has gained a great amount of attention, especially transformational and transactional leadership. Kurland, Peretz, and Hertz-Lazarowitz (2010) conducted a study to predict the impact of that transformational leadership had on shaping and encouraging an organizational culture of learning. The study consisted of 1,474 elementary school teachers from 104 elementary schools in Israel. The findings from the study suggested that vision significantly predicts the transformational leadership style and learning within the organization. The results confirm the theoretical claims that vision is a critical variable in the transformation of schools through transformational leadership. Moreover, transformational leadership proved to be a significant indicator in shaping the organizational culture.

Hood, Poulson, Mason, Walker, and Dixon (2009) conducted a study which examined 150 traditional and nontraditional college students’ preferences of transformational or transactional leadership style for professors. The results from the study concluded that transformational leadership in the classroom creates a positive learning environment for the student. Also, a Hong Kong study by Pounder (2008) examined the effects of transformational leadership in the classroom. The study

participants consisted of 475 undergraduate business college students. The results from the study indicated that professors who exude transformational characteristics in the classroom, had a significant impact on students' motivation, effectiveness and satisfaction.

Summary

A comprehensive review of the literature elucidated students' performance increased in technological student-centered learning environments. Also, constructivist/inquiry-based learning theories undergird the pedagogical integration of technology. Millennials are a generation of individuals who are social, experiential, hands-on learners who utilize technology on a daily basis. In addition, a change in the culture of the university is important in order to embrace technological innovation in which transformational leadership transforms the mindset of the organization. Maurer and Davidson (1998) posited that using technology to support quality and effective learning is a revolutionary transformation in which systemic change must occur in the school culture. The studies revealed that competencies such as collaboration, social skills, and innovation are developed through engaging environments that use technology to support learning. Studies also indicated that differences in technology use exist among generations, including Millennials.

CHAPTER 3

Methodology

The purpose of this study was to examine students' perceptions of technology and the related implications for effective instruction in higher education. Students' perceptions were assessed to measure the use of Web 2.0 and instructional technology. In addition, students were asked a series of demographic questions including gender, age, and major course of study. This chapter describes the methodology of the research by outlining the research design, population and sample, instrumentation, data collection, and data analysis that were performed.

For the purpose of this study, a broad definition of Millennials is used to define the survey participants. According to Black (2010), this generation ranges in age from 10 to 30 (i.e., born 1981 to 2001). However, other researchers (Ajjan & Hartshorne, 2008; Prensky, 2007) extend the top of the Millennial age range to 34 years old (i.e., those born in 1997). Since this study targeted college-aged students, individuals under 18 years of age were not included in the study. For the purposes of this study, Millennials are defined as those currently aged 18 to 34 (i.e., born between 1997 and 2001).

The present study was ultimately guided by the following three research questions concerning technology in higher education:

1. How do students use Web 2.0 Technology?
2. What are students' perceptions of instructional technology in higher education?

3. What differences exist among students' demographics (e.g., age and gender) in relation to their perceptions of the use of instructional technology in the higher education classroom?

Research Design

This study employed a quantitative survey methodology to descriptively evaluate the students' perceptions about technology in higher education and its implications for instruction. According to Wright (2005), survey research methodologies, and especially online surveys, are cost efficient, and they have the ability to reach a broader audience. Online surveys also allow individuals the opportunity to access the survey anytime and anywhere where there is Internet access. Other benefits online surveys provide include integrated access to interpret and analyze large amounts of descriptive data (Wright, 2005). This study employed a cross-sectional design that collected data from a large represented sample. The data were collected simultaneously.

Population and Sample

The participants in this study consisted of college students in higher education. A convenience sample was used to solicit participants. The study participants were recruited from two institutions of higher learning: a small private women's historically black college (School A) and a large public historically black university (School B), both located in a single mid-sized metropolitan area in the southeastern United States. The students were solicited via email from a listserv. School A provides only undergraduate

degrees and has approximately 740 students including full-time, part-time, and high school early college students. School B offers undergraduate, graduate, and doctoral degrees as well as continuing education and certificate programs. School B enrolls approximately 10,000 students, including full-time, part-time, and adult continuing students, and high school early college students. All students enrolled at these schools were eligible to participate in the study. The sample size (n) for each institution was calculated separately to allow for independent analysis. A stratified sample was collected. Based on the sample statistics calculator, a represented sample size for School A was around 240 and for School B was around 370. The total number of respondents ($N = 651$) for this study met the sample sizes at 243 (37.7%) from School A and 408 (62.7%) from School B. Of the total 651 survey respondents, 500 (76.2%) were female and 135 (20.7%) were male.

Instrumentation

The 2010 CDWG 21st Century Campus Assessment Tool (CDWG) was adapted to create a quantitative instrument for this research (see Appendix A). The CDWG questionnaire is a 27-item assessment designed to assess students' perceptions about technology in higher education and is free to download by registering on the CDWG website. This assessment was developed by O'Keefe & Company. Between 2007 and 2010, the assessment was utilized to assess college students, faculty, and IT staff to understand campus technology use, the needs of college students, and how colleges are integrating new tools for learning. This instrument was chosen over other similar

instruments based on the extensive use of this instrument and its prescribed reliability and validity.

Many of the items were converted from open-ended and multiple choice options to five-point Likert scale questions of 1-strongly disagree to 5-strongly agree or 1- never to 5-always. The items identify factors that contribute or influence students' perceptions of the use of technology to support learning and personal use of technology. The three scales developed were (1) *Perception of Technology Scale for Personal Use*, (2) *Perception of Technology Scale for Instruction*, and the (3) *Social Media Usage Scale*.

Additionally, the questions were adapted by changing the wording to include "do you believe" rather than "to what extent is technology used" to gain the personal perceptions of the participants. The first section contained 10 questions that identified demographic information about the participant. The next section examined the students' current use of technology for both Web 2.0 and other instructional technology. For example, "How often do you use social media to connect with classmates to study or work on class assignments?" Other questions addressed students' perception of technology in the academic context. Example items included, "How often do you utilize technology as a learning tool while in class?" or "Please indicate how strongly you agree or disagree with the following statement: My college/university understands how I use or want to use technology as a learning tool. A draft version of the survey was piloted in two classes during the Fall 2010 semester to establish validity of the scales developed by the researcher.

An explanation was included in the survey indicating that participation was voluntary and that participants had the right to terminate their participation at any time. Upon logging into the survey, participants were presented with the informed consent (Appendix A) and clicked “Next” to indicate their agreement to participate in the survey. In total, the survey was open for three weeks. Approximately 10 to 15 minutes were required to complete the questionnaire.

Reliability and Validity

The 2010 CDWG assessment consisted of a total sample size of 1,019 with a margin of error $\pm 3.0\%$ at a 95% confidence level. From that sample, there were 415 students at $\pm 4.8\%$ margin of error at a 95% confidence level. For this study, the researcher developed three scales from the assessment, *Perception of Technology Scale for Personal Use*, *Perception of Technology for Instruction*, and *Social Media Usage Scale*. The Cronbach Alphas reported for the three scales were, .684, .742, and .681, respectively.

The validity of the scales was interpreted from the data collected during the pilot study of 25 students. Validity is a key indicator of the strength of the research. Validity assumes that the findings of the research are true and accurate from the participants’, researchers’, or audiences’ point of view (Creswell & Miller, 2000). Utilizing scales within instruments establishes the validity of the data being measured (Cooper & Schindler, 2006). Thus, scales were developed within the instrument after the pilot study. Although scales were created and tested in the pilot study, which was conducted during

the Fall 2010 semester; the reliability scales were retested after the Spring 2011 data collection. Five of the questions were regrouped differently from how they were in the pilot study. The decision to regroup was based on a more thorough analysis conducted of the similarities in the questions and the internal validity gained from grouping (See Table 4.3). Thus, one additional scale, *Perception of Technology for Personal Use* was created with only two questions.

Data Collection

Data were collected from both schools simultaneously. First, the questions were created in Qualtrics, a web-based survey tool. The 2010 CDWG questionnaire was emailed through a listserv to all students enrolled at both schools. The principal investigator requested all faculty at both schools to urge their students to participate in the survey. Email reminders were sent until a stratified sample was represented for both schools.

Analysis of Data

The quantitative data collected from the survey instrument described the students' perceptions of technology use, their access to technology both in and out of the classroom environment, and their perceived impact of technology on their learning. The results were entered into SPSS for analysis. Data was collected and coded. Descriptive statistics were conducted to analyze demographic variables such as age, race, and classification. Also, frequencies were conducted to analyze use of social networking and other technologies

for personal and educational purposes. The components of questions 25 and 26 (see Appendix A) were combined to create one variable to compare the personal technology use and educational technology use questions. Composite scores were created from survey questions, including “Do you use any of the following technologies in conjunction with your education?” and “Do you use any of the following for personal use?” A means analysis was performed to compare the differences that existed between generational use of technology for educational and personal purposes. The variables were recoded as 0 for No and 1 for Yes because question 25 included an “I don’t know” column that was not in question 26; therefore, the column was removed. Also, three answer options from question 26 were removed to compare questions 25 and 26.

Age was grouped and coded by generations, Millennials were coded as 0 and Non-Millennials were coded as 1. Millennials represented individuals aged 18 to 34, and Non-Millennials were included anyone 35 years of age and older. Gender was coded as 1 for male and 2 for female. Ethnicity was coded into seven groups where the seventh option allowed the participant respond without indicating an ethnic category. Ethnicity was coded 1 for Caucasian/White, 2 for African American, 3 for Asia/Pacific Islander, 4 for Hispanic, 5 for Latino, 6 for Multiracial, and 7 for prefer not to answer. In addition, means analysis and sample t-tests were performed to determine if differences existed among the variables of age and use. Also, means analysis was conducted to examine if differences existed among age, gender, major and perception of technology.

Summary

This study sought to identify students' perceptions of technology and determine the resulting implications for leaders in higher education. This study utilized quantitative descriptive survey analysis. An adapted version of the CDWG assessment was used to examine students' perception of technology. In addition, several demographic questions were developed by the researcher. Means analysis were utilized to determine the differences that exist between generations perception and use of technology. Descriptive analysis and frequency analysis was used to examine participants' age and use of technology. The results of the overall findings were aggregated and are presented in the findings section.

CHAPTER 4

Findings

The purpose of this study was to examine students' perceptions of technology in higher education and the possible implications for educators. The data used in this study were collected from students attending two historically black colleges and universities. This chapter reports on the results of the data analysis.

This chapter begins with a detailed description of the population sample, followed by the results of data analysis, including the reliability data of each of the three scales: *Perception of Technology Scale for Personal Use*, *Perception of Technology for Instructional Use*, and *Social Media Use*. The chapter concludes with a summary of the data analysis.

Population and Sample

The population sample for this study consisted of 651 college students from two historically black colleges and universities in a single mid-sized metropolitan area in the southeastern United States. All participants were enrolled at the beginning of the Spring 2011 semester. Table 4.1 provides a detailed description of the total number of participants enrolled at each of the two schools, the total number of participants from each school, and the represented percentage of participants from each institution.

Table 4.1. Participant Distribution by School

School	Total Enrollment	# of Participants	% Respondents
School A	740	243	33%
School B	10,000	408	4%

The sample population consisted of 135 males and 496 females. School A was an all-female school, which attributed to the large number of female participants. The age range of the respondents was 18 to 68 years. The mean age of the population was 23 years of age. Figure 4.1 displays a distribution of the actual number of each Millennial participant's age represented in the study, and Table 4.2 provides a description of the represented schools based on gender and race.

