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AN EXAMINATION OF STUDENTS' TECHNOLOGY APPREHENSION, COMMUNICATION COMPETENCE, AND ACHIEVEMENT EMOTIONS IN COMMUNITY COLLEGE DEVELOPMENTAL EDUCATION COURSES

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ABSTRACT

Despite the infusion of information and communication technology into higher education, the effects of incorporating this technology in community college classrooms, particularly developmental courses, remains to be thoroughly studied. The demographic differences found in community colleges versus four-year institutions are stark and warrant their own focused investigation. The college experience is an emotion-laden one, especially from the position of an academically at-risk student. Experiencing high levels of technology apprehension could negatively affect a student's achievement emotions. In exploring technology apprehension, self-perceived communication competence should be taken into account because of the communicative nature of the technology used in higher education. This study explored the relationships between technology apprehension, self-perceived communication competence, and achievement emotions. A Pearson correlation revealed a positive association between technology apprehension and negative achievement emotions. Female students were found to experience higher levels of technology apprehension than male students. Data from open-ended questions offered insight into the ways developmental students view technology, and the challenges they face when using technology in their academic pursuits.

DEDICATION

This master's thesis is dedicated to my daughter, Ava Grace Crocker. Ava, you were six months old when I applied to the MACTS program. You are nearly three years old at the completion of this project and this degree. You have been my constant companion throughout the two most trying years of my life to date. I know that throughout this journey we have missed a few precious moments, a bedtime story or two, and a lot of laughs. But, a happier mother makes a happier daughter, and this academic journey was something I needed to do for my own happiness and fulfillment. I'm a stronger person because I did something important and difficult, yet exponentially worth the effort. I hope you can use this part of my life as a reference when you get to your own bridge you must cross. I love you, sweet child of mine.

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CHAPTER ONE

INTRODUCTION

Communication is a necessary and vital part of the education process. Teaching and learning require relaying information, asking questions, and participating in dyadic, small, and large group communication contexts. Students' abilities to communicate effectively play an important role in their academic achievement. Some students experience communication apprehension, which can negatively affect their academic performance. Communication apprehension is more than "butterflies" or stage fright. The symptoms experienced by people with communication apprehension are similar to those experienced by people suffering from medically diagnosed social anxiety disorder (Stein & Stein, 2008). It is an "anxiety syndrome associated with either real or anticipated communication with another person or persons" (McCroskey, 1977, p. 28). Communication apprehension negatively affects learning outcomes as measured in standardized test scores, grade point averages, and overall classroom achievement (McCroskey, 1977).

In recent years, classroom communication has expanded to include computer-mediated communication in addition to face-to-face communication and instruction. Some of the first interactions a student may have with an institution is through that institution's website or social media pages (*Social Media: Considerations and Implications,* 2009). That computer-mediated communication will continue from the initial discovery and interaction until the end of a student's college experience. Computer-mediated learning (CML) has become an integral part of the curriculum in

college classes across the country. Entire degrees can be earned online from the bachelor to doctoral level. Students will more than likely take a course online or participate in some form of CML during their college experience. In 2010, 6.1 million students were enrolled in at least one online course in which the majority of the content was delivered online with no face-to-face interaction with an instructor (Allen & Seaman, 2013). CML has been praised for its efficiency, its facilitation of learning beyond the classroom, and for balancing the student-teacher relationship (McComb, 1994).

Technology apprehension (TA) is anxiety associated with the use or impending use of a computer (Cambre & Cooke, 1985). TA has the potential to interfere with a student's ability or willingness to communicate with peers or faculty members. This could mean a student misses learning opportunities by not contributing to online discussion boards, avoids projects or does not utilize resources involving technology, or does not reach out for help with coursework when needed. Because of the pervasiveness of CML in higher education, TA is a communication issue that needs to be addressed by both communication scholars and professionals in higher education.

Pascarella and Terenzini (1997) submit that research into college students' lives and experiences does not paint a completely accurate picture of the American undergraduate population. The bulk of research conducted has focused on "traditional, white undergraduate college students ages 18-22 who attend four-year institutions full-time, who live on campus, who don't work, and who have few, if any, family responsibilities" (p. 152). These demographics contrast with the typical student body population found in the nation's 1,132 community colleges (*Community College Fast*

Facts, 2013). Community college student populations are more diverse in terms of race, economic status, and age. Pascarella and Terenzini describe this gap in research as an "empirical black hole that means we are functioning in virtual ignorance of the educational impact of one of the nation's most significant social institutions" (p. 155). This thesis seeks to add to the knowledge about community college students and the challenges they face in their learning endeavors.

Defining the Community College

Community colleges are a complex and unique part of the American educational landscape. They were created to address the educational needs of underserved segments of the population including racial minorities, non-English speakers, and working adults. Today they serve almost half of the country's undergraduate population (AACC, 2012). In 2012, the American Association of Community Colleges (AACC) estimated that more than eight million students were enrolled in credit courses for the fall semester. That number does not include the number of students enrolled in non-credit certificate courses, certification courses, and continuing education courses designed to serve the needs of industries such as child-care and healthcare. In total, 13 million students chose community college for their higher education needs.

Increasing numbers of high school graduates are choosing to complete some of their coursework at community colleges before transferring to four-year colleges and universities. This is due to the affordability of community colleges compared to the cost of completing all coursework at a four-year institution. The average annual community college tuition and fees for 2012-2013 is $3,130 compared to $8,660 for four-year

institutions (*Community College Fast Facts*, 2013). This trend is shifting the perception of community college from "Plan B" to first choice.

Community colleges are tasked with "reaching the hard to reach" because they are the academic homes of minority, low income, underprepared, and non-traditional students (Gittell, 1985, p. 51). Women account for 61% of community college enrollment and racial (non-white) minorities account for 49% of community college students (*Community College Fast Facts*, 2013). A defining characteristic of community college students is that many of them *are* or *were* working adults. More than half (59%) of full-time students are employed part-time, and 40% of part-time students are employed full-time. Community college students receive various forms of financial aid including Pell Grants, federal and state grants, lottery tuition assistance, and student work-study benefits. A substantial number (40%) of community college students are the first in their families to attend college. Sixteen percent are single parents and 12% are students with disabilities (*Community College Fast Facts,* 2013). Most important to this thesis, 51.7% of students entering community college enroll in at least one developmental education (DE) course.

Community colleges have made quality education more accessible to people who have been denied admittance to traditional four-year institutions. These colleges have also made higher education a more realistic option for people with financial barriers to four-year institutions and those whose work-life demands are not conducive to attending a four-year institution. Because of their open-admission policy, community colleges are plagued with poor retention rates, low rates of degree completion, and controversy

surrounding a core part of their curriculum—developmental education (Bailey, Leinbach, & Jenkins, 2006; Brock, 2010; Goldrick-Rab, 2010).

Defining Developmental Education

Functioning as open-access institutions, community colleges offer DE for students who are not prepared to perform academically on the college level. DE may also be referred to as college prep, comprehensive studies, remedial education, or basic skills courses. The choice of terminology is ultimately the decision of the institution and typically reflects the way the institution views the coursework. "Developmental" is the dominant mainstream term used by educators working in the field as evidenced by the National Association of Developmental Education (NADE), a professional organization for developmental educators. The term "remedial" has been phased out in practice, but remains somewhat in use in scholarship. "Basic skills" is generally used in adult education settings.

The study of DE is important for a variety of reasons. First, 38 percent of students entering community college enroll in a DE course (Ohio Board of Regents, 2006). These courses are intended to prepare students to perform and succeed on the college level. This significant number prompts investigation and assessment of the measures and methods used to identify students in need of remediation. The necessity of DE courses also reflects the performance of another primary social institution: American secondary school. Institutional in-fighting, public policy, and contrasting professional perspectives on the effectiveness of DE make it an issue worth exploring.

DE courses focus primarily on the subject areas of mathematics, English, and reading. The goal of DE is to help students who perform poorly on college entrance exams to perform well in college level courses. Students are placed in non-credit courses and given an intense and comprehensive review of the material they must master to enter credit-bearing courses. Students pay tuition for these courses, but they generally receive no credit for them.

DE garners some criticism. Wellman and Vandal (2011) summarize the five major criticisms of DE: (1) DE should be taught in high school as opposed to college, (2) DE is a short-term problem, (3) colleges are able to effectively and accurately identify academic readiness, (4) DE is a financial burden, and (5) the belief that some students are not college material.

Proponents of DE criticize colleges for using standardized entrance exams as a diagnostic tool for placing students in DE courses. They argue that a more comprehensive approach such as factoring in a student's high school GPA should be used to determine placement in credit or non-credit courses (Wellman & Vandal, 2011). A study commissioned by the Ohio Board of Regents found that DE is relatively inexpensive for colleges because colleges tend to hire adjuncts to teach these courses, and developmental students account for a small number (5%) of full-time enrollment (FTE) despite the larger percentage (38%) of students enrolled in developmental courses (*Costs and Consequences,* 2006). Data collected from multiple states also indicates that the remediation costs for FTE students are lower than for FTE students enrolled in credit courses seeking four-year degrees (Merisotis & Phipps, 2000). The decade-old

controversy surrounding the place of DE in higher education has been described as an "ideological battleground" (Shaw, 1997, p. 284). Present educational policy discourse and the urging of powerful and well-funded non-profit groups to completely eliminate DE suggest this battle continues to be an ideological one.

Recent calls by Complete College America (CCA), which is funded by the Bill and Melinda Gates Foundation, the Carnegie Corporation of New York, and the Lumina Foundation for Education, to eliminate DE and immediately place all students in credit-bearing classes has shaken one of the cornerstones of community college education. CCA has labeled DE the "Bridge to Nowhere," for its failure to produce a high number of graduates—only 22.3% of students complete remediation and graduate within two years. CCA is lobbying state legislatures to replace DE with "embedded tutoring" (*Remediation: Higher Education*, 2012, p. 3). If this push to eliminate DE is successful, the face of the community college will change. This looming overhaul of DE has the potential to negatively affect the most academically at-risk students by placing them in classes beyond their abilities.

Community Colleges and ICT

Due to rapid growth in the use of ICT in peoples' professional and personal lives, community colleges are responding by integrating more technology into their curriculum and course offerings. This infusion of technology into the curriculum has shifted the epistemic beliefs of some community college faculty from a "skills and drill" approach to "learning as you go," in which students apply what they learn in a continuous manner in the field or laboratories (Dirkx, Kielbaso, & Smith, 2004, p. 27). The opportunities

offered by mobile computing and communication on campus have been presented in utopian perspectives (Violino, 2012). Technology in the classroom has been credited with making the learning environment more collaborative, time-efficient, and individualized. The emergence of e-books has removed restrictive cost barriers to course material and efforts are being made to develop platform agnostic course materials. As mobile devices like smart phones and tablets become more ubiquitous, some institutions have jumped on the "Bring Your Own Device" (BYOD) bandwagon (Violino, 2012, p. 39). BYOD invites students to bring their personal mobile devices into the classroom in order to facilitate learning. As a whole, community colleges are trailing behind four-year institutions in the BYOD movement because they do not have the infrastructure and bandwidth to support it; however, community colleges are making strides to improve mobile computing opportunities (Violino, 2012).