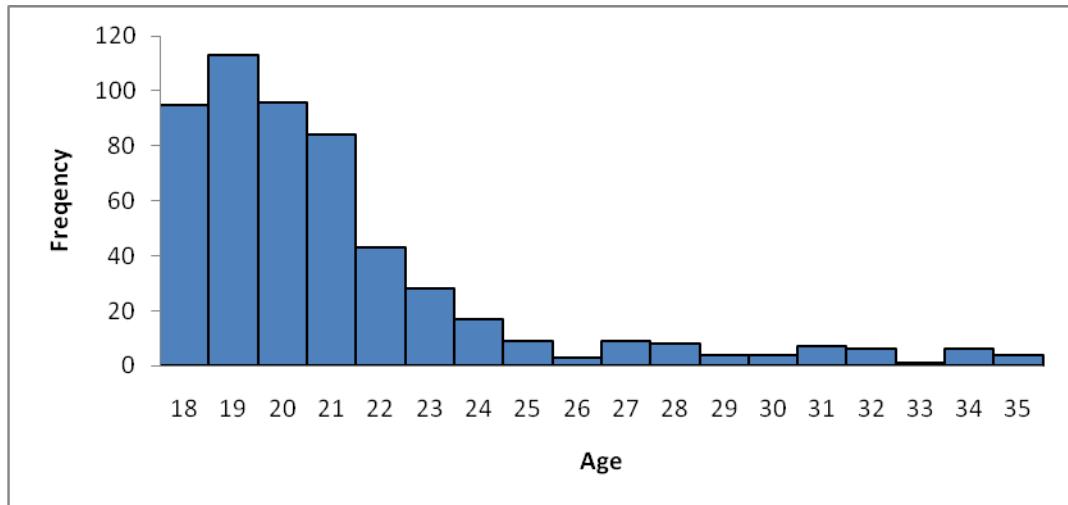


Figure 4.1. Percentages of Represented Age Groups

Table 4.2. Participants' Race by Gender and School

Race	School A (<i>n</i> = 228)		School B (<i>n</i> = 391)		Total (<i>n</i> = 619)	
	Male	Female	Male	Female	Male	Female
	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)
C		1 (0)	24 (6)	25 (6)	24 (4)	26 (4)
AA		204 (89)	83 (21)	205 (52)	83 (13)	409 (66)
A		1 (0)	9 (2)	5 (1)	9 (1)	6 (1)
H		1 (0)	0 (0)	4 (1)	0 (0)	5 (1)
L			1 (0)	1 (0)	1 (0)	1 (0)
MR		14 (6)	6 (2)	17 (4)	6 (1)	31 (5)
NA		7 (3)	8 (2)	3 (1)	8 (1)	10 (2)

Note. C=Caucasian, AA=African-American, A=Asian, H=Hispanic, L=Latino, MR=Multiracial, NA=No Answer

From the 619 participants who reported their race, 492 were African-Americans, 50 Caucasians, 2 Latinos, 5 Hispanics, 37 Multiracial, 15 Asian/Pacific Islanders, 32 missing data, and 18 who preferred not to answer (see Table 4.2). The race/ethnicity was classified as 1 = Caucasian/White; 2 = African American; 3 = Asia/Pacific Islander; 4 = Hispanic; 5 = Latino; 6 = Multiracial; and 7 = Prefer not to answer. African Americans represented the highest frequency of participants (see Figure 4.2). The overall sample consisted of 533 (81.9%) Millennials (ages 18 to 34) and 70 (10.8%) Non-Millennials (35+) and 48 with missing data (see Figure 4.3).

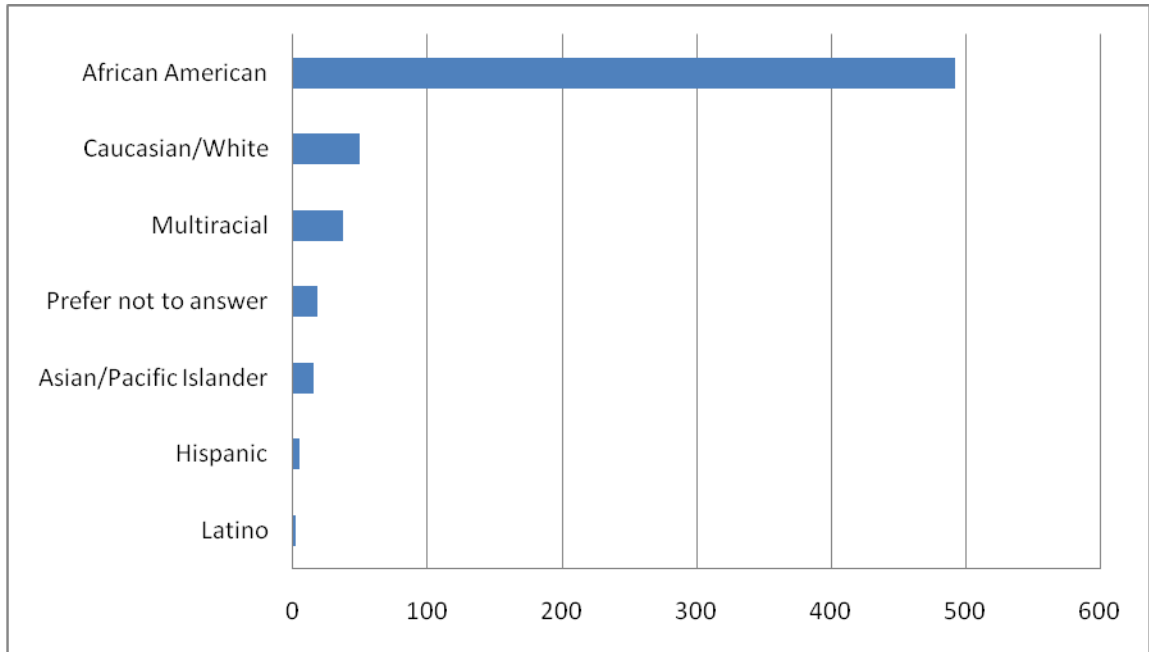


Figure 4.2. Frequency of Participation by Ethnicity

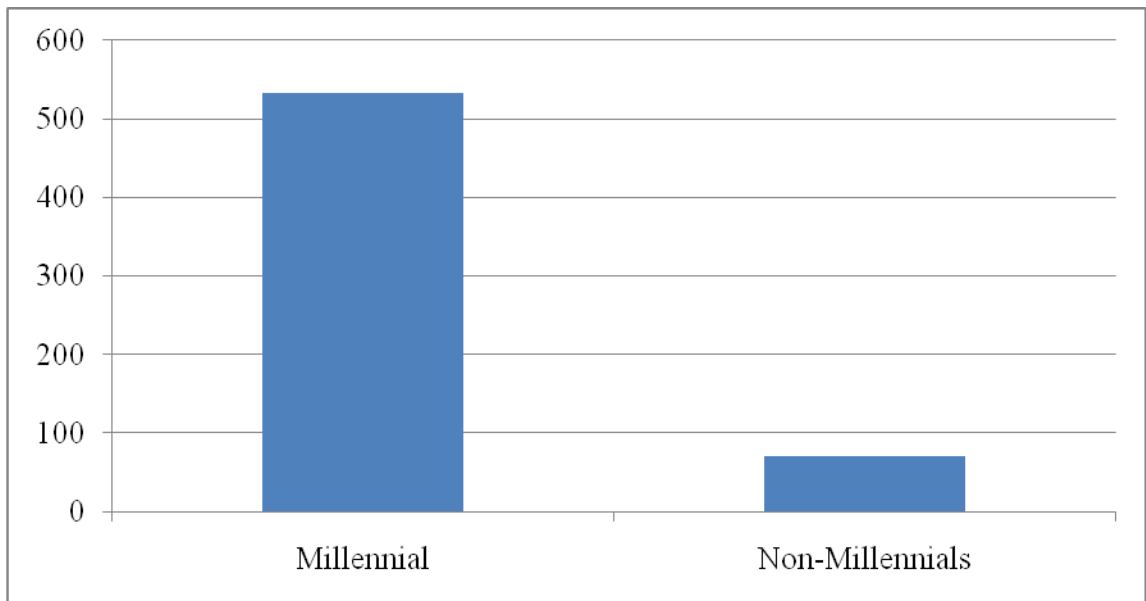


Figure 4.3. Frequency of Participation by Generation

Students' rank classifications ranged from 1 = Freshman; 2 = Sophomore; 3 = Junior; 4 = Senior; 5 = Graduate (MS); to 6 = Graduate (PhD). College A represented 71 (11%) Freshman, 52 (9%) Sophomores, 51 (8%) Juniors, 51 (8%) Seniors and 2 (0.3%) Graduate (MS). The Graduate (MS) data could be an error since School A does not offer any graduate programs. College B consisted of 105 (17%) Freshman, 69 (11%) Sophomores, 74 (12%) Juniors, 66 (11%) Seniors, 63(10%) Graduate (MS) and 22 (3.5%) Graduate (PhD). The undergraduates represented the highest frequency of individuals who participated in the study. The frequency analysis results revealed the characteristics of the population consisted of African-American, female undergraduate students (See Figure 4.4).

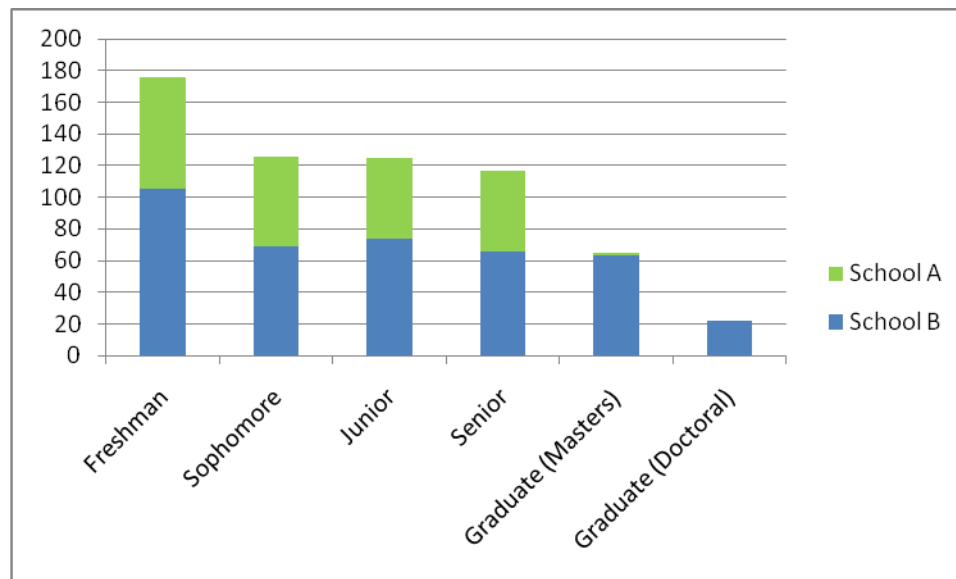


Figure 4.4. Frequency Distribution by Classification

Data Analysis

The scales reliability were reliable .684, for *Perception of Technology for Personal Use* and the remainder of the scales, *Perception of Technology for Instruction* and *Social Media Use*, reported Cronbach Alpha scores of .742 and .681, respectively (See Table 4.3).

Table 4.3. Scale Reliability Coefficients, Mean, and Standard Deviations

	Min	Max	<i>M</i>	<i>SD</i>	Cronbach's Alpha
PTP	4.160	4.182	4.171	1.820	.684
PTI	3.221	3.588	3.348	2.68	.742
SMU	2.081	3.032	2.623	2.928	.681

Note. PTP- Perception Technology for Personal, PTI- Perceptonal of Technology for Instruction, SMU- Social Media Usage

Research Question Results

Research Questions 1 and 2 were answered using frequency analysis and comparing the means with a one-sample t-test to gain an understanding of students' use of Web 2.0 technology. Research Question 2 utilized the *Perception of Technology for Instruction Scale* and conducted a comparison of the means. Research Question 3 used a comparison of the means and hypothesis testing to gain insight into the generational differences of students' perceptions of technology.

Research Question 1. *How do students use Web 2.0 technology?* To determine if a difference existed in students' use of technology for personal and educational purposes, a comparison of the means and a t-test were conducted; the statistical significance was set at .05. Also, a frequency analysis of each item within the question was performed. The mean was significantly different between the Millennials and Non-Millennials in their use of technology for personal and educational purposes (see Figure 4.5). For personal use, the data revealed a mean average of 8.5481 for Millennials and 7.1481 for Non-Millennials [$t(384) = 6.952, p = 0$]. For educational use, the results revealed a mean of 7.1315 for Millennials and a mean of 5.5385 for Non-Millennials [$t(326) = 7.470, p = 0$]. Further analysis indicated that 51% of the students surveyed use social networking sites in conjunction with their education. Also, 22% of the students use blogs, and 23% use wikis in conjunction with their education (See Table 4.4).