Community colleges are also still grappling with the role technology should play in the curriculum. This is particularly challenging for community colleges because of the demographic groups they serve. To what extent should technology be incorporated in the curriculum? How should faculty members design curriculum for students who are apprehensive of or have little experience with technology? As mentioned above, technology apprehension is not just limited to the manual operation of desktop computers. In a college setting a student may work with desktop computers, laptop computers, flash drives, printers, presentation equipment, smart room technology, and institutionally endorsed learning management software. Social media is also working its way into curricula across the country (Abe & Jordan, 2013). Research materials in

libraries are continually migrating to an online format and research skills are increasingly part of the curriculum at community colleges because of the demand for university transfer courses. This environment can be challenging for students who experience TA. Research indicates that prior experience is a strong predictor of future technology use, adoption, and rejection (Venkatesh, Morris, & Ackerman, 2000). Low-income students, older students, and non-traditional students returning to college from the workforce are more likely to have less prior experience with the ICTs used in higher education. This is an important consideration for community college administrators and faculty members.

Community colleges have embraced the migration to online learning quicker than four-year institutions because of their market's demand for flexible learning opportunities. Almost all community colleges—97 percent—have adopted some online course offerings compared to 66 percent of all postsecondary institutions in the United States (Jaggers, 2013). The Community College Research Center at Columbia University's Teachers College warns against the "wholesale replacement" of traditional face-to-face learning environments for strictly online courses (Fain, 2013). Community college students report that they prefer taking traditional face-to-face classes when they find the subject material difficult, particularly interesting to them, or when the course is a requirement for their major (Jaggars, 2013). These preferences are echoed by educators who warn that online classes are not ideal for students who test below college level, or who lack study skills or the technological skills to successfully complete an online course (Rivera, 2013). As a whole, community college students appear to learn most comfortably and successfully in a traditional classroom setting.

As the progress narrative that more money for more technology equals better learning outcomes continues to prevail in education (Baird & Fisher, 2005), it is important for community college thought leaders, administrators, and faculty members to remember who it is they serve. By examining how students react and respond to ICT in their educational endeavors, educators can better determine how to integrate communication technologies more effectively into their pedagogical practices. The effective use and integration of ICT into the course on the part of the teacher could reduce the student's technology apprehension and ultimately create more confident students and communicators.

Technology Apprehension

The pursuit of higher education presents a number of challenges for students. Financial challenges, time management obstacles, indecisiveness during major selection, and maintenance of the school-work-home life balance are all part of navigating the college experience. All of these factors have the potential to induce anxiety in community college students. For a number of students, a fear of or apprehensiveness linked to the use of information communication technologies is a very real obstacle standing between them and academic success in college. Research indicates that despite American culture becoming more immersed in information and communication technologies (ICT), more than half of Americans report experiencing some degree of computer anxiety (Williams, 1994). ICT is an extended acronym for information technology (IT), with a focus on the communicative aspect of technology. It includes any technology that can retrieve, store, manipulate, and transmit digital data (Dillon, 2004).

Anxiety or apprehension is defined as "an exaggerated state of fear that motivates a variety of defensive behaviors, including physical signs, conscious apprehensiveness, or disorganization" (Seivert, Albrittion, Roper, & Clayton, 1988, p. 244). Chua, Chen, and Wong (1999) provide a comprehensive four-part definition of computer anxiety through a meta-analysis of relevant literature. Their four-part definition is as follows:

1. Computer anxiety is a fear of computers when using the computer or when considering the possibility of computer use.
2. Computer anxiety is a kind of state anxiety, which can be changed.
3. Computer anxiety is measurable in multiple dimensions.
4. Computer anxiety causes computer use avoidance. (p. 611)

Maurer and Simonson (1984) add taking extreme caution with computers to the list of characteristics defining computer anxiety. These scholars also stress that computer anxiety is not normal fear of the unknown; rather, it is irrational fear associated with computers. Although these scholars used the term "computer anxiety," as did much of the previous literature in the 1980s and 1990s (Brosnan, 1998; Cambre & Cooke, 1985; Laguna & Babcock, 1997), technology apprehension (TA) is the more fitting term for this thesis because technology used for educational purposes has expanded beyond the common desktop computer.

College students today must learn to navigate the technological infrastructure of their chosen institutions. This technological navigation begins when researching institutions online, applying for admission online, purchasing permits and paying fees online, filing for financial aid online, and communicating with faculty and staff members

online. Shortly after admission to an institution, students must master the institution's e-mail system, register for courses through the institution's preferred software, and become acquainted with the institution's learning management system such as Blackboard or Lore (Margolin, Miller, & Rosenbaum, 2013). At some point students may choose to enroll in a hybrid course administered partially online, or be expected to participate in online discussion boards or collaborate on a group project online. Many educators working in higher education are proponents of blended learning, which mixes synchronous face-to-face learning in a traditional classroom setting with asynchronous learning in an online setting. This option is attractive because it frees the students and teachers from time and spatial constraints (Garrison & Kanuka, 2004). This immersion in ICT will continue throughout course completion until the final semester when the student registers to graduate and pays graduation fees online. In sum, there is no escaping ICT in today's college experience.

In addition to apprehension related to the use of computer hardware, research is trending toward the possibility that the apprehension experienced while using or anticipating using technology is actually related to the sheer volume of information made available by ICT. The construct of informational reception apprehension (IRA) is defined as "a pattern of anxiety and antipathy that filters informational reception, perception, and processing, and or adjustment (psychologically, verbally, and physically) associated with complexity, abstractness, and flexibility" (Wheeless, Preiss, & Gayle, 1997, p. 16). It refers to a pattern of anxiety induced by the act of receiving, gathering, processing, and interpreting information.

Complexity, abstractness, and flexibility are the three cognitive processes involved with IRA. Complexity is the amount of informational stimuli and "implicit schemata and cognitive schemes" of the receiver (Wheeless, Eddleman-Spears, Magness, & Preiss, 2005, p. 146). Abstractness refers to the ability of the receiver to deal with abstract information, and flexibility refers to the ability of the receiver to manage varying aspects of incoming information including openness and adaptability (Wheeless et al., 2005).

Demographics and Technology Apprehension

When TA is coupled with a demographic factor that is typically disadvantageous to academic success—low socio-economic status (SES) or being a non-native speaker, for example—the result can be a negative, anxiety-ridden academic experience. Age can also be a factor in the level of TA a person experiences. Ellis and Allaire (1999) found that TA has a positive correlation with age. Older adults (55 and over) typically report higher levels of TA than younger adults (18-27), and when given a computer task, older adults take longer to complete the task and make more incorrect decisions than younger adults (Laguna & Babcock, 1997).

Biological sex plays a role in predicting levels of TA. Igbaria and Parasuraman (1989) determined that external loci of control and math anxiety levels are contributing factors to TA. Females report significantly higher levels of math anxiety than do males (Betz, 1978). While locus of control is not inextricably linked to biological sex, an internal locus of control is positively correlated with masculinity (Kapalka & Lachenmeyer, 1988; Watson & Newby, 2005).

When the discussion turns toward race, prior use is shown to be a much stronger predictor of TA than race (Scott & Rockwell, 1997). Because racial minorities are more likely to live in socio-economically challenged areas, they have less access to technology, creating a disparity in prior use (Mosseberger, Tolbert, & Gilbert, 2006). The stress of this anxiety can lead to poor learning outcomes and decrease an institution's retention rate. Community colleges serve a largely disproportionate number of these at-risk students and are struggling to retain them (*Reclaiming the American Dream,* 2012).

Communication Competence

Communication competence is the "adequate ability to pass along or give information; the ability to make known by talking or writing" (McCroskey & McCroskey, 1988, p. 109). A crucial part of the learning experience is the communication that takes place in the classroom between students and teachers and between peers (Wells & Arauz, 2006). McCroskey (1984) outlines four criteria that must occur before a student can achieve communication competence. Students must (1) acquire certain behavioral skills that are in line with societal norms, (2) students must understand the communication process and the nuances of the communication process, (3) students must feel a positive emotional response toward communication, (4) and students must make competent communicative behavior a purposeful and habitual practice.

McCroskey (1984) attributes the development of communication competence to a "learning environment which permits the development of appropriate behavioral and cognitive skills, shapes a positive affect for communication, and provides opportunities

for use and reinforcement of those abilities" (p. 267). Research has revealed that at-risk students report higher levels of communication apprehension and lower levels of SPCC than national averages (Chesebro et al., 1992). Community college students typically fall into the category of at-risk students due to their socio-economic status, family history, and past academic achievement.

Communication and Emotion

Recent communication literature suggests that learning and emotion are intertwined and the two should not be viewed as a binary (Meyer & Turner, 2006; Titsworth, McKenna, Mazer, & Quinlan, 2013). Stated simply, the emotions students experience before, during, and after their classes affect their academic performance. The terms affect, mood, and emotion are often used interchangeably, but actually mean different things. Affect is the broadest of the three terms referring to the positive or negative valence of a particular emotional experience. Moods are "feeling states" that generally last longer than a specific emotion and are attributed to no particular event. (Guerrero, Andersen, & Trost, 1998, p. 7). Emotions are affective states, not bodily, cognitive, or behavioral (Ortony, Clore, & Foss, 1987). Of the three concepts, this thesis will explore the emotions experienced by developmental students in community colleges.

A large part of student success is dependent upon the emotions students experience in the course of their academic careers. The most common set of emotions experienced in learning environments are achievement emotions. These emotions are defined as "emotions tied directly to achievement activities or achievement outcomes" (Pekrun, 2006, p. 317). Students enter a course with the goal of acquiring new knowledge

and performing well enough on learning measures to pass the course. These goals position achievement in the center of their emotional experiences.

Summary of Research Objectives

Community colleges were created to serve a population of students who found four-year institutions unsuited to their lifestyles or abilities. DE is a cornerstone of community colleges because of their commitment to being open-access institutions. Communication, which is fundamental to learning, has shifted from primarily face-to-face communication in traditional classroom settings to include computer-mediated communication and CML. Some students experience anxiety when coursework requires or incorporates the use of technology. Developmental students are the most academically at-risk students and report lower levels of SPCC than other students. This makes any apprehension they experience in the classroom an area of concern.

Classroom apprehension has been studied in various contexts, but this thesis seeks to study apprehension in terms of technology use. An additional focus area will investigate SPCC because of the communicative nature of the technology used in the classroom. More specifically, this thesis seeks to explore the relationships between TA and SPCC and students' achievement emotions. Learning is an emotional process and the emotions a student experiences can affect his or her academic trajectory.

Substantial research focusing specifically on the TA and SPCC of community college students is lacking. This gap warrants further investigation because of the large and demographically diverse population of community college students. Methods and remedies appropriate for addressing TA and SPCC in university students likely will not

have the same effect on community college students. Therefore, this thesis seeks to explore the following research question:

> RQ: What is the relationship between technology apprehension, self-perceived communication competence, and the achievement emotions experienced by students enrolled in community college developmental education courses?