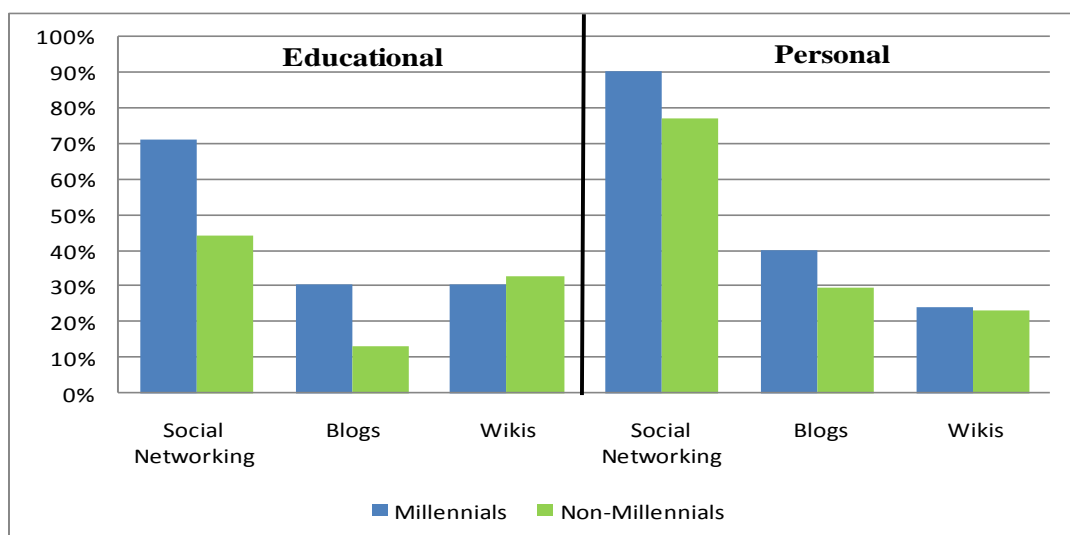


Figure 4.5. Comparisons of Social and Media Use by Generation

Table 4.4. Frequency of Social Media Use

	Social media to study	Social media to connect with classmates to study	Social media to connect with faculty on assignments
Never	15.9%	11.8%	34.4%
Rarely	18.2%	14%	17.2%
Sometimes	22.1%	24%	15%
Often	13.1%	17.4	8.9%
Always	9.7%	12.1	3.2%

Research Question 2. *What are students' perceptions of instructional technology in higher education?* The results suggest there is a mean difference in the Millennials' and Non-Millennials' perceptions of technology use in higher education. Three questions were used to identify this scale. In the question that asked students about their perception of the technology provided by their college, the Millennials' mean was 3.55 and the Non-Millennials' was 3.75 [$t(466) = -4.168, p = 0$]. Laptops ranked highest for the most frequently used technology for both educational (91%) and personal use (97%). Further analysis revealed that nearly 43% of the students agreed that their professors are fully integrating technology into their classes as a learning tool and know how to use technology whereas, 29% disagreed that faculty are not fully integrating technology as a learning tool and 28% were neutral in their response (see Figure 4.6). Additionally, 81% perceive technology as important to study for their major (see Figure 4.7), and 84% of the student's perceived technology as important to their chosen profession (see Figure 4.8).

Further analysis revealed nearly 50% of the overall students reported that the college understands how they want to use technology as a learning tool (see Figure 4.9). In addition, students reported the most important technology they want offered by their college was computer labs, wireless technology, off campus network access (see Figure 4.10). Further, the top technologies offered by the colleges were off campus technology, digital content, course management software, desktop computers, computer labs, and wireless technology (see Figure 4.11).

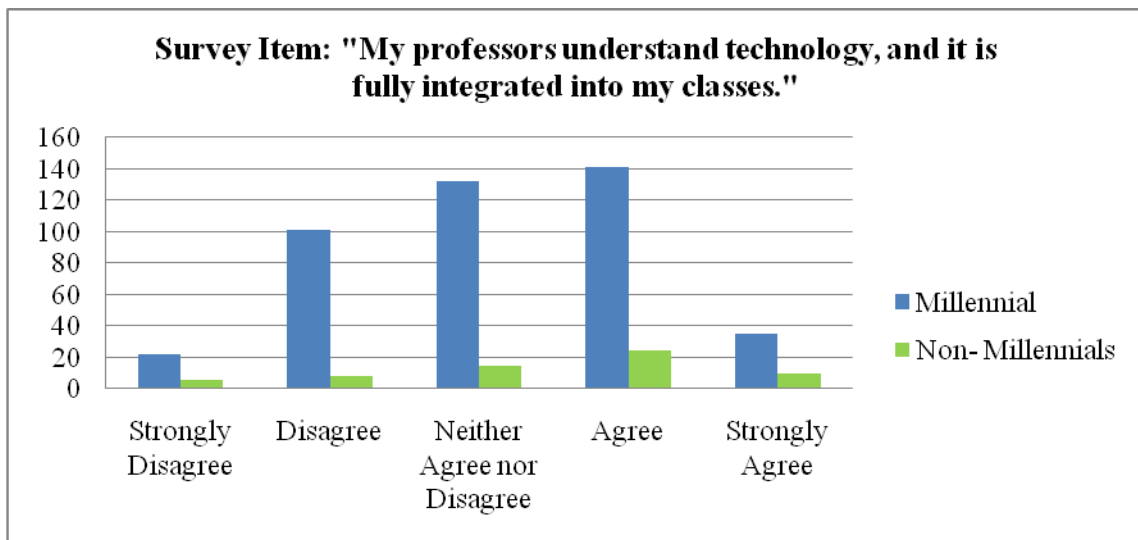


Figure 4.6. Technology Fully Integrated

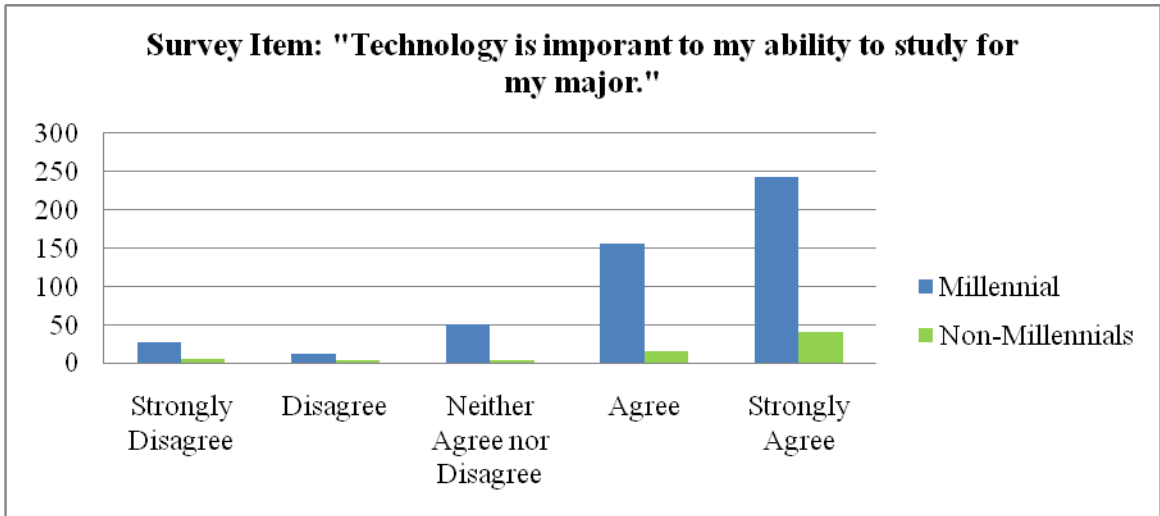


Figure 4.7. Importance of Technology to Study for Major by Generation

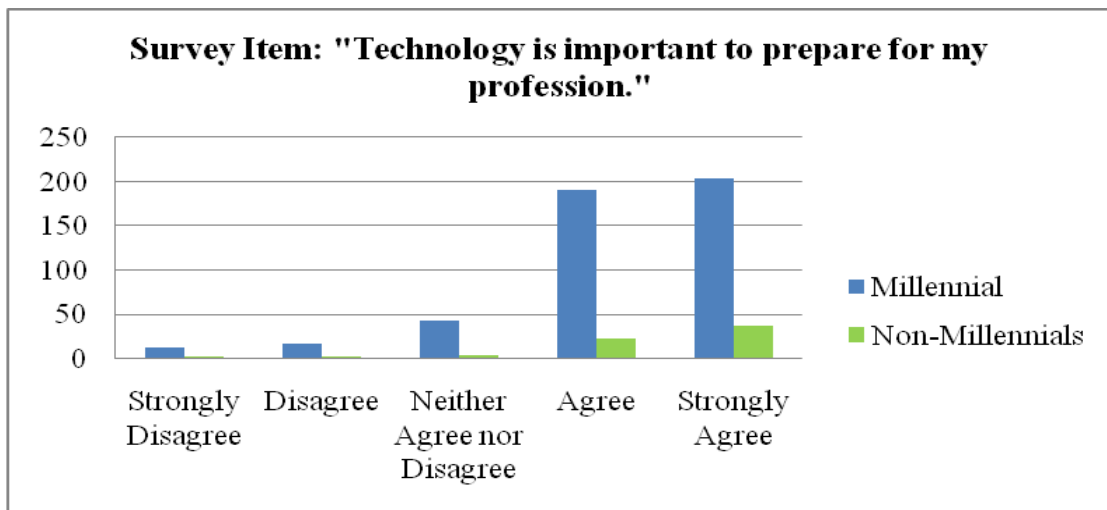


Figure 4.8. Importance of Technology to Prepare for Profession by Generation

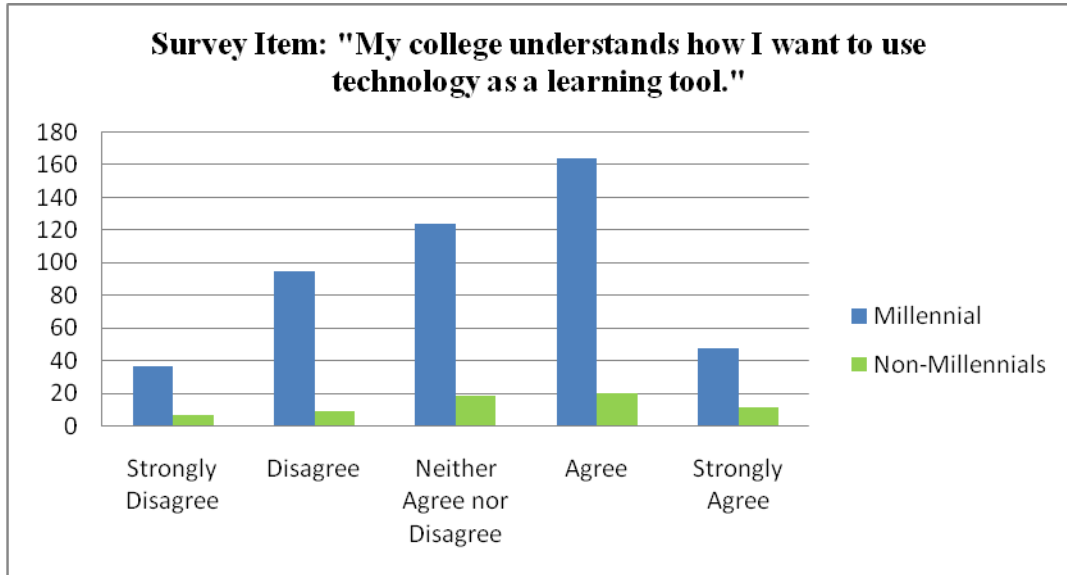


Figure 4.9. College Understanding of Technology as a Learning Tool by Generation

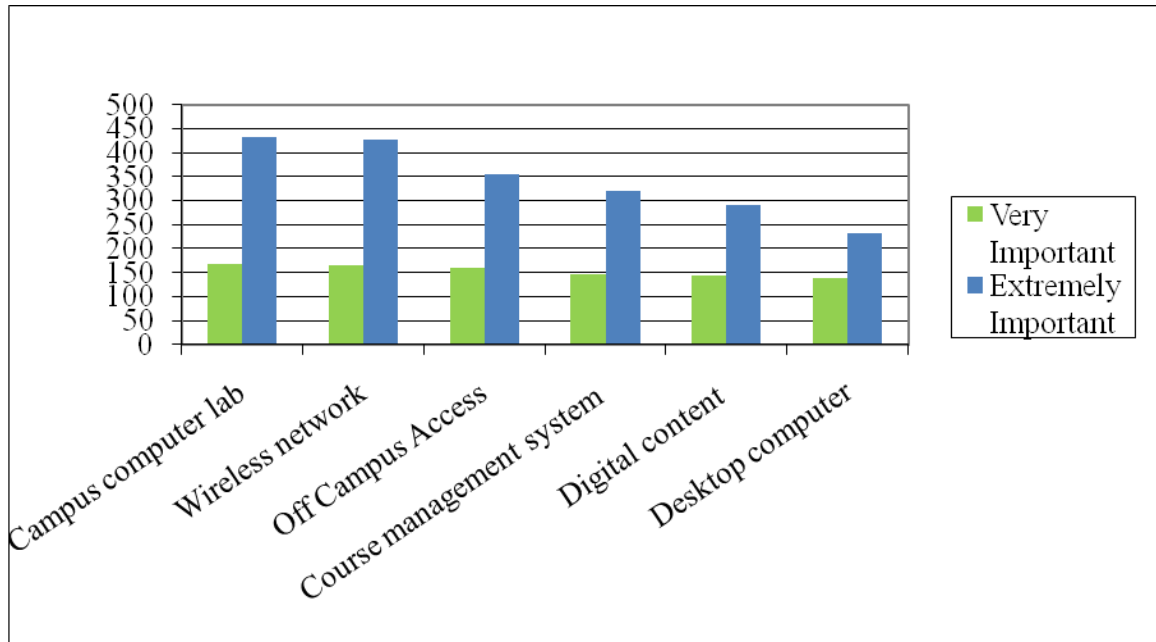


Figure 4.10. College Technology Tools Offered by Importance

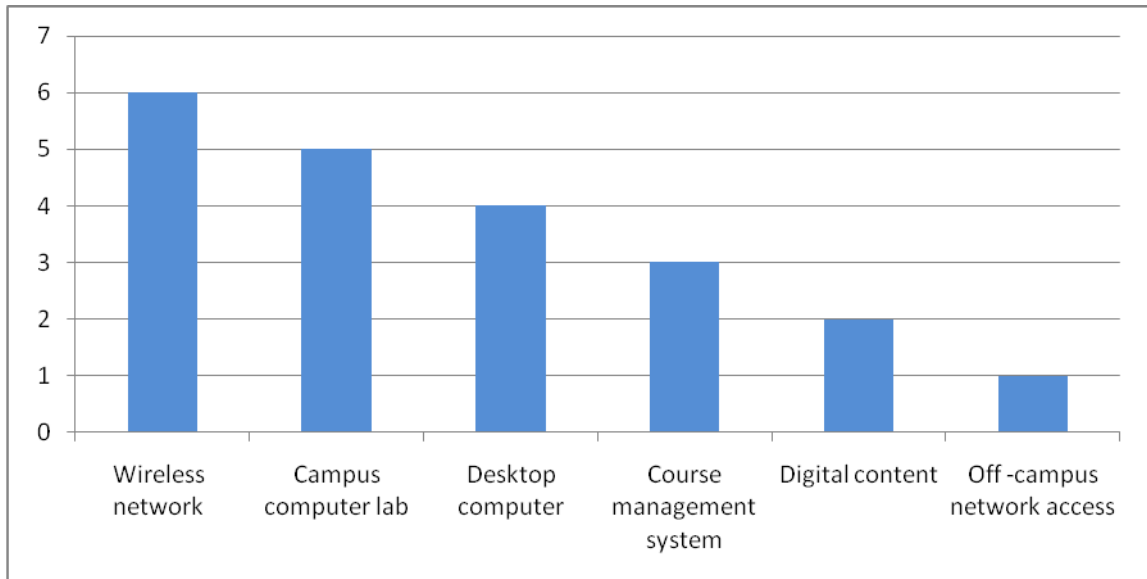


Figure 4.11. Top-Ranked Technology Offered by College

Research Question 3. *What differences exist among students' demographics (e.g., age, gender major) in relation to their perceptions of the use of instructional technology in the higher education classroom?* Survey questions 20, 21, and 22 were used to conduct the analysis. In terms of the college understanding how students want to use technology as a learning tool grouped by major (STEM and Non-STEM) no significant difference was found between the mean average of 3.61 for Non-STEM and 3.53 for STEMS [$t(236) = .105, p = .916$]. Also, in terms of the professors using the technology provided by the college in class grouped by major (STEM and Non-STEM) no significant difference was found between the mean average of 3.61 for Non-STEM and 3.53 for STEMS [$t(234) = -1.162, p = -.078$]. Further, there was no significant difference in students' perception of how their college is preparing them to successfully

use technology in the workforce with a mean average of 3.24 for Non-STEM and 3.23 for STEMS [$t(235) = -.090, p = .928$]. Nearly 50% of the students surveyed agreed that the college is preparing them to successfully use technology in the workforce (see Figure 4.12). The mean average was the same for Millennials and Non- Millennials at 3.23, [$t(465) = -.007, p=.99$].

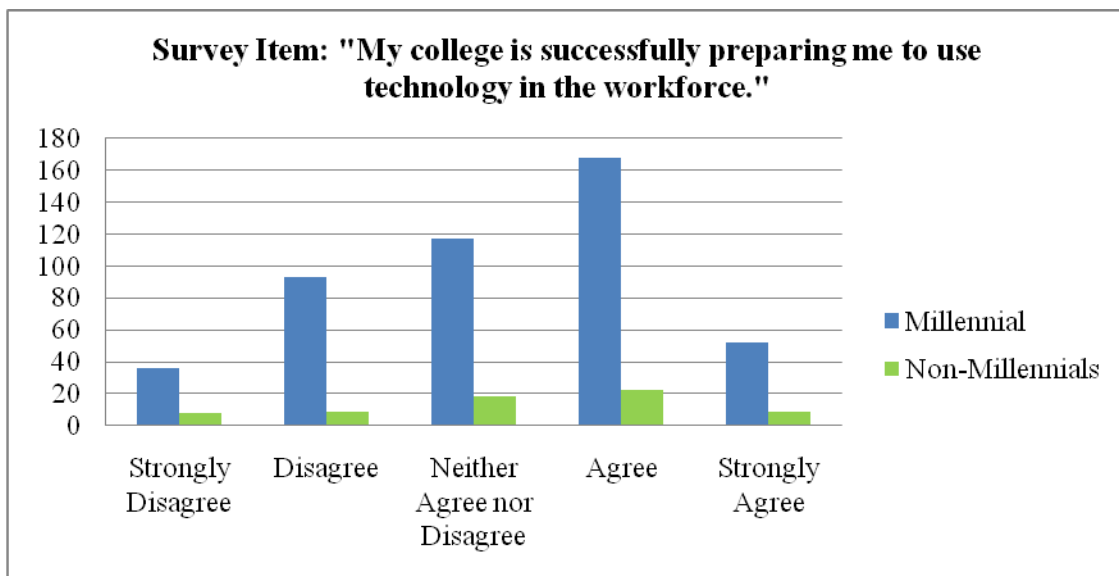


Figure 4.12. Perception of Technically Preparedness for Workforce by Generation

An analysis of the genders, revealed no significant differences in the technology provided by the college being used in classes and in the college understanding how students want to use technology as a learning tool. The mean average of 3.56 for Females and 3.55 for Males [$t(119) = 2.369, p = .955$] for technology provided by the college being used in classes. The mean average of 3.16 for Females and 3.29 for Males [$t(119) =$

1.326, $p = .187$] for the college understanding how students want to use technology as a learning tool. However, there was a significant difference with respect to gender in how students feel the college is preparing them to successfully use technology in the workforce. The mean average of 3.16 for Females and 3.39 for Males [$t(119) = 2.369$, $p = .019$].

Given the percentages of racial representation, the ethnic demographics were repurposed to report findings for black (African-American) and non-black (all other) races. The data revealed no significant differences in students' perceptions. The mean average was 3.58 for black and 3.57 for non-black [$t(430) = .201$, $p = .841$] with regard to technology provided by the college being used in classes. The mean average was 3.24 for black and 3.16 for non-black [$t(431) = 1.474$, $p = .141$] for the college understanding how students want to use technology as a learning tool.

However, there was a significant difference with respect to the black and non-black races in how students feel the college is preparing them to successfully use technology in the workforce. The mean average was 3.27 for black and 3.11 for non-black [$t(430) = 2.888$, $p = .004$] for technology provided by the college being used in classes.

Additional Data Analysis

The data revealed that 30% of the Millennials use wikis for educational purposes as compared to 32% for Non-Millennials. However, a greater difference was revealed when comparing the use of social media for educational purposes with 71% of the

Millennials reporting its use, but only 44% of Non-Millennials reporting social media use for educational purposes. A similar distinction was reported for the use of blogs for education purposes with Millennials at 30% and Non-Millennials at only 12.9%. However, the data on personal use of social networking revealed greater numbers for both groups, with Millennials at 90.5% and Non-Millennials at 77%. Also, 40% of Millennials use blogs for personal use, whereas 30% of Non-Millennials use blogs for personal use. Finally, 24% of Millennials use wikis for personal use and 23% of Non-Millennials use wikis for personal use.

Additionally, 52% of the students agree that faculty believe technology is an important tool and encourage students to use it (see Figure 4.13). However, 33% of the students state that faculty treat technology as optional for their classes (see Figure 4.14). Furthermore, 28% of the students reported using technology as a learning tool in most their classes (see Figure 4.15). Subsequently, nearly 90% of the students reported using email as their most preferred means of communication with faculty outside of class (see Figure 4.16). However, 43% report the biggest challenge to classroom technology was a lack of technical support for the technology resulting in technology adequately working (see Figure 4.17). Additionally, 40% of the students surveyed reported their colleges' technology was significantly better than their high school technology and 34% of the students believe the classroom technology provided by their college is current or up to date (see Figure 4.18).