CHAPTER TWO

LITERATURE REVIEW

This chapter reviews literature focusing on the affective experiences of community college students with information communication technologies (ICT) in their academic pursuits. Because communication is often mediated through ICT in today's community college classrooms, self-perceived communication competence (SPCC) is also reviewed. Research on the technology apprehension (TA) and SPCC of community college students as a distinct group is lacking. Therefore, TA and SPCC of two distinct demographic groups found in community colleges, females and racial minorities, will be reviewed. First, a brief history of community colleges and DE will begin this review of literature to provide context for the present study.

Community Colleges

Community colleges date back to the beginning of the 20th century. Calls for social equality through education and the need for trained citizens amidst an industrial boom were two of the driving forces behind the creation of community colleges. Community colleges were originally referred to as "junior colleges" and were branches of private universities (Cohen & Brawer, 2008). William Rainey Harper, the founding president of the University of Chicago, was the first administrator to take formal steps to separate the first two years of college by tacking them onto high school or creating junior colleges that served as preparatory institutions for four-year colleges and universities (Kane & Rouse, 1999). The term shifted to "community college" in the 1950s and 1960s and referenced publically supported institutions. Community college is the term used

today for both public and private two-year institutions (Cohen & Brawer, 2008). For the purpose of this thesis, Cohen and Brawers' (2008) definition of community college will be used: "A community college is defined as any institution regionally accredited to award the associate in arts or the associate in science as its highest degree" (p. 5). Some institutions that meet this definition may refer to themselves as technical colleges. This includes both public and private two-year colleges, but eliminates unaccredited vocational schools and adult education centers.

Community colleges experienced a growth spurt in the 1900s. In 1909, there were only 20 community colleges in the United States. This number increased to 170 by 1919 (Koos, 1924). Cohen and Brawer (2008) attribute the increased demand for schooling to the lengthening perception of adolescence during the early part of the century. A second explanation for the rapid growth is that communities sought to build colleges for greater community appeal and prestige and to meet the demands of the industrial workplace. Still, some view the creation and growth of community colleges as a by-product of a capitalistic economic system designed to hinder the economic and social upward mobility of the working class (Cohen & Brawer, 2008). In contrast to the later view, some scholars view community college not as an institutional device to undermine the success and advancement of minorities, but rather a way to break down educational barriers. Gittell (1985) describes community colleges as "specifically designed to reach those left out of the traditional educational experience" in reference to racial minorities, people from low socio-economic backgrounds, and working adults (p. 51). Community colleges became increasingly popular in the 1970s when baby boomers became college age and young

men were looking for ways to dodge the draft for service in Vietnam. During this time enrollment increased from 2.2 million to 4.3 million (Kasper, 2003).

The mission and goals of community colleges have shifted to meet the demands and preferences of students and industry. In the first half of the twentieth century community colleges functioned as springboards to baccalaureate colleges and universities, hence the early term "junior colleges" (Bragg, 2001; Dougherty, 1994). This mission is not entirely lost today as institutions in many states have articulation agreements between community colleges and four-year universities.

As the country continued to industrialize in the early twentieth century, the focus shifted from university transfer to vocational training (Shaw, 1997). Also during this time period, community colleges began fostering business relationships with prominent industries in the communities they served. This resulted in community colleges creating contract courses to meet specific needs of individual industries and vocational training leading to certification in those industries (Kasper, 2002). Levin (2000) distinguished the various historical mission tracks of community colleges: (1) curricular with a focus on academics and remediation, (2) social with an emphasis on social stratification and social mobility of individuals, (3) job training entities, and (4) "pipeline" to the four-year degree. Levin argues that all four of these mission tracks have recently been replaced with a mission to serve the economy by "producing labor and reducing public sector spending" (p. 19).

Due to shifting the foci and design of community colleges, these institutions are presently navigating complex issues that have positioned them at a crossroad. Some of

those issues include the blending of vocational and university-level learning, unfocused courses of study based on student preferences and convenience rather than academic end goals, and issues of funding and accountability (Cohen & Brawer, 2008). Another one of these issues, which plays a central role in this thesis, is the issue of DE.

Developmental Education

Although a cornerstone of community colleges, DE actually predates the creation of community college, dating back to Harvard College in the 17th century (Merisotis & Phipps, 2000). Open access policies initiated in the 1960s increased the diversity of students enrolling in community colleges and also increased the number of underprepared students. DE became a focus of community colleges in the 1960s when they adopted open-access policies (Bragg, 2001). There is still a great deal of emphasis on DE in community colleges and the issue has become rife with controversy (Lu, 2013). The term "developmental education" remains the dominant term, but can be used interchangeably with "comprehensive education," "basic skills" courses, and "college preparatory" courses. Usually, each individual college or state system has its own entrance exam that determines if students are prepared for college-level courses. If students prove to be underprepared, they are enrolled in developmental courses that focus on the primary areas of math, English, and reading. College skills courses teaching time management, networking, and study skills are increasingly part of the developmental curriculum (Cohen & Brawer, 2008). These types of courses were designed in an effort to remedy the low-retention/high-attrition rate at community colleges.

DE has not always been solely a community college hallmark, but various ideologies are forcing it to become *primarily* a community college issue. Shaw (1997) describes the differing ideologies surrounding the place of DE. Some professionals in education and government think that it is the place of high schools to prepare students for college-level work and that remediation should not exist on the college level. Opposing perspectives contend DE should be relegated entirely to community colleges in order for four-year institutions to focus on scholarship and research and development.

A unique challenge to students enrolled in DE courses, and to DE as a whole, is the low-status assigned to it by society and the institutions that house it. Most institutions that offer developmental courses do not award credit for the successful completion of such a course. Rose's (2012) history of DE provides accounts from the early 1930s and 1940s in which developmental courses were referred to as "sick sections" or "hospital sections" (p. 6). Rose (2012) admits that such brash labels are no longer used today thanks to research into cognitive development, learning styles, and brain function; however, he contends that the stigma of DE remains and is evidenced by the use of terms including "handicapped" and "disabilities" in reference to developmental students (p. 6).

Low-income students of color are overrepresented in DE (Brock, 2010; Rose, 2012). These minority students report feeling more stress related to academic achievement than non-minority students (Smedley, Myers, & Harrell, 1993). These negative achievement emotions experienced by developmental students, minorities especially, lead to high dropout rates (Hoyt, 1999).

Technology Apprehension and Community College Students

The implementation of technology in the community college classroom is not without its challenges. Two looming administrative challenges for community colleges striving to incorporate more technology into instruction are securing the funding necessary to do so and equipping faculty members with the knowledge and skill sets to effectively teach with technology (Miller & Pope, 2003). Another challenge worthy of attention is how community college students respond to the incorporation of technology in the learning environment.

Community college students use technology primarily to facilitate coursework. They are less likely to engage in more technical aspects of technology like writing code or hosting websites (Miller, Pope, & Steinmann, 2005). As mentioned in Chapter 1, CML is a common choice for community college students as evidenced by the popularity of online and hybrid classes. Technical skills prove to be a non-factor in predicting student success and satisfaction in online courses; rather, study skills and time management prove to be the determining factors (Puzziferro, 2008). Higher levels of technology use have been found to be predictive of overall academic achievement in community college students. High users of technology also reported higher self-efficacy regarding their ability to use information technology than low-users of information technology (Anderson & Horn, 2012). The authors found a positive correlation between the number of computer literacy classes taken and level of computer usage and encouraged community college faculty and administration to offer computer literacy courses for low-users of information technology. Usefulness and ease of use are the strongest predictors

of new technology adoption in community college students. Ease of use is the strongest predictor with research showing that if community college students perceive a new technology as too difficult to use, they will not invest the time to learn it despite its usefulness (Behrend, Wiebe, London, & Johnson, 2011).

There is not a wealth of research focused specifically on the TA of community college students. However, there is extensive research focusing on the TA of the various demographic groups commonly found in community colleges. The following sections will review some of the research focusing on the TA of females and racial minorities (61% and 49 % of enrolled community college students, respectively).

Biological Sex

Scholars have extensively researched the intersection of gender/biological sex and technology using both quantitative and qualitative methods. Gender constitutes a masculine and feminine identity that is socially constructed, while sex refers to biological attributes that distinguish males from females (Pryzgoda & Chrisler, 2000). Feminist technology studies, a subfield of technology studies, explores the coproduction of gender and technology (Faulkner, 2001; Wajcman, 2010). These scholars posit that in Western societies technology is coded masculine which creates the perception that men will be intrinsically capable of skillfully using technology while women will naturally be apprehensive of technology (Bray, 2007; Oldenziel, 1999). Despite increasing numbers of women who become users of new technologies, women are still wholly underrepresented in the design and ownership phase of technology production (Fountain, 2000). The social construction of technology (SCOT) and actor network theory (ANT)

are two theoretical approaches that have proven useful for feminist technology scholars. SCOT (Klein & Kleinman, 2000; Wacjman, 2000) posits that the design, content, and usage of technology are open to sociological analysis. ANT is described by Latour (1996) as a "powerful tool used to destroy spheres and domains and regain a sense of heterogeneity" (p. 380). In terms of technology studies, ANT breaks down the illusion of technology and society as two separate spheres working side by side. Instead, it positions technology within society as an integral part of society and can help explain how people create, use, and react to technology in social life (Wajcman, 2000).

The above qualitative findings contextualize and add dimension to the bulk of quantitative data surrounding biological sex and technology. In terms of biological sex and TA, quantitative research does not present a definitive sex difference. Some studies find that men report higher levels of self-efficacy and enthusiasm when using technology than women (Broos, 2005; Comber, Colley, Hargreaves, & Dorn, 1997; Hattie & Fitzgerald, 1987; Whitley, 1997). Other research states the opposite (Loyd, Loyd, & Gressard, 1987). Still, other studies reveal no significant sex difference in terms of TA (Busch, 1995; Todman, 2000). Echoing qualitative findings, quantitative research also reveals that technology is coded male in Western cultures (Chen, 1986). One sex difference in terms of TA is that women tend to believe there is something intrinsically wrong with their individual computing ability when they experience anxiety or discomfort using computers. Men tend to blame poor teaching or lack of experience for their anxiety (Bernstein, 1991).

Racial Ethnicity

The Digital Divide (DD) metaphor is often used in discussions of race and technology. The DD originally referred to perceived barriers of access to ICT for different demographic groups (Norris, 2003). The discourse referred to access to actual computer hardware and digital information. A more recent definition of the DD suggests that the divide is much more than an access problem, and that the division is more communicative, social, and cognitive in nature (Harper, 2003). Despite varying definitions of the DD, data does show that Caucasians have more access to ICT than do African Americans and Latinos (Fairlie, 2004). This is more a result of socio-economic status than race. Race has not been found to be a significant predictor of technology apprehension (Gilroy & Desai, 1986). However, socio-economic status *is* a predictor of TA. Individuals from higher socio-economic backgrounds are more likely to have prior experience with ICT than individuals from lower socio-economic backgrounds, thus decreasing their levels of TA (Bozionelos, 2004). Typically, Caucasians hold a higher socio-economic status than other racial minorities, giving the appearance that race is the predictor. African Americans *do* report experiencing TA, though, and the group's preferred method to reduce that apprehension is experience with technology (Gilroy & Desai, 1986).