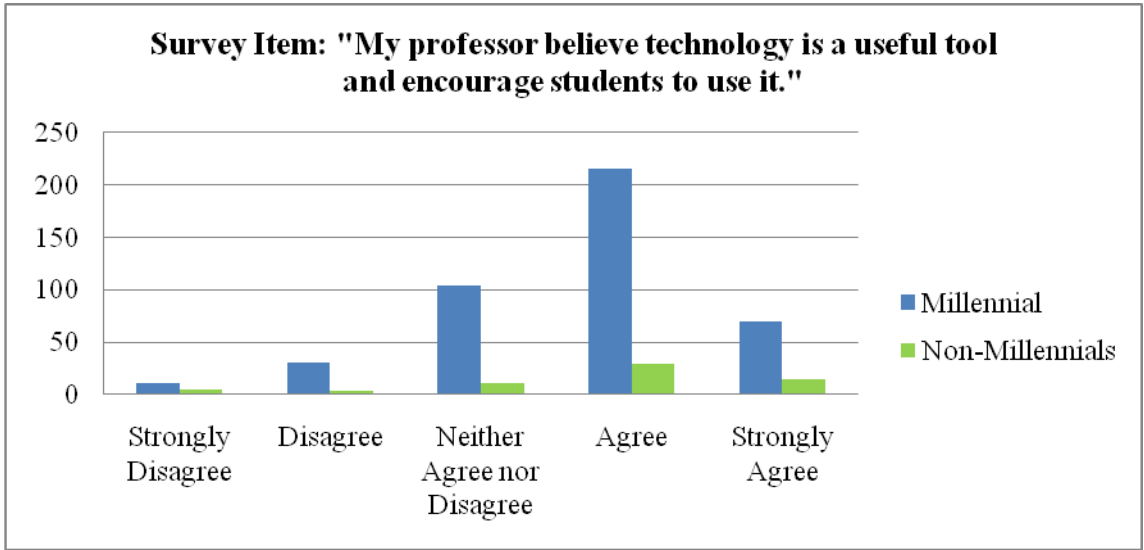


Figure 4.13. Professors Believe Technology is Useful by Generation

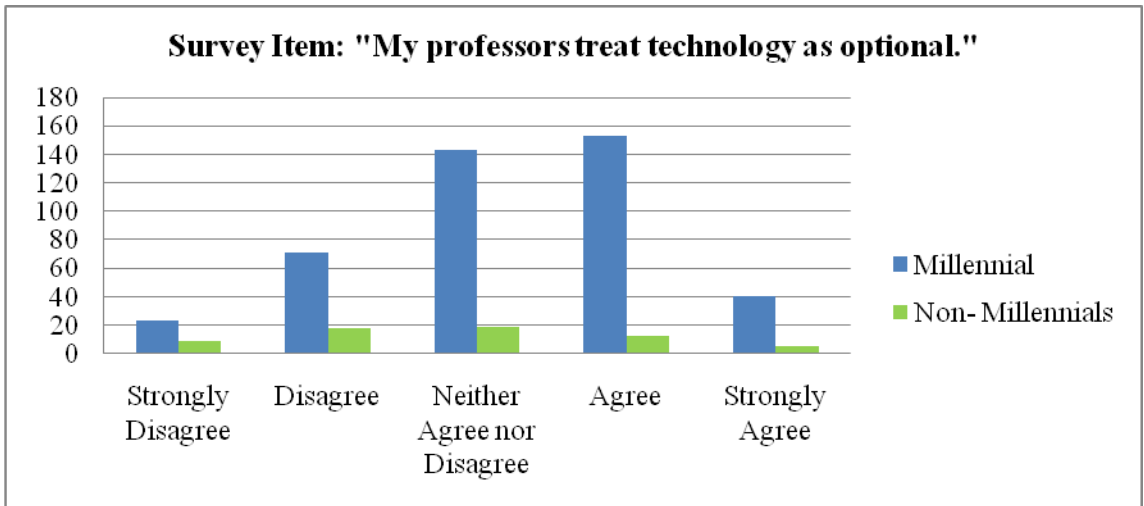


Figure 4.14. Professors Feel about Technology as a Learning Tool by Generation

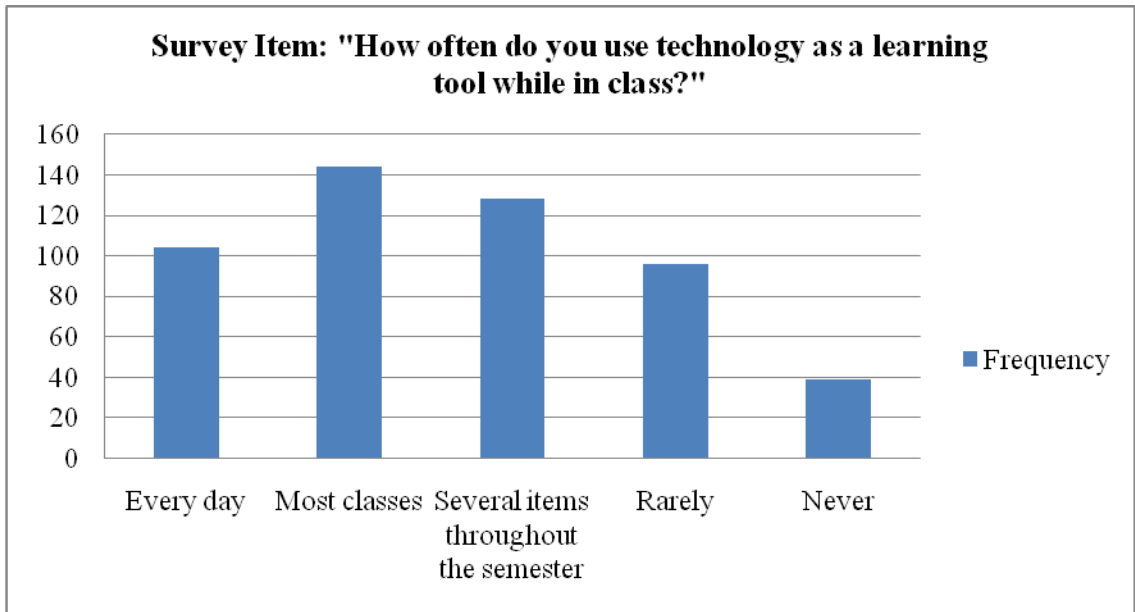


Figure 4.15. Students' Use of Technology as a Learning Tool While in Class

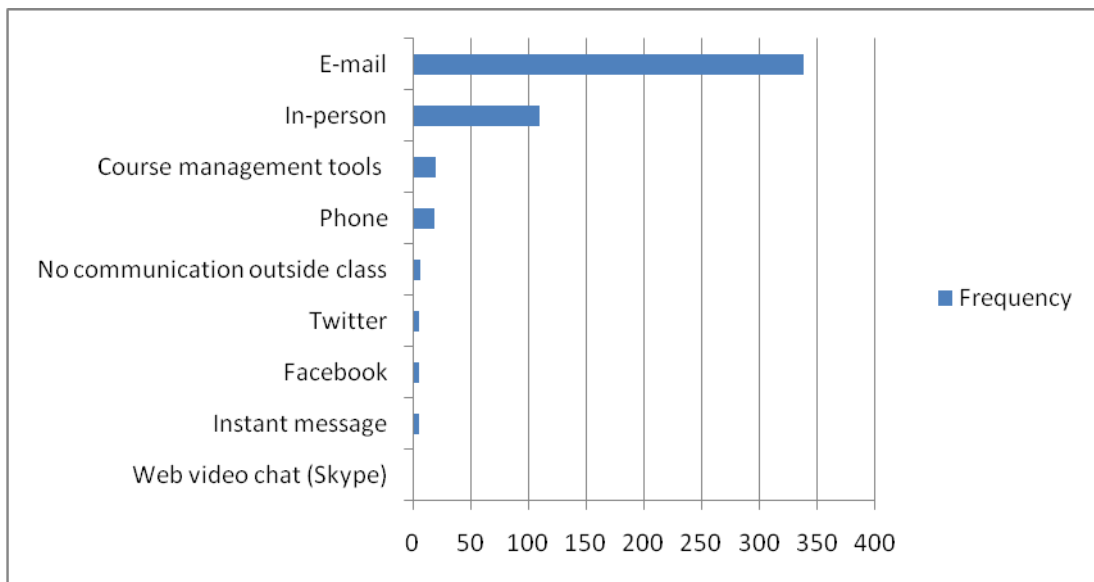


Figure 4.16. Preferred Means of Communication

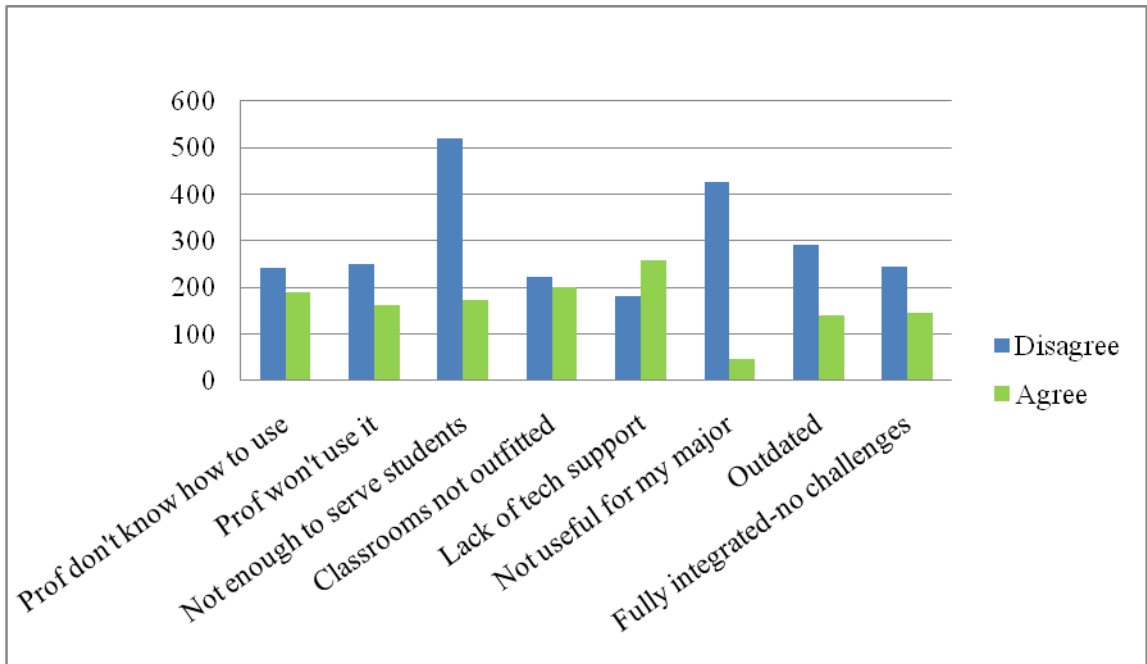


Figure 4.17. Perception of Biggest Challenge to Classroom Technology

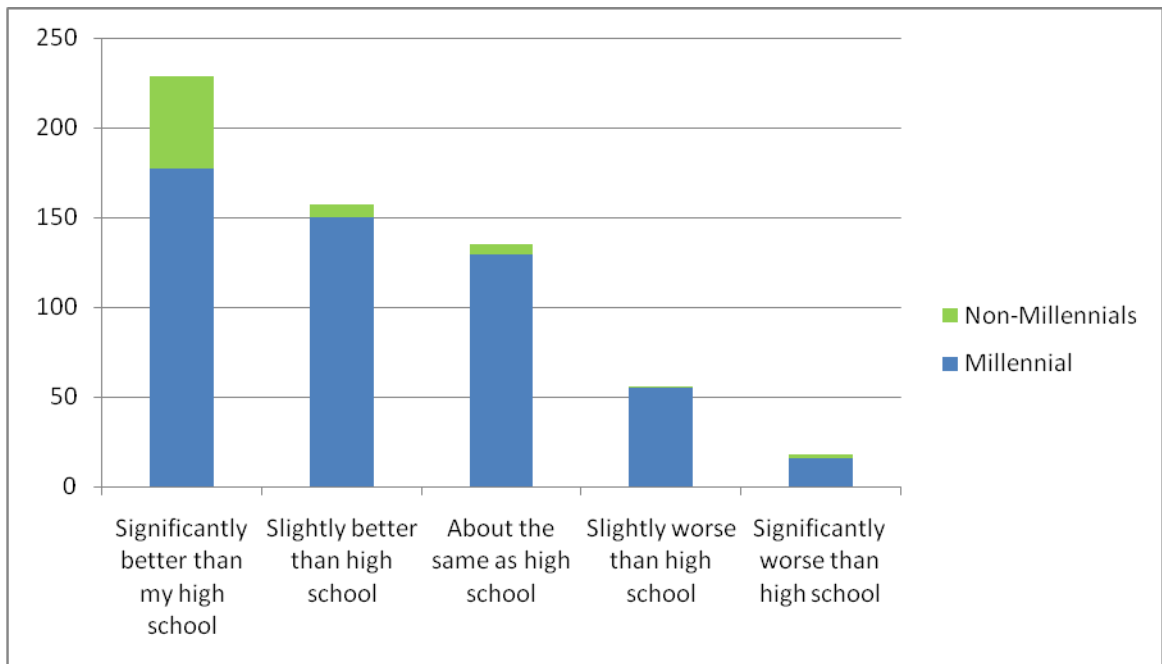


Figure 4.18. Comparisons of High School and College Technology

Summary

This chapter identified the findings for each of the research questions. The sample consisted of 651 participants from all academic majors at two different historically black colleges/universities. The sample population consisted of 135 males and 496 females. The age range of the study participants was 18 to 68 years. The mean age of the population was 23 years of age. Of the 619 participants who reported their race 75.6% were African-Americans, 7.7% Caucasians, .3% Latinos, .8% Hispanics, 5.7% Multiracial, 2.3% Asian/Pacific Islanders. The overall sample consisted of 81.9% Millennials and 10.8% Non-Millennials. The results of the data for Research Question 1 revealed students' higher use of web technology for personal purposes than for educational use. Also, there was a difference in the use of technology for personal use between Millennials and Non-Millennials. The data for Research Questions 2 and 3 suggest there are differences in the way Millennials and Non-Millennials view the use of technology as a tool for learning by faculty. However, the two generations both perceived that their schools were preparing them to successfully use technology in the workforce.

CHAPTER 5

Discussion and Implications

The purpose of this study was to examine students' perceptions of technology in higher and discuss the implications their perceptions have on instruction. The overarching conceptual framework suggests that transformational leadership, constructivist learning theories, and Web 2.0 technology can be used to effectively instruct the Millennial learner. An in-depth analysis of the student's perceptions was investigated in relation to Web 2.0 and instructional technology to examine generational differences and perceptions in the use of these types of technologies as learning tools. This chapter includes a discussion of the findings and the implications of the research. In addition, a comparison of the findings linked to prior research is discussed. Finally, the chapter concludes with the implications for instruction and leadership as well as a summary of the chapter.

Discussion of the Results

The overall goal of this study was to examine the perceptions of students in higher education in an effort to provide faculty and administrators with a framework to address the pedagogical needs and concerns of students, specifically Millennial students matriculating at historically black colleges and universities. This research also provides higher education professionals with information about students' perceptions of how to best meet the needs of this technically savvy generation of students. Millennials use

technology on a daily basis for both personal use and as a learning tool. The study sought to understand how Web 2.0 technologies can be used effectively in the classroom as instructional tools to motivate Millennial learners. The data revealed that 90% of the Millennial students surveyed use social networking for personal purposes; however, only 70% use these sites for educational purposes. Yet the findings also implied that 81% of the students believe technology is beneficial to their learning. These data support Prensky's premise that Millennials are frequent users of technology (2001a; 2001b). The following sections outline the findings within the three research questions.

Research Question 1. Technology Usage: *How do students use Web 2.0 technology?* Survey questions 25 and 26 (see Appendix) asked students about their use of Web 2.0 technology for personal and educational purposes. The findings suggest that there is a difference between Millennials' use of Web 2.0 technology and Non-Millennials' use. This study found that Millennials are more likely to use Web 2.0 technologies to collaborate with classmates on assignments. The findings reveal 30% of the Millennials use social media to connect with classmates on assignments and 25% connect often, whereas 17% of the Millennials always use social media to connect with classmates on assignments. Subsequently, 49% of the Non-Millennials use social media to connect with classmates on assignments and 25% reported rarely using social media to connect with classmates on assignments using social media. One possible explanation for this finding is that Millennials have grown up with technology (Prensky, 2001a).

However, the findings suggest that Millennial students use technology for personal purposes more so than for education purposes. This could be attributed to the

reluctance faculty have to use technology in the classroom. Roblyer et al. (2010) reported that the major barrier to effective integration of technology was attributed to faculty reluctance to embrace the technology.

In terms of their use of technology for educational purposes, the mean score was 7.1315 for Millennials and 5.5385 for Non-Millennials. Of the students surveyed, 70% of the Millennials used social networking in conjunction with their education as compared with only 42% of Non-Millennials. One possible explanation for these findings could be the supposition that Millennial students feel the need to be continuously connected to their friends. Shen and Khalif (2008) referred to online communities as Internet-connected collectives in which constant communication and posts encourage relationships.

These findings support the literature that Millennials are social and the learning theories that learning is social and active (Roblyer et al., 2010). Students' significant use of technology for social purposes may be due in part to the fact that Millennials seem to be motivated by communication, collaboration, and relationships in an online environment. For example, Howe et al. (2000) supported the concept that Millennials respond mostly through technology because it is their preferred means of communication as a collaborative tool. Additionally, 22% of the overall students reported using social networking sites 51% of the time in conjunction with their education. Also, students use blogs 22% of the time and wiki 23% of the time in conjunction with their education. This finding suggests that faculty could use the social media technologies that motivate Millennials to develop learning activities that motivate and encourage innovation. For example, social networking sites could be used as a basis for discussion about important

classroom topics and encourage students' active participation in the learning process. Faculty could create specific lessons that connect students with the professors through more interactive technology than merely email. This concept supports Dewey and Vygotsky's notion of social and active learning in which meaning is constructed through collaboration and experiential learning (Shelly et al., 2010).

Although Millennials use technology more often than Non-Millennials, the Non-Millennial students do report greater use (42%) than predicted. One possible explanation is that Millennials use is affecting Non-Millennials use. For example, parents and relatives may feel the need to explore their younger relative's social media outlets in order to "keep up" or to increase channels of communication, especially at a distance (Prensky, 2001a; 2001b).

Research Question 2. Perception of Technology: *What are students' perceptions of instructional technology in higher education?* Instructional technologies are technological tools that can be used to instruct. These technologies encompass laptops, desktops, iPads, iPods etc. The data indicated a significant mean difference between the Millennials' and Non-Millennials' perceptions of instructional technology. Millennials' (3.55) and Non-Millennials' (3.75) perceptions of technology in higher education, $t(466) = -4.168, p=0$. When students were asked how important it was that their college offered specific technologies, student ranked computer labs, wireless, off-campus network access, course management software, digital content (downloadable course information), and virtual learning among the most important to support their learning. However, when asked whether their college offered specific technologies, the highest ranked included

wireless, computer labs, desktop computers, course management software, and digital content. These findings could be attributed to the satisfaction that the majority of students surveyed have with these tools. They believe technology provided by their colleges is used effectively in the classroom as a learning tool. Further, 45% of the Millennials agreed and 48% of the Non-Millennials agreed that their college understands how they want to use technology as a learning tool. The data analysis suggests Millennials and Non-Millennial alike agree that their colleges understand how they want to use technology as a learning tool.

Of those surveyed, 43% of the students agree their professors understand technology and fully integrate it into their classes as a learning tool. Fifty-five percent of the students reported using technology as a learning tool while in class. This percentage reflects the combined data of students reporting 29% use of technology in most classes and 26% use in several classes. Furthermore, 40% of the students stated that the technology provided by the colleges was used in their classes. These findings suggest that technology is being incorporated into the classroom as a learning tool. However, further analysis revealed, 43% agree that one of the biggest challenges to classroom technology on their campus is that it is not fully integrated into the curriculum and there are obstacles. These findings indicate that although professors are integrating technology in their classes, there are still obstacles present, and it's not fully implemented into every aspect of the curriculum by all professors. However, although technology is important to students, 62% did not base their college selection on the technology offerings their college provided. This finding suggests that either technology is not as important as

students indicate, or they may have made assumptions about the amount or type of technology their chosen college campuses offered.

Furthermore, 85% of the students reported technology is important to their ability to prepare for their chosen profession. Eight-one percent of the students reported technology is important to their ability to study for their major. Further analysis revealed that students agree the college is successfully preparing them to use technology as a profession tool in the workforce. These findings support the Economist Intelligence Unit (2008), which reported that technology provided by higher education to equip students to be innovative will impact the workforce. These findings suggest that students understand the importance of the role technology will play in their professional careers. These findings also reveal that students believe they have the necessary skills to successfully use technology in the workforce.

When communicating with faculty, students most frequently reported using email. In fact, 71% of students reported email as their most preferred means of communication with faculty. These results suggest that faculty may not be embracing other forms of technology to communicate with students, such as social networking. Only 22% of students reported face-to-face as a preferred means of communication. Lueng (2003) suggested that students prefer Internet communication over face-to-face conversations. Prensky (2007) further supports this concept by positing that online technology is the most responsive means of engagement for Millennial students. This finding suggests that faculty could keep Millennial learners engaged and responsive both in and out of the classroom by increasing the use of social media as a means of staying connected.

Seventy-five percent of the students reported wireless technologies as extremely important to their college experience, which suggests that students are dependent on the continuous access and connectedness that technology affords them. These findings support Lueng's (2003) study in which connectedness and the ability to be emotionally open were key components of online activity. The findings of this study recommend that higher education continue to make technology accessible both on and off campus and keep students connected through the tools and technology that they use every day.

Research Question 3. Perception of Technology: *What differences exist among students' demographics (e.g., race, gender, and major) in relation to their perceptions of the use of instructional technology in the higher education classroom?* The findings indicated no significant mean difference between blacks and non-blacks in their perception of technology use as a learning tool in class. However, there was a significant difference between blacks and non-blacks in their response to the preparedness they feel to successfully use technology in the workforce; blacks agreed more than non-blacks. These findings suggest that either blacks have a false sense of how prepared they *should* be to use technology in the workplace, or non-blacks have higher expectations of what they believe they need to know to use technology successfully in the workplace. Additionally, the findings related to gender revealed no significant mean differences between males and females in their perception of technology use as a learning tool in class. However, there was a significant mean difference between males and females in their response to the preparedness they perceived they needed to be successful in the workplace. The data indicated that females felt less prepared than males. Further

analysis related to major (STEM and non-STEM disciplines) revealed no significant mean differences between majors in their perceptions of technology use as a learning tool in class or in their preparedness to successfully use technology in the workplace. However, the mean averages for STEM majors (3.53) was lower than for non-STEM majors (3.61) , but both agreed that their college was using the technology provided in classes. However, both STEM and non-STEM majors were neutral in response to their preparedness to successfully use technology in the workforce. These findings are alarming in that STEM majors should be agreeing or strongly agreeing that technology is used in class and that they feel prepared to successfully use technology in the workforce. These findings suggest that there is a population of students who appear to be ready to use technology; however it is not happening to the extent they believe it should in order to prepare them effectively for their careers.

Implications for Instruction

The findings from this study are reported at a time when education is facing a myriad of challenges in the areas of pedagogy, budget cuts, and technology. Thus, this study has implications for instruction in higher education.

First, faculty need to be willing to learn from the technically savvy Millennial students and become facilitators of the learning process. This concept supports Dewey's philosophy of student-centered learning (Shelly et al., 2010). According to the results of this study, a large percentage of the student sample reported using social media to collaborate with classmates to study (30% sometimes, 25% often, and 17% always). In

addition, 49% of the Non-Millennials reported never using technology, and 26% reported using it sometimes to connect with classmates. These findings suggest that students are using social media to collaborate with peers and to study. To this end, it is an expected outcome that social media will progressively increase by both Millennials and Non-Millennials in the future. This collaboration supports Piaget and Brunner's notion that learning occurs by constructing meaning through experiential collaboration (Roblyer et al., 2010). This has implications for instruction in that the more faculty use technology to communicate, the more comfortable or familiar they will become. Further, if learning occurs in a social environment and Millennials are in fact social, the development, implementation and delivery of instruction should embrace a collaborative, constructivist social approach. This concept is important because although faculty are content experts, unless they have an education background they are not proficient in pedagogical strategies. Furthermore, Dewey supports this premise in that growth occurs through knowledge acquisition, by integrating real-world hands-on activities using tools students are familiar with to solve problems (Roblyer & Doering, 2010). Therefore, it is important that daily technologies such as social networking sites, iPads, and iPods etc., are integrated into the classroom as learning tools.

Second, there is an intrinsic component that the online environment feeds, specifically social networking sites in which social relationships are developed. Students experience a sense of connectedness and acceptance to the online world. In Greenhow et al. (2009), the notion of connecting with individuals is based on their abilities, interests, and personalities. They feel a sense of validation that the social networking sites offer.

Shen and Kahlifa (2008) suggested that content generation and relationship building support this sense of validation. These characteristics are all driven by a sense of connection and belonging, which is deemed most essential to effective learning.