Informational Reception Apprehension

Informational reception apprehension (IRA) has been studied in various contexts including organizational communication (Terry & Ritz, 1999), dyadic communication (McEwen & Reed, 1999), and reading and listening studies (Wheeless et al., 1997). IRA

can become disruptive and can hinder one's ability to manage the information they need (Wheeless et al., 1997). Most relevant to this thesis, research has identified significant relationships between IRA and student motivation and overall academic achievement. IRA has a negative association with motivation in learning contexts. When students experience all three IRA factors combined—complexity, abstractness, and flexibility—there is a negative effect on their self-reported grade point averages. Of all three factors, extremely high levels of inflexibility can most negatively affect grade point average. When students report high levels of inflexibility when processing information they also begin to report lower levels of context-based motivation, which affects overall academic achievement (Schrodt, Wheeless, & Ptacek, 2000). These findings focused on listening IRA, but can be reasonably extended to IRA involving technology because of the vast amount of information provided by ICT and the incorporation of ICT in educational settings.

Although the bulk of literature pertaining to IRA centers on listening and reading anxiety, scholars are also exploring the connections between informational receptivity and information technology. Wheeless et al. (2005) argue that the communication dimension of constructs defining computer anxiety has been ignored and that researching the communication dimension could help explain why some individuals avoid or limit their interactions with ICT. In response to the missing communication dimension, Wheeless et al. (2005) developed the IRAT-IT scale to specifically measure the relationship between IRA and ICT. They argue that this is crucial to investigate because

of the possibility that TA might originate from the task of gathering, sorting, and processing information rather than the technology itself.

Communication, Emotion, and Community College Students

There is no single universal definition of emotion agreed upon by scholars who conduct research related to emotion. Emotions are comprised of physiological, cognitive, and social factors (Ekman, 2003). Typically emotions are understood as a mental state and scholars offer lists of emotions rather than concrete definitions (Cabanac, 2002; Reisenzein, 2007). Emotions are displayed and interpreted through various communication contexts including interpersonal (Burleson, 2003), organizational (Kramer & Hess, 2002), and computer-mediated settings (Derks, Fischer, & Bos, 2008), for example. Anderson and Guerrero (1998) offer a comprehensive examination of the intersection of communication and emotion including concepts, principles, processes, and applications. Nonverbal communication such as facial expressions, gestures, voice tone, and body orientation and proximity can communicate the emotions a person is experiencing (Friedman, Prince, Riggio, & DiMatteo, 1980). Verbal communication also expresses emotion through spoken words combined with nonverbal cues. For the most part, scholars agree that there is adequate evidence to substantiate the existence of six basic emotions: happiness, surprise, fear, sadness, anger, and disgust (Ekman, 1992; Johnson-Laird & Oatley, 1992). There are exceptions to this premise, though, attributed to the various numbers and identities of basic emotions recorded in the basic emotions research (Ortony & Turner, 1990). Therefore, this thesis will focus on anxiety induced by ICT and the possible effect it has on achievement emotions.

Learning environments, specifically classrooms, are fertile ground for the intersection of communication and emotion. Teaching and learning is a relational and communicative process and scholars are determining that emotions are not separate from this process. Teacher behaviors influence students and affect students' motivation to learn (Titsworth, Quinlan, & Mazer, 2010). Students have the ability to elicit strong emotions such as anger from teachers (McPherson & Young, 2004), and teachers must learn how to effectively manage their emotions while communicating with students (Zhang & Zhu, 2008). Learning theories and research in various disciplines include emotional dimensions of learning in addition to cognitive dimensions (Gagne, 1984; Goralnik, Millenbah, Nelson & Thorp, 2012; Plax, Kearney, McCroskey, & Richmond, 1986; Titsworth et al., 2013). Bandura's (1977) theory of self-efficacy argues that people avoid tasks and environments that they believe exceed their personal capabilities. The concept of self-efficacy originated and has a rich history in the field of psychology. Bandura (1997) defines self-efficacy as "the beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (p. 3). Self-efficacy theorizes that people yearn to have control over the happenings and circumstances in their lives because uncertainty induces negative emotions such as anxiety. Self-efficacy, whether accurate or flawed, plays an important role in how people behave, think, and respond (Bandura, 1982).

As mentioned in Chapter 1, achievement emotions are the most commonly experienced emotions in academic settings. Developmental students are often ashamed of their academic status. Koch, Slate, and Moore (2012) conducted interviews in which

developmental students reported feeling like "dummies" and experiencing a negative "stigma" upon learning they placed into developmental classes (p. 72). Maxwell (2000) extended this stigma of "classes for dummies" experienced by students to faculty members who reported feeling like second class citizens compared to faculty members who teach discipline specific courses (p. 12).

In addition to stigma and shame, developmental students experience lower levels of self-efficacy than students in credit-bearing courses. Hall and Ponton (2005) studied mathematics students enrolled in calculus and developmental math courses. They discovered that the students enrolled in calculus courses reported much higher levels of self-efficacy than the students enrolled in developmental math. These scholars recommend that developmental programs pay special attention to the affective needs and experiences of their students.

Communication Competence and Community College Students

Communication competence is a precursor for success in social, academic, and professional spheres. The ability to communicate effectively and confidently can have positive effects on interpersonal relationships and attainment of personal goals in academic and professional settings (Halberstadt, Denham, & Dunsmore, 2001). Conversely, failure or inability to communicate competently can increase the risk of social isolation, low self-esteem, and practice of avoidance behaviors (Blood & Blood, 2004). Krauss and Glucksburg (1969) define two steps that must occur for a speaker to successfully construct a message. First, the speaker must be able to distinguish a referent from similar others. Second, the speaker must use language that is compatible with the

listener's knowledge. Communication competence is comprised of the effectiveness and appropriateness of a message (Bochner & Kelly, 1974).

Chesebro et al. (1992) investigated the SPCC of at-risk students. At-risk students are associated with the following characteristics: (1) single-parent households, (2) households in which the parent(s) or sibling(s) did not complete high school, (3) limited English proficiency, (4) previous academic struggle or failure, and (5) limited parental supervision. Racial ethnicity and geographic location (urban vs. rural vs. suburban) also factored into whether a student was classified as at-risk. African American and Latino students and students residing in urban areas reported lower SPCC than Caucasian students and students from rural or suburban areas. These at-risk students reported experiencing more fear in communication contexts, especially in small groups or dyads, and report much lower SPCC than students classified as not at-risk. African American students are perceived as less communicatively competent than Caucasian students with Latino and Asian American students falling between African American and Caucasian students. Caucasian students are also more likely to initiate communication than any other group of students (Dillon & McKenzie, 1998).

Whether or not sex plays a role in communication competence is debatable. Canary and Hause (1993) contend through a meta-analysis that communication research reveals no significant sex differences in communication competence. Despite their conclusion, research does offer some insight into perceptions of sex difference in communication. Wood and Karten (1986) found that males are perceived to be more active and competent communicators than females. Donovan and McIntyre (2004)

discovered that adolescent females report higher levels of SPCC than adolescent males, but the findings reverse with age. As females age, their SPCC decreases and men's SPCC increases.

Summary of Research Objectives

Community colleges began in the early 20th century in response to calls for accessible education for all citizens and to supply workers for a burgeoning industrial economy. Originally branches of private universities, community colleges numbers drastically increased in the 1900s, and they began instituting open admissions policies by the 1960s. The open admissions policies created the need for DE courses due to the influx of underprepared students into the community college system. Community colleges today educate more non-traditional students, racial minorities, low-income students, and females than four-year institutions. A disproportionate number of community college students take at least one DE course during their enrollment. These students often experience a negative stigma set forth by society and their own institutions due to their developmental status. They begin their college careers at an academic disadvantage and typically do not complete their degree programs.

Teaching and learning is naturally an emotion-laden experience. Students and teachers experience a range of emotions in the classroom from pride to anger. Achievement emotions are the most commonly experienced emotions in learning environments because students are trying to attain knowledge or a skill set they did not previously possess. The practice of using ICT to aid and facilitate learning has become ubiquitous in higher education (Sahay, 2004), and community colleges are no exception.

While the infusion of ICT into college courses is often portrayed in a utopian fashion (Rintala, 1998; Stern & Cotton, 2013), research indicates that technology or the anticipated use of technology does induce anxiety in some people. Theory proposes that people avoid what they feel surpasses their personal abilities because they want to avoid experiencing negative emotions and remain in control. Therefore, the following research question is posed:

> RQ_1: What is the relationship between TA and the achievement emotions experienced by students enrolled in developmental education courses in community colleges?

Although quantitative research does not present an undisputable consensus on whether or not females experience more TA than males, qualitative research reveals that technology is firmly coded male in Western society. This leads to the perception on the part of individuals and society that males will be more skilled in terms of technology use. Thus, the following hypothesis is proposed:

> H_1: Female students in developmental education courses in community colleges will report higher levels of TA than male students in developmental education courses in community colleges.

Finally, there is not a substantial body of research on the SPCC of community college students in particular. Research does reveal, however, that students classified as at-risk report lower levels of SPCC than students not at-risk. Communication today is very much mediated through ICT, and students will have to use these technologies to

communicate throughout their college experiences. In sum, communication and technology are inseparable. Therefore, the following research question is posed:

RQ_2: What is the relationship between TA and the SPCC of students enrolled in developmental education courses in community colleges?

CHAPTER THREE

METHODS

Participants and Target Classes

The sample consisted of 132 students enrolled at a multi-campus community college in the southeast with a student population of approximately 6,000. Eligible participant requirements were: (1) either part-time or full-time enrollment at the institution under study and (2) enrollment in at least one developmental education course. The sample consisted of 85 females (64.4%) and 47 males (35.6%). The average age of the participants was 23.25 years old (*SD* = 9.10). Of all the participants, 79 (59.8%) reported receiving a federal Pell grant and 52 reported not receiving a federal Pell grant, with one participant not reporting Pell grant status. The average annual median income was $5,500. The majority of the students were Caucasian (*n* = 102, 77.3%), followed by African American (*n* = 25, 18.9%), with no other ethnic group accounting for more than 5% of the total.

Participants were asked to provide target course information by identifying the first class they attended each week in which they had the opportunity to use or were required to use technology. This class served as their target course on which they based their responses for questions on the Achievement Emotions Questionnaire (AEQ; Pekrun, Goetz, Frenzel, Barchfield, & Perry, 2011). Basing responses on a target course allows for maximum variability in the subject fields surveyed (Plax et al., 1986). Demographic data collected for target courses included an estimate of the number of students enrolled, sex of the instructor, class structure, reason for enrollment, and the name of the course.

The average size of the students' target course was small, with an average of 18 students enrolled (*SD* = 5.66). Biological sex of the target class teachers was predominately female (68.2%) and 31.8% male. The majority of the classes were lecture oriented in their structure (*n* = 78, 59.1%), with discussion-based classes second (*n* = 41, 31.1%), and online classes third (*n* = 11, 8.8%). A majority of students (*n* = 75, 56.8%) reported they were enrolled in their target classes because of their major, while a smaller number of students (*n* = 36, 27.3 %) reported that they were enrolled in their target course due to a general education requirement or a mandate by the institution. A total of 10 students (7.6%) reported taking the target course for elective credit, and 10 students (7.6%) reported they were taking the target course for other reasons. Only one participant did not report the reason for taking the target course.

After analyzing course titles and prefixes, courses from 20 different fields were represented, the majority from Math (*n* = 45, 34. 1%), followed by English (*n* = 36, 27.3%), College Skills (*n* = 11, 8.3 %), and Computer Technologies (*n* = 10, 7.6%). No other area of study represented more than 5% of the target courses.

Participants were also asked questions about the regularity of their computer use. The average number of years of regular computer use was 9.83 years. The average number of years of regular email usage was 7.01 years, regular instant-messaging software usage was 6.16 years, and regular social media usage was 5.48 years.

Procedures and Measures

After receiving IRB approval, a survey was administered in person during designated class periods (See Appendix C for survey questions). Demographic

information was also collected including sex, age, race, income levels, scholarship information, and computer use and experience.

The department chair of the Developmental Studies Department, who endorsed the project, served as a project sponsor by initiating communication with developmental faculty members and providing contact information for each of those faculty members. Formal recruitment began when IRB approval was granted. An informational letter was emailed to all developmental faculty members explaining the project and seeking their participation (See Appendix A for the informational letter). Willing faculty members replied with dates and times that worked for their classes to participate.

Paper copies of the surveys were distributed to participants as opposed to using online survey methods at the request of the institution. Prior to administering the surveys, students were told their participation was optional and they would incur no penalty if they chose not to participate. All participants gave informed consent (See Appendix B for the informed consent form). The researcher and teacher left the room during the duration of the survey and were alerted to return after completion by a designated student.

Data collection took place over a four-week period in the Fall 2013 semester. At the point of data collection, students had been enrolled in their developmental courses for approximately six to eight weeks, giving them adequate time to evaluate their emotions and experiences in relation to their target course.

Technology Apprehension

Technology apprehension was measured using an 11-item short version of the Informational Reception Apprehension Test – Informational Technology (IRAT-IT) scale

(Wheeless, Eddleman-Spears, Magness, & Preiss, 2005). This scale measures apprehension related to retrieving information from technology, and seeks to explain aversion to ICT beyond anxiety related only to tangible computer hardware. The alpha reliability of the short-version scale was .73. Participants responded using a 7-point Likert-type scale with responses ranging from 1 (*strongly disagree*) to 7 (*strongly agree*).

Self-Perceived Communication Competence

SPCC was measured using McCroskey and McCroskey's (1988) Self-Perceived Communication Competence Scale. This is a 12-item scale that asks participants to estimate their own communication competence on a scale of 0 (*completely incompetent*) to 100 (*completely competent*) based on varying communication contexts. The authors emphasize that the scale should be used to measure only *self-perceived* communication competence, not communication performance. It is useful for determining perceptions, causation of perception and outcomes of perception, and contributes to a better understanding of communication. McCroskey and McCroskey (1988) advocate for the use of self-reports in communication research describing them as a "hallmark," "legitimate," and "appropriate" (p. 109). The overall alpha reliability for the scale was .74.

Achievement Emotion

The third and final measure used was an adapted version of the Achievement Emotions Questionnaire (AEQ; Pekrun et al., 2011). This scale seeks to gauge the emotions that students experience before, during, and after a particular target course. The current study focused on both positive and negative emotions: enjoyment (e.g., "I get

excited about going to class"), hope (e.g., "I am full of hope"), and pride (e.g., "I am confident when I go to this class"), hopelessness (e.g., "I feel hopeless), anxiety (e.g., "I feel scared"), anger (e.g., "I feel frustrated in class"), boredom (e.g., "I get bored"), and shame (e.g., "I'm embarrassed that I can't express myself well."). Participants responded using a 5-point Likert scale with response options ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Cronbach's (1951) alpha reliability estimates for the AEQ emotions in the current study were satisfactory with the exception of hope, which was only .44. The rest of the alpha reliability estimates were .88 for enjoyment, .83 for pride, .74 for hopelessness, .92 for anxiety, .88 for anger, .85 for boredom, and .92 for shame.

Open-Ended Questions

In addition to quantitative measures, two open-ended questions were included in the study. The first question asked: What is your typical attitude toward teachers who require you to use technology to complete assignments for the class? The second question posited: Please recall a time when you were required to use technology in class or to complete an assignment for a class. What emotions did you experience during this time?

Data Analysis

Quantitative

Pearson correlations were conducted and descriptive statistics were calculated using SPSS to test the hypothesis and answer the research questions. Alpha was set at .05. in vivo coding and emotion coding were used to analyze the open-ended questions. The questions were aimed at understanding the affective experiences of the students surveyed.

Qualitative

For the qualitative data analysis portion of this project, in vivo coding and emotion coding were used. In vivo coding stands for "literal" or "verbatim" coding. Saldana (2013) recommends in vivo coding for educational studies because it gives voice to students. In vivo coding was useful for this thesis because it offered the participants a chance to share their experiences in their own words, giving depth and voice to the responses in the quantitative portion of the survey.

Emotion coding is a method that falls under the larger umbrella of Affective Coding. It is useful for studying intrapersonal and interpersonal participant experiences by labeling the emotions recalled by those participants (Saldana, 2013). It was useful for this thesis because apprehension is an intrapersonal experience, and this method of coding will allow for identification of the emotions related to it. Emotion coding also complemented the quantitative exploration of achievement emotions.

CHAPTER FOUR

RESULTS

This chapter provides the results related to the hypothesis and research questions presented in Chapter 2. The results of the research questions will address the relationships between technology apprehension (TA), self-perceived communication competence (SPCC), and achievement emotions.

Hypothesis

The hypothesis predicted that female students in developmental education courses in community colleges would report higher levels of TA than male students in developmental education courses in community colleges. An independent samples t-test revealed a statistically significant difference (t = -2.21, df = 129, $p < .05$) between the amount of TA reported by male (M = 29.62; SD = 10.56) and female (M = 35.61; SD = 16.77) developmental students. Females reported significantly more TA than male students, fully supporting the hypothesis.

Research Questions

The first research question explored the relationship between TA and the achievement emotions experienced by students enrolled in developmental education courses in community colleges. A Pearson correlation revealed that TA was positively correlated with students' anger (r = .210, $p < .05$, R^2 = .04), anxiety (r = .34, $p < .05$, R^2 = .11), shame (r = .34, $p < .05$, R^2 = .11), and hopelessness (r = .17, $p < .05$, R^2 = .03). Students who reported higher levels of TA also reported greater anger, anxiety, shame, and hopelessness. The analysis failed to reveal associations between TA and enjoyment

($r = .10$, $p > .05$, $R^2 = .01$), hope ($r = -.05$, $p > .05$, $R^2 = .00$), pride ($r = -.009$, $p > .05$, $R^2 = .00$), and boredom ($r = -.03$, $p > .05$, $R^2 = .00$).

The second research question explored the relationship between TA and the SPCC of students enrolled in developmental education courses in community colleges. A Pearson correlation failed to reveal an association between TA and SPCC ($r = -.17$, $p > .05$, $R^2 = .03$).

Qualitative data analysis began after all surveys were collected. After two thorough readings of all open-ended questions detailed in Chapter 3, categorization began in an effort to identify commonalities in the participants' responses. Two categories were identified: (1) developmental students' views of technology and (2) challenges created by integrating technology into the curriculum. After categories were determined, coding began. Lindlof and Taylor (2011) define the purpose of coding as "characterizing the individual elements constituting a category" (p. 248). Coding revealed six distinct themes, or sub-categories. The first two themes fall under the category of developmental students' views of technology. They are (1) the recognition that technology is ubiquitous, and, (2) the expectation of or resignation to technology use in educational contexts.

The remaining four themes fall under the category of challenges created by integrating technology into the curriculum. These four themes are: (1) access to technology, (2) technological malfunction, (3) subject area or task-based objections, and (4) displacement of instructor's role.

Developmental Students' Understanding of Technology

The majority of the participants who answered the open-ended questions reported positive emotions, experiences, and attitudes related to the requirement of technology in the curriculum. Technology was credited with making schoolwork "faster," "easier," "more fun," and "enjoyable." The integration of technology into the curriculum was reported as "preferable" and "cool." Often, participants who reported positive attitudes and experiences using technology in college qualified those attitudes and experiences by including their ability, comfort, and confidence in using technology in their day-to-day lives.

Other participants reported negative emotions and attitudes toward technology in the curriculum, reporting that they preferred "old-school" or "old-fashioned" methods. Some of the participants could not see the value in completing quizzes or tests online when it could be done on hardcopy in class.

Technology is Ubiquitous

The first theme in the category centers on the participants' view of technology in a broad, more general sense. Participants consistently shared the perception that technology is ubiquitous by offering sentiments like "We're in a technological era where it (technology) is evolving everyday." Typically, when this was mentioned, the participant included the need to "get with the program" or "advance daily" in terms of learning to use technology. For the most part, participants expected and desired that technology use be integrated and required by their instructor: "Society today is geared toward technology, so I feel that using technology in teaching methods/assignments is a

very wise choice." These participants felt that the integration of technology would add value to their degree and prepare them for work in the "real world." (See Table 1)

Assumption of Integration and Resignation

The second theme centers more specifically on the participants' attitudes toward technology integrated into the college curriculum. A sense of expectation ("We use Blackboard, so it's a common occurrence here") of the requirement of technology in the curriculum was consistent throughout the positive responses. Some participants reported feeling as if technology was such an integral part of the curriculum that they automatically expect to be required to use it. Others reported disliking the required use of technology, but were using it because it is necessary to pass the course. An exemplary statement of this sentiment: "I don't personally like computers. I will use them and try to figure out what I am doing if I need to." (See Table 2)

Challenges Presented by Integrating Technology into the Curriculum

Access to Technology

The most consistent theme in this category centered on the hardship faced by students with no or limited access to technology hardware and Internet service. Several participants who held a favorable view of technology in the curriculum and reported finding technology use enjoyable would qualify that viewpoint by indicating they had access to the required technology. Most of the participants who communicated having access issues attributed those issues to socio-economic factors such as not having familial support systems to rely on or only having enough financial resources to pay for basic necessities: "Not all students have mom and dad backing them. When it comes down to

the wire, food is far more important to spend money on than a stable Internet connection." These participants reported the logistical complications no access creates, including having to wait for access in public spaces such as libraries or depending on friends and family to share their access and hardware. An exemplary statement: "It is hard because I don't have a computer or Internet. I have to find time to go to a friends [sic] house or the library . . . ." Frustration and anxiety were the emotions participants associated with no or limited access to technology. (See Table 3)

Technological Malfunction

Second to issues of access, participants cited technological malfunction or failure as one of the challenges of technology use in the curriculum. The majority of responses favored teachers requiring technology use, but expressed that technology cannot be depended upon to work properly at all times; for example, "I like that we can use technology. But, you can never fully, 100% depend on it. It could crash on you at any moment." Participants reported receiving bad grades due to assignments submitted online never reaching their destination. One participant reported producing hard copies of assignments due to extreme difficulty with uploading software only to have the instructor refuse to accept it. Anger, frustration, and anxiety were the emotions the participants cited when technology failed. One participant shared, "I have to use technology for essays in English. It makes me angry sometimes if the computer runs slow or the printers act crazy." (See Table 4)