Relative to the results of this data analysis, the emphasis is not on what activities students engage in; instead the focus is on the fact that faculty learn how to effectively implement technology into the curriculum regardless of the student age. This requires an intentional plan focused on activities utilizing social media both in and out of the classroom as a learning tool. Training and development for faculty on ways to develop curriculum to support the implementation of Web 2.0 collaborative technology to engage students will lead to a process of not only engagement but innovation, learning, and motivation. Brunner posited that learning is active rather than passive (Roblyer & Doering, 2010).

The effective use of technology as a learning tool supports the social nature of constructivist learning theory. Oblinger and Oblinger described Millennials as a social, collaborative, team oriented, and experiential multi-taskers (2005). The results from this study support Oblinger and Oblinger's description: a larger percentage of Millennials are using technology for social reasons. Web 2.0 technologies that encompasses social networking is described as a collaborative, communicative, participatory, interactive internet tool.

If in fact Millennials are social, Web 2.0 technologies can be integrated into the curriculum to support the pedagogical needs of the Millennial learner. Dewey posits that learning is a process of growth through knowledge acquisition using hands on

experiences. Whereas, Piaget suggests that there are stages of development that an individual experiences throughout life that build on current knowledge. Thus, the two concepts joined together can be translated for the Millennial to mean that their current technical knowledge and experiences can be built upon by the professor and peers whereby learning continues to evolve through the collaboration of multiple perspectives of others involved in this learning process (Shelly et al., 2010). Piaget further supports the notion that students develop through interaction with their environment. Thus, Millennial students are constantly learning and developing through their interaction with others using technology. Their social online interaction develops as their online social skills develop. However, their face-to-face interaction declines.

Van den Beemt et al. (2010) suggested the gap continues to widen between interactive technology use and young people's everyday use of technology. Therefore, if higher education does not address the growing needs of the future generations, the reoccurring theme of the intergenerational gap will continue to persist. Thus, training and educating faculty to stay abreast of the current, cutting edge technologies is integral to the lifespan of the technology adoption process. Higher education must support ongoing faculty training on how to use technology to facilitate effective teaching and learning. Equally important is the faculty's role in staying abreast of how emergent technologies contribute to the development of students' skills and abilities for the workforce.

Implications for Leadership

Learning is a transformational process in which the leaders transforms the follower and vice versa (Northouse, 2007). Wren (1995) suggested that transformational leadership is a reciprocal process. Batson (2010) stated that it is not the technology itself, but the importance of a shift in the mindset of educators to be leaders of innovation. Therefore, leaders will need to change the culture of the learning institution and encourage faculty to become early adopters of technology and persistently encourage and support training and conferences in the specified technical area for other faculty members.

Based on this concept a change in the mindset can be achieved through leaders attending faculty meetings, encouraging the importance of technology integration into the curriculum. In addition, collaboration among division and department leader endorsing free lunch and learn workshops offered by the college would be beneficial to changing the mindset. However, if the entire organization is not in agreement with how change should occur, according to Burns (1978), the ability to transform an organization will not occur. Thus, the leaders and followers need to be willing to change their way of thinking.

Most institutions in higher education have mission and vision components. According to Kurland et al. (2010), vision significantly impacts school culture through transformational leadership. Thus, changing the branding, mission and vision of the university to reflect a college the supports technology integration can have an impact. Additionally, higher administration leaders are not typically involved in the decision making process of specific technology faculty utilize in the classroom. As such, there

may be a disconnect in the technology used and the training necessary to stay abreast of the most current technologies. This has implications for how educational leaders communicate change to the organization.

Learning is a lifelong process according to Piaget (Roblyer & Doering, 2010). Leaders in higher education including professors, chief information officers (CIO's), deans and chancellor's play an important role in continuing to support the institution in the development of new ideas which integrate daily technologies into the classroom. However, CIO leadership must take a closer look at how technology is being supported at the university level. According to the results of this study, nearly half of the students reported that the biggest challenge to classroom technology was a lack of technical support, which equated to the technology not always working. For example, a more intense tracking mechanism may need to be in place to support technical issues being resolved in a timely manner. In addition, college and university administrators are strongly encouraged to define policies and procedures to handle the large amount of requests that technical support receives. Lastly, leadership may want to revisit how to endorse policies and procedures to provide effective and efficient support of the technical infrastructure to support learning in the classroom. The impact of ineffective technology affects not only the faculty, but the students' ability to be successful. Additionally, the implications this study has on leadership as it relates specifically to the Non-Millennial leaders at HBCUs is the challenge of adopting the constructivist methodology in the utilization.

This study has implications for higher education leadership, including faculty and administration in the decision-making process involved in the adoption and integration of technology in higher education. The findings from this study provide them with how students are using instructional and Web 2.0 technology and that wireless, course management software, off campus network access and computer labs are amongst the top ranked technology that are important to students. It also informs leaders that student's agree that the college is equipping them with the necessary technical skills to successfully use technology as a professional in the working world. Additionally, implications for higher education leadership can be gleaned by providing leadership with the areas in which faculty need training to support and implement social media as an education learning tool. Incorporating training is a key ingredient for educators to integrate technology is integral to the pedagogy of teaching because the data revealed that 38% of the students reported that technology used in high school is significantly better than in college whereas 28% report it as slightly better. These findings suggest that students have certain expectations, that technology provided by high schools may not be adequate enough to prepare them for college.

Recommendations for Future Research

Future research could gather data from a greater number of schools, including predominately white colleges and universities. The information gained from other institutions could be used to examine differences that may exist in the perceptions of other students at predominately white institutions compared to those at HBCU's.

Future research could also examine socio-economic and funding differences that may exist between students at predominately white colleges and universities (PWI's) and students at historically black colleges and universities (HBCU's). The information gleaned could provide higher education with how these factors impact or influence student's preparedness to compete in the global market.

Future research could also examine other stakeholder's perceptions toward technology in higher education: faculty, administration, and chief information officers, who are decision makers responsible for choosing, purchasing, and maintaining technology on college campuses. They play an important role in choosing the tools students will use to learn and how they can be implemented effectively.

This study revealed that there was a high percentage of students who used social media to communicate with classmates on assignments; however, few students used social media to communicate with faculty on assignments. More research needs to occur to determine why students are not using social media to communicate with faculty on assignments.

Future studies need to determine the best practices from both instructional technology experts and students' in how technology can effectively be used as a learning tool. This information could provide faculty with ideas in which to implement a myriad of social media for teaching and learning to engage the learner, thus creating a learning environment that makes learning fun and can be engaging and motivates the student to be innovative.

Finally, 50% of the students in the survey reported mobile technology as a most frequently used technology. More research needs to examine how students are using mobile technology as a learning tool. The information gained could provide higher education with ideas and suggestions for implementing mobile technology in the classroom as an effective learning tool.

Summary

In summary, this research study was conducted to examine students' perceptions of technology in higher education and to discuss the implications these perceptions have on instruction in higher education. The findings revealed that differences exist in the Millennials' and Non-Millennials' perceptions and use of technology for educational and personal purposes. The findings also reveal demographic differences in gender and race (black and non-black) in their preparedness to successfully use technology in the workforce. These findings further suggest that the African-American Millennials matriculating at the HBCU's in this study fit the standard Millennial definition; they are frequent users of technology, specifically social media. The findings from this study have implications for instruction and leadership.

Non-Millennials reported a greater use of social media than predicted. These findings suggest that Millennial use may affect Non-Millennial use. Thus, educators in higher education may consider becoming facilitators of learning using social media, specifically Web 2.0 technology to innovate and motivate both the Millennial learner as well as the Non-Millennial learner (Shelly et al., 2010). Therefore, it is imperative that

faculty learn how to effectively implement technology into the curriculum to address the pedagogical needs of learners of all ages. Furthermore, developing, and delivering instruction from an interdisciplinary constructivist, collaborative, social approach can provide students with the content as well as the pedagogical instruction. To this end, training plays an integral role in the effective implementation. This notion leads to the important role that leadership plays.

Higher education leadership plays an integral role in transforming the educational environment. Leaders in higher education must first transform the mindset of the organization to embrace technology; hence, creating a culture that supports and encourages the use of technology into the curriculum (Batson, 2010). The implementation of technology is not effective if it is not successfully implemented to engage and invoke innovation within the learner. Therefore, leaders are encouraged to support faculty training, workshops, and conferences. Also, university leaders are advised to ensure that dialogue is occurring relevant to the decision making process surrounding adopting new technologies. Lastly, leaders are encouraged to build a constructivist framework into the practices and procedures to aide in transforming the mindset.

In conclusion, there is a need for all students to be proficient in their use of technology in order to be effective and efficient global citizens. Therefore, the pedagogy of teaching should incorporate a balance between technology and the use of both cognitive and behaviorist learning theories. Furthermore, an interdisciplinary collaboration by faculty in the development and implementation of curriculum to effectively address the pedagogical needs of students is integral. Additionally, leader

must support the effective implementation of technology through the mission and vision of the college as well as its professional development for faculty and staff.

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APPENDIX

Students' Perception of Technology

Q1 INFORMED CONSENT TO PARTICIPATE IN A RESEARCH STUDY

Emergent Technology and the Millennial Generation: Examining the Perceptions of Students and Implications for Instruction in Higher Education

PI: Karen Martin-Jones

Dear Respondent,

I am inviting you to participate in a research project to study students' perceptions of technology in higher education and its implications for instruction. Along with this letter is a short questionnaire that asks a variety of questions about how you as a student use technology and how you want to use technology. In addition, questions on how you feel about the technology your college provides to assist in preparing you for your future are also included. I am asking you to please complete the survey. It should take you about 15 minutes to complete. This is a chance for you to tell about your perceptions of technology in higher education and assist university leaders with the knowledge necessary to address your concerns about technology.

I do not know of any risks to you if you decide to participate in this survey, and I guarantee that your responses will not be identified with you personally. Participation is voluntary [and there is no penalty if you do not participate]. There will be a link at the end of the survey asking if you would be interested in participating in a follow-up focus group to express your concerns. If you answer yes you will be prompted to enter your name, phone and email address. Every participant will have the opportunity to participate in a drawing for a ten dollar gift card. In order to keep your information separate from your survey responses a link will be provided at the end of the survey which will link you to a different site to collect contact information. If you do not wish to participate, you may stop at any time. Your names will not appear in the final write up. Completing this survey is your agreement to participate.

The data you give me will be used for my dissertation which I am currently writing and may be used as the basis for articles or presentations in the future. I won't use your name or information that would identify you in tape recordings, any publications or presentations.

If you have questions or concerns about this research, please contact: Karen Martin-Jones
Phone: (336)517- 2279, 900 E Washington Street Greensboro, NC 27401,
kmdst12@gmail.com. You may also contact the faculty member supervising this work:
Lisa Gueldenzoph Snyder, Interim Chair, Business Education, lguelden@ncat.edu , (336)
334-7657 ext. 4000. This project has been approved by the Institutional Review Board
(IRB) at North Carolina A&T State University.

If you have any questions about your rights as a research study participant, you may
contact the chair of the IRB through Compliance Office at (336) 334-7995 or
rescomp@ncat.edu.

You must be at least 18 years old in order to participate. If you agree to participate, you
may keep this form and complete the survey. If you wish, you may stop at any time. You
do not have to place your name on the survey.

Sincerely,

Karen Martin-Jones, Doctoral Candidate and Principal Investigator

Q2 What institution are you attending?

- Bennett College (1)
- NC A&T State University (2)

Q3 Are you currently a full-time or part-time student?

- Full-time (1)
- Part-time (2)

Q4 Do you reside on campus or off campus?

- On campus (1)
- Off campus (2)

Q5 What is your class standing?

- Freshman (1)
- Sophomore (2)
- Junior (3)
- Senior (4)
- Graduate (Masters) (5)
- Graduate (Doctoral) (6)

Q6 Gender

- Male (1)
- Female (2)

Q7 What is your age?

Q8 What is your current or intended major?