Subject Area or Task-Based Objections

Participants sometimes objected to the requirement of technology use on the basis of subject or task assigned. The only two subjects explicitly stated were math and English. Every time math was mentioned, the experience was negative. As one participant bluntly stated, "For math, I hate it." The requirement for technology use in English was mentioned only one time and in a favorable manner. Participants indicated they enjoyed using technology for some assignments, but for others they preferred to use textbooks or pen and paper. No examples of particular tasks or assignments in which pen and paper were preferable were given. (See Table 5)

Displacement of Instructor's Role

Some participants voiced their dissatisfaction with what they perceive to be a negative effect of teachers using technology in the classroom: the technology becoming the primary instructor or facilitator of course material. For example, one participant described the scenario this way: "I absolutely hate it [teacher's required use of technology], because they quit teaching in class and make you learn on your own time." Participants emphasized the importance of the teacher's role in their ability to succeed and use the assigned technology. The most common sentiment in this theme was that technology in the curriculum is primarily a mode of convenience for instructors and makes it easy for them to "not do their jobs." (See Table 6)

Table 1

Theme	*Exemplar Statements*
Technology is Ubiquitous	"I don't mind because everywhere you turn you need to know how to use a computer."
	"I have no problem with it [teacher's required use of technology] because we are living in a time when you have to know how to use technology."
	"I think that its [sic] a good idea for teachers/professors to make us use technology, because the 'tech' world is advancing daily and so should we."
	"I think it (teacher's required use of technology) is a good idea because in today's world a lot of jobs require a person to have some type of knowledge on how to use technology."
	"My attitude is a good one b/c technology is ever growing and changing and it more familiarizes us with technology."
	"We're in a technological era where it is evolving everyday."
	"Society today is geared toward technology, so I feel that using technology in teaching methods/assignments are very wise choices."
	"I feel as if it [technology in the classroom] is basically a requirement this day and age."

Table 2

Theme	*Exemplar Statements*
Assumption of Integration and Resignation	"We use Blackboard, so it's a common occurrence here."
	"I feel that the use of technology is a part of the regular cirriculum [sic]"
	"I feel that the use of technology is a part of doing the assignment."
	"The world we live in is full of technology and we are becoming dependent on it."
	"I expect most teachers to assign things for class to be on the computer. It doesn't bother me."
	"I hate typing papers, but I do it because it has to be done."

	"I don't personally like computers. I will use them and try to figure out what I am doing if I need to."
	"If the course requires it, then so be it."

Table 3

Theme	*Exemplar Statements*
Issues of Access	"It is understandable how much easier a program can make a teacher's job to be. But not all students have mom and dad backing them. When it comes down to the wire, food is far more important to spend money on than a stable Internet connection."
	"It is hard because I don't have a computer or Internet. I have to find time to go to a friends [sic] house or the library. Then, if something is due before I get time to go I can't do it. So, I do not like how we have to use computer's [sic] for a lot of things at all."
	"Some kids can't use technology cause [sic] they are poor."
	"I don't think it should be mandatory, because some people are less fortunate when it comes to stuff like that . . ."
	"I am all for technology for those who have access and are somewhat computer literate. However, society vs [sic] poverty and resources are very limited. Not everyone can afford technology-based equipment in their home."
	"Some students live in broken homes that have no computers, so they can't do the assignments that the teacher wants them to."
	"Out-of-class assignments that require internet may sometimes not be available to students depending on their area of residence . . ."
	"I don't like it because I don't have a computer at home so sometimes it is hard for me to do my work."

Table 4

Theme	*Exemplar Statements*
Technological Malfunction	"It's [computer software] too touchy and VERY one-track concerning how it will accept a correct answer."
	"I have to use technology for essays in English. It makes me angry sometimes if the computer runs slow or the printers act crazy."
	"The programs used are a little glitchy [sic]. For example, MyLabsPlus isn't really working on my laptop which contains window 8 software."
	"I think it [teacher's requirement of technology use] is a good way to get assignments, but at the same time if you have tech problems, your assignments could be lost or not delivered in a timely manner."
	"Annoyance, some frustration mainly when a program freezes or doesn't accept my answer, satisfaction when it actually works."
	"I like that we can use technology. But, you can never fully, 100% depend on it. It could crash on you at any moment."
	"The majority of the time, the technology was helpful, but there were times when technology would fail and it would cause an assignment to be late. This was very frustrating and made me very nervous."
	"I was told to upload an assignment online and the uploading software used wasn't working right so I couldn't upload my paper. Instead I brought a copy to class and explained what happened; even still I get many points counted off. I was very angry at my teacher and the technology. Made me care less about getting my work done."

Table 5

Theme	*Exemplar Statements*
Subject Area or Task-Based Objection	"Sometimes doing math online can be difficult. It stressed me out, I guess cause I'm not used to it."
	"The very first time I did my math homework online, I hated every second of it."
	"I don't mind it [teacher's required use of technology] at all. I had rather use a computer for some things, but for others a textbook is just fine."
	"It [teacher's required use of technology] depends on the class. For math I don't like doing it on the computer, I rather do it by hand and turn it in. But for English, I rather use the computer."

	"It depends on the type of assignment, but generally, I enjoy using technology for assignments."
	"I do like using technology, but sometimes I don't because math on the computer is sometimes different than math on paper."
	"In math, I don't like using MyLabs b/c the answers were different sometimes than what were [sic] taught."
	"For math, I hate it."

Table 6

Theme	*Exemplary Statements*
Displacement of Instructor's Role	"I absolutely hate it [teacher's required use of technology], because they quit teaching in class and make you learn at home on your own time."
	"If the teacher is a good teacher, it [teacher's required use of technology] is great. If the teacher doesn't teach, it is harder."
	"Well, I use a computer for my math class. We complete assignments by computer and also tests. I hate it. I feel as if I'm not learning the material. I think that a teacher should be lecturing."
	"It makes it easy for the teacher not to their [sic] job."

CHAPTER 5

DISCUSSION

The primary objective of this thesis was to examine possible associations between technology apprehension (TA), self-perceived communication competence (SPCC), and achievement emotions experienced by developmental students in developmental education community college classrooms. The hypothesis proposing that female students would report more TA than male students was supported. A positive association was found between TA and negative achievement emotions, offering valuable insight for those working in the field of developmental education. No association was found between TA and SPCC, but valuable information can be gleaned from the qualitative open-ended questions.

Theoretical Implications

The need for research focusing on the emotions entangled and experienced in the learning process has been largely overlooked in education research. Anxiety has been studied in terms of math anxiety (Geist, 2010) and test anxiety (Elliot & McGregor, 1999; Zeidner, 1998), but Pekrun, Elliot, and Maier (2006) highlight the gap in emotions research as compared to research into students' cognitive and motivational processes. This study helps fill the void of emotions research in educational contexts. Although it focused primarily on a form of anxiety—technology apprehension—it examined the effects of that apprehension on multiple achievement emotions, both positive and negative.

A very important contribution of this study is the insight it offers into the experiences of community college students. Although research into the lives and experiences of community college students exists, it pales in comparison to research into the lives and experiences of students in four-year institutions (Pascarella & Terenzini, 1997). This line of inquiry is important because it studies a unique, dynamic, and significant social and educational institution. More specifically, this study added to the knowledge base surrounding developmental students, a demographic that is almost exclusively found in community colleges. Research examining students' TA is largely non-existent; therefore, this study addresses that void and offers insight into that area of inquiry.

The first research question sought to explore the relationship between TA and the achievement emotions experienced by students enrolled in developmental education courses in community colleges. The data implies, as previous literature suggests, that people continue to experience apprehension when using technology (Brosnan, 1998; Cambre & Cook, 1985; Chua, Chen, and Wong, 1999). Despite technology being continually integrated into various facets of life, it still has the potential to induce anxiety in some people. This data also implies that just because students were "born digital," a term used to describe people born in the rapidly growing information technology era of 1980 and later, does not mean that they are completely proficient or confident in all areas of ICT use (Palfrey & Gasser, 2008). As students experience more TA, they simultaneously experience more negative achievement emotions, namely hopelessness, anxiety, anger, and shame. Although TA was positively correlated with the negative

achievement emotions of anger, anxiety, shame, and hopelessness, no association was found between TA and the positive achievement emotions of enjoyment, hope, and pride. This implies that technology may not play as significant a role in course satisfaction as popular opinion might assume. A positive or negative course experience is likely affected by many other variables in addition to the level and extent of technology integration.

The only negative achievement emotion that does not positively correlate with TA is boredom, implying that apprehension, although it can frustrate and anger students, keeps them stimulated. This is because boredom is not dependent on a positive subjective state (Pekrun, Goetz, Daniels, Stupnisky, Perry, 2010). For example, a student can be angered by an instructor's words or actions and not be bored. More specific to this study, a student can experience significant TA and not experience boredom. Whether this is a result of satisfaction in other components of the course, or because the student is in a frenzied state due to his or her TA cannot be determined from this data set.

Pekrun (2006) critiques the bulk of achievement emotions research as narrowly focusing only on emotions related to achievement *outcomes*, and offers a definition of achievement emotions that includes the emotions (e.g., enjoyment, boredom, frustration, anger) experienced in achievement-related *activities*. This study subscribed to Pekrun's (2006) definition of achievement emotions because the participants under study were students. In their role as students, these participants were frequently engaged in achievement-related activities: attending classes, completing homework assignments, studying for tests, taking tests, and engaging in class discussions. Therefore, this study

helps fill the gap in research focusing on emotion and achievement-related activities as identified by Pekrun (2006).

The hypothesis proposing female students in developmental education classes in community college would report higher levels of TA than male students in the same situation was supported. The hypothesis was proposed after reviewing both quantitative and qualitative research into gender, biological sex, and TA. Although quantitative research has not reached a definitive stance on whether males or females experience more TA, more studies indicate females struggle with TA than do males. The results of this study reflect those findings. Qualitative research views technology through a gendered perspective rather than a biological sex perspective. In the dichotomy of masculine and feminine, technology is primarily viewed as a masculine creation, design, and skill set (Fountain, 2000; Oldenziel, 1999). Viewing technology through this gendered lens, this study reinforces the previous depictions of technology as firmly coded masculine. Through both perspectives—biological sex and gender—this study implies that TA remains a predominately female experience. Research into college major selection and biological sex gives practical credibility to this theorizing. Technology focused majors like engineering and computer science are still predominately male, while female students continue to gravitate toward the social sciences and humanities (Tulshyan, 2010).

The second research question aimed to examine the relationship between TA and the SPCC of students enrolled in developmental education courses in community colleges. The issues of access revealed in this study add to the theorizing about the

Digital Divide (DD). Access to technology and the services needed to use it are still out of reach for some students. Scholars are shifting the definition of the DD from purely an issue of access to hardware to a more communicative, social, and cognitive definition (Harper, 2003). Over half of the participants (59.8%) in this study reported receiving a federal Pell grant. This means that using the EFC metric (expected family contribution), the federal government recognized a significant financial need for tuition assistance and granted funds based on that metric. This aligns with the definition of the DD as an issue of access to hardware. Although a portion of the participants reported in their open-ended responses that access to technology was problematic for them, participants also reported having regularly used a computer for approximately a decade (9.83 years).

The access issues reported by the students give credence to the use of actor network theory (ANT) in terms of technology studies. As discussed in Chapter two, ANT dissolves the notion of technology and society as two separately functioning spheres. Instead, ANT depicts technology functioning as an integral part of society and helps explain how people use and respond socially to technology (Wajcman, 2000). Differing degrees of access obviously impact a person's ability to use technology in a way that will allow them to succeed or prosper in various social settings such as the workplace or classroom. The access issues also demonstrate how technology is continually integrated into various facets of life. For example, some students communicated their frustration at having to find public places to access the Internet or having to rely on friends and family to share their hardware and access. In these instances, technology, and the problems related to it, infiltrates personal lives and interpersonal relationships.

Practical Implications

The most obvious practical implication of this study is the valuable information it offers community college faculty members and administrators about the students they teach and advise. This study offers insight into the ways developmental students think about and view technology. The majority of the participants surveyed viewed technology as ubiquitous and expected it to be part of their college experience. They saw value in integrating technology into coursework and felt that it prepared them for life after college. Even those students who were not enthusiastic about technology were resigned to the idea that it is simply part of the present day higher education experience. This data should help instructors and administrators who are still grappling with the role technology should play in the learning experience. The data does not answer the question of the *extent* of technology integration; rather, it illustrates the *expectation* of technology integration. This study also identified a few factors to consider when integrating technology into course design: access to technology, students' biological sex, and subject area.

Access. First, educators should either remain or become aware that some students still have no in-home access to computers and/or Internet service. This is obviously a disadvantage to those students, especially in comparison to students who can complete their coursework at a leisurely pace in the comforts of their own home. Students with little or no access to technology or Internet service often have to navigate crowded public spaces such as libraries or commercial businesses that offer free Wi-Fi, or depend on friends or family members to share access to their technology. This predicament creates

stress and is not conducive to producing quality work. Barriers to access may also prevent a gifted student from displaying his or her full potential simply because he or she does not have access to the tools needed to do it.

Administrators should make it a top priority to ensure that there are enough open-access computer labs with flexible hours on campus to reasonably meet students' access needs. Access to open labs outside of regular business hours is necessary for those community college students who are also employed. The percentage of full-time community college students who work part time is 59 percent. Twenty-one percent of full-time community college students work full time (*Community College Fast Facts*, 2013). As a substantial portion of the community college study body, the work-life realities of these students should be taken into consideration.

Teachers should take into account access issues when they are preparing their courses. Technology integration should remain a priority, but it would be helpful if teachers acquainted themselves with their students' access to technology, or lack thereof. This could easily be accomplished by placing a disclaimer in the syllabus explaining that if access is an issue, the student should immediately inform the instructor so a solution can be found.

Biological Sex. In addition to issues of access, educators might also take into consideration the role biological sex and gender identification can play in a student's relationship with technology. The quantitative data from this study revealed that females report more TA than males, which echoes the chorus of other studies that classify technology as masculine and the proficient use of technology as a predominately

masculine skill set (Bray, 2007; Faulkner, 2001; Fountain, 2000; Oldenziel, 1999; Wajcman, 2010). Educators might want to take this knowledge into consideration when designing courses for majors that typically attract more female than male students. Awareness on the part of instructors of technology as masculine might help them become more attuned with the possible struggles their students might face. At the very least, it serves to remind instructors to choose their language carefully when referring to "the ease" of using technology.

Subject Area. Finally, there are practical implications in terms of integrating technology into various subject areas. In their responses to the open-ended questions at the beginning of the survey, participants reported a resounding opposition to using technology, with the exception of calculators, for mathematics. The chosen institutional software for math learning, MyLabsPlus, was discouraging and frustrating for students. Many participants preferred pencil and paper for taking math tests and quizzes as opposed to completing them online. Because all students used the same platform, MyLabsPlus, it is unclear whether it is actually doing math on a computer that frustrates students, or if it is this particular software. Either way, the data implies a need for the institution under study to review and reevaluate the preferred software to ensure that it is user-friendly and aids learning rather than impairing it. More generally, this data illustrates that technology integration should be adapted to fit the various subjects it accompanies. Educators should ensure that the technology incorporated into various subjects is not done in vain or to meet expectations, but serves to help accomplish the end goal of learning.

Possessing the knowledge to appropriately and effectively use information communication technology (ICT) is critical to a student's success inside the college classroom and in securing and maintaining employment after college. Still, some students struggle with this increasingly basic skill set. This study offers insight into the difficulties and challenges experienced by developmental students when tasked with using technology to complete schoolwork. The data from which these challenges were derived came directly from participants in the form of responses to open-ended questions. In vivo, or verbatim, coding was used, reducing the possibility of misinterpretation of the students' opinions and experiences. Faculty and administration can utilize the knowledge of these challenges when developing curriculum, establishing expected learning outcomes, and implementing institutional technology policies and practices.

Methodological Implications

Although this study offered a needed examination of an understudied and unique demographic of American college students, there are limitations. The first limitation is a lack of geographic and cultural diversity. The data for this study was collected at only one community college in a fairly rural southeastern community. Community college student bodies are typically composed of students who live in the general vicinity of the institution; students do not usually relocate to attend a community college. These students reflect the practices of the school systems from which they graduated and the cultural values of their respective families and communities. Therefore, this sample offered an accurate perspective of students from a small town in the southeast, but not necessarily in other regions of the country, or even a more urbanized setting with a higher median

household income within close proximity. It would strengthen the study to partner with researchers in diverse regions of the country to reflect more accurately the perspectives and experiences of developmental students as a whole.

Although not a serious limitation, a larger sample size would have strengthened the findings and given a more accurate portrayal of the student demographic group under study. The limited number of developmental students available to participate in the research study is not surprising. Previous research shows community colleges are plagued with low retention rates, and data collection for the present study began in November, very late in the fall semester (Bailey, Leinbach, & Jenkins, 2006; Brock, 2010; Goldrick-Rab, 2010). The cooperating institution had experienced significant attrition in the Developmental Education Department at this point in the semester with some classes consisting of less than ten students.

The conflicting quantitative and qualitative data in terms of access is a limitation of this study. Access issues emerged as a qualitative theme with 22 mentions of limited access to technology. But, overall the participants reported having regularly used a computer for approximately a decade (9.83 years). This discrepancy could have various explanations. Perhaps participants' definitions of access varied. Some participants may have counted their school or work-related computer use, while others only counted their personal in-home or mobile computer use. Future research is needed to more clearly define exactly what access means to individual students in order to more effectively understand and address the access issue.

Finally, it is important to note the correlational nature of this study. Statements of causality based on the results of correlation analyses must be treated with caution. Causal inferences should not be made from the correlational results of this study due to the cross-sectional, nonexperimental nature of this data.

Areas for Future Research

Although the data failed to reveal an association between TA and SPCC, there are still communication avenues to explore in regard to TA. The results indicate that face-to-face communication and computer-mediated communication are perhaps perceived as categorically different modes of communication. Previous research does indicate that face-to-face communication and computer-mediated communication do produce different outcomes (Bordia, 1997; Kiesler, Siegel, & McGuire, 1984). Even though a person may feel confident communicating face-to-face, he or she may still experience anxiety using or communicating via ICT, or vice versa. Future research is needed to determine how SPCC is affected by the communication context.

Another avenue of future research could focus on the way that TA affects a student's *willingness* to communicate via technology in the context of a college course. Different from the intentions of this study, which focused on TA's effects on achievement emotions, willingness to communicate centers on a person's general willingness to talk to other people (McCroskey & Richmond, 1987). It would be useful to explore whether or not TA impairs a student's willingness to "talk" to other people via ICT. Perhaps some students choose not to seek help from instructors, miss pertinent class or campus information, or fail to reach their full potential as students as a result of their

hesitation or apprehension toward technology. Future research should seek to identify if such a relationship exists, and subsequently seek a remedy.

This study revealed a positive association between negative achievement emotions (hopelessness, anxiety, anger, and shame) and TA. Therefore, it may be helpful for future research to examine the effect TA has on student *motivation* since prior research has highlighted the effect that emotions have on motivation (Shweder & Haidt, 2004). In short, are students more inclined to put forth less—or no—effort toward succeeding academically in any given course if they experience high levels of TA?

Finally, the qualitative themes offer various extensions for possible future research. The multi-method nature of the survey was a strength of this particular study. The survey consisted of 108 quantitative questions and two qualitative questions. To ensure that the participants completed the qualitative questions before they experienced any fatigue, they were positioned before the quantitative questions in the survey. One aspect of this study was the examination of emotions. Because emotions are first an intrapersonal experience, developing a way to extend or strengthen the qualitative portion of this survey would be beneficial.

Some participants communicated that their teachers "quit teaching" and instead relied on technology to take the place of solid instruction and teaching. It would be incredibly beneficial to delve into these experiences in order to offer practical pedagogical advice. Qualitative in-depth interviews might offer the most useful and detailed information for this purpose. As discussed in the previous chapter, participants reported preferring technology for some subjects, but "hating" it for others. Future

research might aim to further develop these findings and determine if there is a general consensus on which subject areas students prefer or object to technology integration. Students in this study reported disliking technology integration in mathematics courses. Future research could explore the contributing factors that create this intense dislike. Equal attention should be paid to the areas in which students enjoy technology and find it a useful learning tool.

Conclusion

Communication is fundamental to the emotional process of learning. Presently, a great deal of communication and learning is accomplished through information communication technologies; these technologies induce anxiety in some users. This study aimed to examine the relationships between TA, SPCC, and achievement emotions in developmental students in community colleges. The data revealed TA is positively associated with students' negative achievement emotions, and that female students experience more TA than male students. Qualitative findings offered a variety of insights into how developmental students view technology and the challenges community college faculty members face when integrating technology into the curriculum.

This study provided valuable insight into the emotional learning experiences of the rarely studied community college population. The findings reflected research portraying TA as a predominately female experience, and that the DD remains a reality for some students despite the prevalence of ICT in American society. Practical implications include suggestions for integrating technology into the community college classroom based on issues of access, students' biological sex, and subject area.

APPENDICES

Appendix A: Letter to Faculty Member

September 25, 2013

Dear Faculty Member,

My name is Sara Crocker and I am a graduate student in the Department of Communication Studies at Clemson University. I am in the second year of my program working toward my M.A. in Communication, Technology & Society. Currently, I am in the process of working on my master's thesis under the guidance of my advisor, Dr. Joseph Mazer (jmazer@clemson.edu).

One of my primary research interests is the intersection of communication and education, specifically in terms of information communication technology. As a former staff member at your institution, I am well aware of the diverse student body population and the challenges faculty members face when instructing these students. I also greatly admire and value the mission of the community college, therefore, I have focused my thesis on the community college student body population, and specifically those students enrolled in developmental education courses.

My thesis is exploring the relationships between technology apprehension, self-perceived communication competence, and achievement emotions in community college students enrolled in developmental education courses. To gather data, I request permission to administer one survey to your students during one of your designated class periods. I estimate this taking 25-30 minutes of your class time. I understand that class time is extremely limited and cherished by you as an instructor. I promise to remain respectful of that reality by being efficient and prepared.