- Agriculture (1)
- Arts (2)
- Biology (3)
- Business (4)
- Chemistry (5)
- Computer Science (6)
- Education (7)
- Engineering (8)
- English (Teaching and Non-teaching Tracks) (9)
- History (10)
- Home Economics (11)
- Interdisciplinary Studies (12)
- Journalism & Media Studies (Mass Communications) (13)
- Mathematics (14)
- Nursing (15)
- Political Science (16)
- Psychology (17)
- Social Work (18)
- Technology (19)
- Leadership Studies (20)
- Sociology (21)

Q9 Please indicate your family's current household income in U.S. dollars

- Under \$25,000 (1)
- \$25,001 to \$50,000 (2)
- \$50,001 to \$75,000 (3)
- \$75,001 to \$100,000 (4)
- Over \$100,001 (5)

Q10 How would you describe yourself?

- Caucasian/White (1)
- African American (2)
- Indigenous or Aboriginal Person (3)
- Asian/Pacific Islander (4)
- Hispanic (5)
- Latino (6)
- Multiracial (7)
- Prefer not to answer (8)

Q11 What age were you when your family first purchased a computer you could use in your home?

- Always had a computer available to use at home (1)
- Between ages 1-5 (2)
- Between ages 6-10 (3)
- Between ages 11-15 (4)
- 16+ (5)
- Never had a computer available to use at home (6)

Q12 Consider for a moment the classroom technology, including computer equipment and access to that equipment, that you used in high school. How does it compare to the classroom technology on your campus?

- Significantly better than my technology in high school (1)
- Slightly better than my technology in high school (2)
- About the same as my technology in high school (3)
- Slightly worse than my technology in high school (4)
- Significantly worse than my technology in high school (5)

Q13 Did you consider an institution's technology offerings to students when you were considering colleges?

- Yes (1)
- No (2)

Q14 When you were considering where to attend college, how important was an institution's technology offerings to students, including equipment and access to that equipment, in your selection process?

- Not at all Important (1)

- Not very Important (2)
- Neutral (3)
- Somewhat Important (4)
- Extremely (5)

Q15 How important is it that your college offers the following to students? Please answer "extremely," "very," "somewhat," "slightly," or "not at all" next to each answer option.

	Not at all Important (1)	Slightly Important (2)	Somewhat Important (3)	Very Important (4)	Extremely Important (5)
Wireless network (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Laptop computer (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tablet computer (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Desktop computer (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Netbook computer (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
iPad (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Smartphone (e.g., BlackBerry, Droid, iPhone) (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
E-reader device (e.g., Kindle, Sony Reader) (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Course management system (e.g., Blackboard, Jenzabar, Moodle, Web CT) (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

<p>Digital content (e.g., online textbooks and material available online for download, including PDF documents, notes and other curricular materials in electronic form) (10)</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<p>Interactive whiteboard (11)</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<p>Student response systems (a.k.a. "clickers" or learning response systems) (12)</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<p>Accessing the campus' network from an off-campus location (13)</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<p>Recorded class lectures to watch on your own time (14)</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<p>Virtual</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

learning, which delivers education to students who are not physically in the same location as the teacher and/or other students (15)					
Campus computer lab (16)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Multimedia content streaming (17)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q16 Does your college offer the following to students? Please answer "yes," "no" or "don't know" next to each answer option in the blank space to the right.

	Yes (1)	No (2)	I don't know (3)
Wireless Network (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Laptop Computer (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tablet Computer (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Desktop Computer (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Netbook Computer (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
iPad (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
SmartSmartphone (e.g., BlackBerry, Droid, iPhone) (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
E-reader device (e.g., Kindle, Sony Reader) (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Course management system (e.g. Blackboard, Jenzabar, Moodle, Web CT) (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Digital content (e.g., online textbooks and material available online for download, including PDF documents, notes and other curricular materials in electronic form) (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
k) Interactive whiteboard (11)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Student response systems (a.k.a. "clickers" or learning response systems) (12)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Accessing the campus' network from an off-campus location (13)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Recorded class lectures to watch on your own time (14)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Virtual learning, which delivers education to students who are not physically in the same location as the teacher and/or other students (15)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Campus computer lab (16)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Multimedia content	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

streaming (17)			
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Q17 What is your opinion about the following statements that you think are the biggest challenge to classroom technology on your campus? Please select one.

	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
My professors don't know how to use it (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My professors won't use it (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My campus does not have enough technology to adequately serve students (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Our classrooms are not outfitted with technology (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of technical support, which means that technology does not always work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

(5) Technology isn't useful to my course of study (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Technology is outdated (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Technology is fully integrated into my curriculum-- there are no obstacles (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q18 Please indicate how strongly you agree or disagree with the following statement: Technology is important to my ability to study for my major?

- Strongly Disagree (1)
- Disagree (2)
- Neither Agree nor Disagree (3)
- Agree (4)
- St
- rongly Agree (5)

Q19 Please indicate how strongly you agree or disagree with the following statement: Technology is important to my ability to prepare for my chosen profession?

- Strongly Disagree (1)
- Disagree (2)
- Neither Agree nor Disagree (3)
- Agree (4)
- Strongly
- Agree (5)

Q20 To what extent do you agree that the technology provided by your college is used in your classes? Please indicate how strongly you agree or disagree.

- Strongly Disagree (1)
- Disagree (2)
- Neither Agree nor Disagree (3)
- Agree (4)
- Strongly Agree (5)

Q21 Please indicate how strongly you agree or disagree with the following statement: My college/ university understands how I use or want to use technology as a learning tool.

- Strongly Disagree (1)
- Disagree (2)
- Neither Agree nor Disagree (3)
- Agree (4)
- Strongly Agree (5)

Q22 Please indicate how strongly you agree or disagree with the following statement: My college/ university is preparing me to successfully use technology as a business/professional tool when I enter the workforce.

- Strongly Disagree (1)
- Disagree (2)
- Neither Agree nor Disagree (3)
- Agree (4)
- Strongly Agree (5)

Q23 What do you think are the benefits of virtual or distance learning? Please select all that apply.

- I do not see benefits of virtual learning/I do not want to take a virtual learning class (1)
- Virtual learning gives me the opportunity to study with a broader variety of faculty members (2)
- Virtual learning enables me to interact with a greater number of fellow students (3)
- Virtual learning increases the variety of classes I can take (4)
- Virtual learning provides the opportunity for professional adults to take classes while working full time (5)

Q24 What is your opinion about the following statements concerning how you think your professors feel about technology as a learning tool?

	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
My professors understand technology, and it is fully integrated into my classes (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My professors believe that technology can be a useful tool, and they encourage students to use it (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My professors treat technology as optional for their classes (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My professors do not understand technology and do not use it (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q25 Do you currently use any of the following technologies/Internet tools in conjunction with your education (e.g., to study, while in class, to work on projects)? Please select yes, no or I don't know.

	Yes (1)	No (2)	I don't know (3)
Laptop computer (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tablet computer (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Netbook computer (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Desktop computer (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
iPad (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
iPod/MP3 player (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
E-reader device (e.g., Kindle, Sony Reader) (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Digital video recorder (e.g., Flip) (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Smartphone (e.g., BlackBerry, Droid, iPhone) (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Videoconferencing (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Web conferencing (11)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Online text or video chat (12)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Course management system (e.g., Blackboard, Jenzabar, Moodle, Web CT) (13)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Digital content (e.g., online textbooks and material available online for download,	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

including PDF documents, notes and other curricular materials in electronic form) (14)			
Interactive whiteboards (15)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Student response systems (a.k.a. "clickers" or learning response systems) (16)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Open source applications (e.g., Google Apps, OpenOffice) (17)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Social networking sites (e.g., Facebook, Twitter, Google Buzz, LinkedIn, MySpace) (18)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Blogs (19)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wikis (20)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Podcasts/vodcasts (21)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q26 Do you use any of the following technologies/Internet tools for personal use (e.g., to connect with friends/family or for hobbies, extracurricular activities and relaxation)? Please select all that apply.

	Yes (1)	No (2)
Laptop computer (1)	<input type="radio"/>	<input type="radio"/>
Tablet computer (2)	<input type="radio"/>	<input type="radio"/>
Netbook computer (3)	<input type="radio"/>	<input type="radio"/>
Desktop computer (4)	<input type="radio"/>	<input type="radio"/>
iPad (5)	<input type="radio"/>	<input type="radio"/>

iPod/MP3 player (6)	<input type="radio"/>	<input type="radio"/>
E-reader device (e.g., Kindle, Sony Reader) (7)	<input type="radio"/>	<input type="radio"/>
Digital video recorder (e.g., Flip) (8)	<input type="radio"/>	<input type="radio"/>
Smartphone (e.g., BlackBerry, Droid, iPhone) (9)	<input type="radio"/>	<input type="radio"/>
Videoconferencing (10)	<input type="radio"/>	<input type="radio"/>
Web conferencing (11)	<input type="radio"/>	<input type="radio"/>
Digital content (e.g., online books and material available online for download in electronic form) (12)	<input type="radio"/>	<input type="radio"/>
Online text or video chat (13)	<input type="radio"/>	<input type="radio"/>
Open source applications (e.g., Google Apps, OpenOffice) (14)	<input type="radio"/>	<input type="radio"/>
Social networking sites (e.g., Facebook, Twitter, Google Buzz, LinkedIn, MySpace) (15)	<input type="radio"/>	<input type="radio"/>
Blogs (16)	<input type="radio"/>	<input type="radio"/>
Wikis (17)	<input type="radio"/>	<input type="radio"/>
Podcasts/vodcasts (18)	<input type="radio"/>	<input type="radio"/>

Q27 Social media uses mobile and Web-based communications platforms to enable real-time dialog and content sharing (ex. Facebook, Twitter, blogs and wikis) How often do you use social media to study or work on class assignments?

- Never (1)
- Rarely (2)
- Sometimes (3)
- Often (4)
- Always (5)

Q28 How often do you use social media to connect with classmates to study or work on class assignments?

- Never (1)
- Rarely (2)
- Sometimes (3)
- Often (4)
- Always (5)

Q29 How often do you use social media to connect with faculty to study or work on class assignments?

- Never (1)
- Rarely (2)
- Sometimes (3)
- Often (4)
- Always (5)

Q30 How often do you use technology as a learning tool while in class?

- Every day (1)
- Most Classes (2)
- Several items throughout the semester (3)
- Rarely (4)
- Never (5)

Q31 Outside of class, how do you prefer to communicate with your professors?

Please select your most preferred methods of communication.

- I do not communicate with teachers outside of classes (1)
- In-person (2)
- Phone (3)
- E-mail (4)
- Instant message (5)
- Facebook (6)
- Twitter (7)
- Course management tools (e.g., Blackboard, Jenzabar, Moodle, Web CT) (8)
- Web-based video chat (e.g., Skype, Microsoft OCS) (9)

Q32 Some institutions are considering digital/online textbooks/e-text as an alternative to traditional print textbooks. These textbooks are delivered via a laptop, netbook or e-reader device. What benefits, if any, do you see for you and your campus?

- Do not see any benefits (1)
- Instant access to content (2)
- Increased student engagement (3)
- Cost savings for students (4)
- Ease of note taking (5)

Q33 What challenges do you see for your campus and students by moving to digital/online textbooks/ e-text?

- I do not want to use digital/online textbooks/e-text (1)
- There are no challenges to moving to digital or online textbooks (2)
- Availability of, or access to, digital or online textbooks (3)
- Availability of, or access to, a digital content reader or computing device (4)
- Affordability of digital textbook device (5)
- Faculty reluctance to move to digital or online textbooks (6)
- Some students prefer print material (7)
- Lack of understanding of the benefits of digital or online textbooks (8)

Q34 Please list the one technology tool that you do not have at your disposal, that you believe would be most useful in your studies.

Q35 Are you interested in participating in a follow-up interview with me to express your views in more detail ?

- Yes (1)
- No (2)

Q36 Click the link to input your contact information and to enter for a chance to win a Wal-mart gift card <https://www.surveymonkey.com/s/VBHMC22>

Q37 Please click on the following link for the chance to win a Wal-mart gift card: <https://www.surveymonkey.com/s/V3H56HM>