I ask that you email me directly at the email below with a date and time I can survey your class. If you have any questions, please feel free to email or call. You can also contact your department chair, who has endorsed this project, if you have any questions or concerns. This survey is not mandatory for your students. Your students will be asked to give informed consent and will be excused if they wish not to participate. I appreciate your willingness to work with me as I pursue this valuable research.

Sincerely,
Sara Crocker
sgcrock@clemson.edu
864-634-4825

Appendix B: Informed Consent

You are invited to participate in research study conducted by Joseph Mazer and Sara Crocker of Clemson University. The purpose of this research is to explore how community college students respond emotionally to information communication technology in their academic pursuits.

Your participation will require you to complete one survey. It is anticipated that the amount of time required for your participation is approximately 30 minutes.

Risks and Discomforts:
There are minimal risks involved in this study. If you volunteer information, your responses will be anonymous.

Protection of Anonymity and Confidentiality:
Your responses will be private. To maintain anonymity/confidentiality, only the researchers will be allowed access to the data. The surveys will not ask you for information that can be used to identify you individually. If you volunteer information, your responses will be anonymous. If you contact or provide identifying information, your identity will be kept confidential.

Voluntary Participation:
Your participation in this research study is voluntary. If you chose to participate in this survey your responses are confidential and will kept anonymous. You may choose not to participate and may withdraw your consent to participate at any time. Should you decide not to participate or withdraw you will not penalized in any way. You are not required to answer every question. If you wish to skip a certain question, simply do not write an answer and move to the next question.

Contact Information:
If you have any questions or concerns about this study or if any problems arise, please contact the Principal Investigator, Joseph Mazer, at jmazer@clemson.edu or 864-656-5254. If you have any questions or concerns about your rights as a research participant, please contact the Clemson University Office of Research Compliance (ORC) at 864-656-6460 or irb@clemson.edu.

Demonstration of Informed Consent:
Thank you for considering participation in this study. By remaining in classroom and taking the survey, you confirm that you have read the above information and voluntarily agree to take part in this study.

Appendix C: Survey

This survey seeks to understand your opinions and emotions related to your experiences in comprehensive education courses. There are no right or wrong answers. Your identity and your answers will be kept strictly confidential. The information will be used for research purposes only and will not be available for any other reason.

The survey consists of five sections. Please be sure to answer every question. Your thorough participation in this study is vital to its overall success and is also greatly appreciated.

Section 1: Demographic Information

1. What is your age? _____
2. What is your biological sex (please circle one)?
    1. Male
    2. Female
3. What is your ethnicity or race (please circle one)?
    1. White
    2. African American
    3. Hispanic American
    4. Native American
    5. Asian American
    6. Other (please specify): _____
4. How many years have you been using a computer on a regular basis? _____ (Years)
5. How many years have you been using e-mail on a regular basis? _____ (Years)
6. How many years have you been using instant messaging (IM) software on a regular basis? _____Years
7. How many years have you been using social media on a regular basis (Facebook, Twitter, Tumblr, etc.) _____(Years)

Section 2: IRAT-IT Scale

Directions: For each item, please circle the number that best represents your level of agreement using the following scale:

Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

1. I get nervous when I have to find information on the Internet.
   1 2 3 4 5 6 7

2. New computer accessories such as scanners, web cameras or voice recognition are confusing and frightening to me.
   1 2 3 4 5 6 7

3. I feel nervous and anxious about keeping up with new information technology.
   1 2 3 4 5 6 7

4. I get irritated and restless learning about complicated, new information technology.
   1 2 3 4 5 6 7

5. It makes me tense and agitated when people are discussing information technology.
   1 2 3 4 5 6 7

6. I am terrified when using information technology that I have never used before.
   1 2 3 4 5 6 7

7. I hate it that things are becoming so complex with new technology.
   1 2 3 4 5 6 7

8. I feel comfortable and confident in my ability to deal with new, complex information technology.
   1 2 3 4 5 6 7

9. It is annoying that I am expected to understand and like computers just like everyone else.
   1 2 3 4 5 6 7

10. It is frightening that everyone else is adapting to information technology better than I am.
    1 2 3 4 5 6 7

11. When receiving complex technology-related information, I am afraid I will misinterpret it.
    1 2 3 4 5 6 7

Section 3: Self-Perceived Communication Competence Scale

Directions: Below are 12 situations in which you might need to communicate. People's abilities to communicate effectively vary a lot and sometimes the same person is more competent to communicate in one situation than in another. Please indicate how competent you believe you are to communicate in each of the situations described below. Indicate in the space provided at the left of each item your estimate of your competence. **Presume 0 = completely incompetent and 100 = completely competent.**

_____1. Present a talk to a group of strangers.

_____2. Talk with an acquaintance.

_____3. Talk in a large meeting of friends.

_____4. Talk in a small group of strangers.

_____5. Talk with a friend.

_____6. Talk in a large meeting of acquaintances.

_____7. Talk with a stranger.

_____8. Present a talk to a group of friends.

_____9. Talk in a small group of acquaintances.

_____10. Talk in a large meeting of strangers.

_____11. Talk in a small group of friends.

_____12. Present a talk to a group of acquaintances.

Section 4: Achievement Emotions

Attending classes in college can induce different feelings. This part of the questionnaire refers to emotions you may experience when attending classes in your **TARGET COURSE**. Before answering the questions on the following pages, please recall some typical situations and class periods in your target course.

Your TARGET COURSE is the first class you attend each week in which you have the opportunity to use or are required to use technology.

1. Please estimate the total number of students in your target course.

_____

2. Please circle the sex of the instructor in your target course.
   a. Male
   b. Female
3. Please circle the structure that best describes your target course.
   a. Lecture-based
   b. Discussion-based
   c. Online
4. Please indicate the reason you enrolled in your target course.
   a. Requirement for degree, diploma, or certificate program
   b. Elective of choice
   c. General education requirement or mandated by the college
   d. Other reason
5. Please write the name of your target course. Example: Math 101. If you do not know the name of your target course, please indicate the subject.

_____

The following questions pertain to feelings you may experience **BEFORE** class periods in your target course. Please indicate how you feel, typically, before you go to class. Use the following scale to indicate your answers. You should write the number representing your opinion for each statement in the spaces in the "Response" column.

1	2	3	4	5
Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree

Response	Statement: All statements are about how you feel **BEFORE** class.
	1. I get excited about going to class.

	2. It's pointless to prepare for class since I don't understand the material anyway.
	3. Even before class, I worry whether I will be able to understand the material.
	4. Being confident that I will understand the material motivates me.
	5. I am looking forward to learning a lot in this class.
	6. Because I'm so nervous I would rather skip the class.
	7. I am confident when I go to class.
	8. I wish I didn't have to attend class because it makes me angry.
	9. I am full of hope.
	10. Even before class, I am resigned to the fact that I won't understand the material.
	11. I am motivated to go to class because it is exciting.
	12. I worry whether I'm sufficiently prepared for class.
	13. My confidence motivates me to prepare for class.
	14. The thought of this class makes me feel hopeless.
	15. I worry whether the demands might be too great.
	16. My hopes that I will be successful motivate me to invest a lot of effort.
	17. Thinking about class makes me feel uneasy.
	18. Because I've given up, I don't have the energy to go to class.
	19. When I think about class, I get queasy.
	20. I am optimistic that I will be able to keep up with the material.
	21. I feel scared.
	22. I'd rather not go to class since there is no hope of understanding the material anyway.
	23. I am hopeful that I will make a good contribution in class.

The following questions pertain to feelings you may experience **DURING** class periods in your target course. Please indicate how you feel, typically, while you are in class. Use the following scale to indicate your answers. You should write the number representing your opinion for each statement in the spaces in the "Response" column.

1	2	3	4	5
Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree

Response:	Statement: All statements are about how you feel **DURING** class.

	24. I enjoy being in class.
	25. I worry that others will understand more than me.
	26. I'm tempted to walk out of the lecture because it is boring.
	27. When I say something in class I feel like I turn red.
	28. I feel frustrated in class.
	29. Because the time drags, I frequently look at my watch.
	30. I take pride in being able to keep up with the material.
	31. Because I don't understand the material, I look disconnected and resigned.
	32. My enjoyment of this class makes me want to participate.
	33. I get restless because I can't wait for class to end.
	34. When I say anything in class I feel like I am making a fool of myself.
	35. I get tense in class.
	36. I get bored.
	37. I am confident because I understand the material.
	38. After I have said something in class I wish I could crawl into a hole and hide.
	39. I feel anger welling up in me.
	40. I am proud that I do better than others in this course.
	41. It's so exciting that I could sit in class for hours listening to the professor.
	42. I get so bored I have problems staying alert
	43. I get embarrassed.
	44. Thinking about the poor quality of the course makes me angry.
	45. I start yawning in class because I'm bored.
	46. When I make good contributions in class, I get even more motivated.
	47. I'm embarrassed that I can't express myself well.
	48. I feel hopeless.
	49. I enjoy participating so much that I get energized.
	50. I feel nervous in class.
	51. The lecture bores me.
	52. Because I get embarrassed, I become tense and inhibited.
	53. I am proud of the contributions I have made in class.
	54. Because I'm angry I get restless in class.
	55. I have lost all hope in understanding this class.
	56. I get scared that I might say something wrong, so I'd rather not say anything.

	57. During class I feel like I could sink into my chair.
	58. I am ashamed.
	59. Thinking about all the useless things I have to learn makes me irritated.
	60. When I do well in class, my heart throbs with pride.
	61. Because I get bored my mind begins to wonder.
	62. When I talk in class I start stuttering.
	63. I find this class fairly dull.
	64. If the others knew that I don't understand the material I would be embarrassed.
	65. When I don't understand something important in class, my heart races.
	66. I think about what else I might be doing rather than sitting in this boring class.

The following questions pertain to feelings you may experience **AFTER** class periods in your target course. Please indicate how you feel, typically, after you attend class. Use the following scale to indicate your answers. You should write the number representing your opinion for each statement in the spaces in the "Response" column.

1	2	3	4	5
Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree

Response	Statement: All statements are about how you feel **AFTER** class.
	67. After class I start looking forward to the next class.
	68. I am ashamed because others understand more of the lecture than I did.
	69. I wish I could tell the teacher off.
	70. I am proud of myself.
	71. I am happy that I understand the material.
	72. I'd rather not tell anyone when I don't understand something in class.
	73. I am angry.
	74. I think that I can be proud of what I know about this subject.
	75. I feel so hopeless all my energy is depleted.
	76. I am glad it paid off to go to class.
	77. Because I take pride in my accomplishments in this course I am motivated to continue.

	78. When I think of the time I waste in class I get aggravated.
	79. I feel hopeless continuing in this program of studies.
	80. I would like to tell my friends about how well I did in this course.

Section 5: Open-Ended Questions

Directions: Please read the questions and respond by writing your answers in the spaces provided. For these questions, the term "technology" includes, but is not limited to, any computer hardware (desktop, laptop, tablet, flash drive, etc.), software (word processing programs, Excel, PowerPoint, etc.), or any web-based application.

1. What is your typical attitude toward teachers who incorporate technology into their teaching or require you to use technology to complete assignments for the class?

2. Please recall a time when you were required to use technology in class or to complete an assignment for a class. What emotions did you experience during this time?

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