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Adult Learners and Technology: Understanding the Digital Divide in Developmental Writing Courses

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ADULT LEARNERS AND TECHNOLOGY: UNDERSTANDING THE DIGITAL DIVIDE IN DEVELOPMENTAL WRITING COURSES

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"I can do all things through Him who strengthens me" (Philippians 4:13, *NASB*, 1990).

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In loving memory of my father, William Gerbert Aikens, Sr., May, 2015.

ABSTRACT

This study investigated computer literacy of nontraditional and traditional adult learners in a two-year community college. The study included 276 participants enrolled in developmental writing courses. Participants were administered a computer literacy survey and demographic form to collect quantitative and qualitative data. Mixed methodology and convergent design, in particular, were used to analyses data. Quantitative analysis was used to determine correlations between three constructs: computer literacy scores, age, and performance. Qualitative analysis was used to determine attitudes about receiving supplemental technology training based on the three constructs. Computer literacy score and age did show a significant inverse correlation. In addition, age and performance did show a significant correlation. However, computer literacy score and performance did not show a significant correlation. Frequency counts determined that 78.5% of adult learners preferred supplemental training during class time. The implications of this study warrant investigation of nontraditional adult learners' motivation and curriculum development to include technology training. Background, methodology, findings, conclusions, implications, and recommendations are discussed.

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I

INTRODUCTION

". . . learning to use technology with confidence was a necessary stage in the journey to becoming an online learner" (Kemmer, 2011, p. 70).

Does it matter that a student should enter into college with varying degrees of technological skills and be able to maintain coursework expectations? A logical response to the question would be affirmative. It does matter when the students' grades hinge upon the use of technology. It is especially relevant when technology is used in writing courses. Relles and Tierney (2013) described the proliferation of technology for our modern time and how it impacts writing skills. The notion that technological differences could potentially impede a student's academic progress is one that bears consideration.

Acquisition of technology skills is important for nontraditional adult learners because of its pervasiveness in modern times. The term *nontraditional adult learner* is categorical but relevant to an older population of society who chooses to return to academia (Deutsch & Schmertz, 2011). What nontraditional adult learners leave behind is a simple pathway to learning like blackboards and chalk or overhead projectors and films. The classrooms they were familiar with were stocked with individual chairs and tabletops for writing. However, these images pale in comparison to modern-day classrooms where computers, laptops, and online teaching tools prevail. While this research does examine the uses of technology in modern classrooms, it does not exclusively examine online learning.

In order for nontraditional adult learners to gain full advantage of technology, they are challenged with learning how to navigate its mechanisms and devices. To do so, older adults must learn to be technologically proficient. Gatto and Tak (2008) found "computer training, development of Internet accessible educational materials, online social support, and computer-mediated communication are among the interventions that can benefit older adults" (p. 810). While adult learners are highly motivated (VanOra, 2012), they may lack appropriate computer experience to fulfill coursework. Older nontraditional adults need "adequate training and ongoing support to use the devices effectively" (Encuentra-H, Pousada, & Zúñiga-G, 2009, p. 240). They are willing to learn how to navigate technology even though they may experience challenges. Moreover, the use of technology for the older generation is grounded in their intent to use it. Lewis-B, Buys, Kitchin-L, Barnett, and David (2007) purport that technology is a means for creating a better lifestyle and "learning about computers is one of the desires" (p. 265). In a study conducted by DiBiase and Kidwai (2010) nontraditional adult learners were more inclined to outperform traditional learners when monitoring their use of Internet activity. On the other hand, traditional learners gravitate towards computers and the Internet at rapid speeds, and they hold higher proficiency levels with technology (Enoch & Soker, 2006). Traditional learners have good facility with using technology in multiple environments. Not only can they utilize technology for academic purposes, but also utilize technology to engage on social networks, on smart technology, and for other non-academic purposes. Kubiatko (2013) supported this notion with his belief that ". . . this generation of young people used ICT and Internet differently compared with older respondents" (p. 1271). They are what Helsper and Eynon (2010) call "digital natives"

and are “the youngest generation who has grown up with technology and does not know any other context” (p. 506). Thus, nontraditional adults are still learning, and they demonstrate a sincere effort to gain technological knowledge.

A significant barrier that college students face is deficient technology skills. The difference between students who are adept with technology and those who are not (Muñoz-C, 2010) was investigated and presented multiple views of the digital divide. Further, the general view in this study focused on the digital divide in relationship to how computers are used. Smart and Cappel (2006), in their research on student perceptions of online learning, discovered “for most participants, who were accustomed to learning in a traditional, face-to-face classroom environment and who had little experience with online learning, the completion of the online units may have seemed like a lengthy, solitary experience” (p. 214). If not for the social factor in a college environment, nontraditional older students might experience the same solitude as they grapple with keeping up with technology. The digital divide could be grounded in the reality that nontraditional adult learners may not have the access to technology prior to enrolling in school. In a 2011 United States Census Bureau report, younger adults under 34 lived in households that used computers and accessed the Internet “73.4%” of the time (“Types of Internet Usage for Individuals, by Selected Individual Characteristics,” Table 5). Ironically, these numbers do not compare with access to computers and the Internet for older adults ages 65 and older. In fact, older adults only accessed the Internet computers only about “41.8%” of the time (United States Census Bureau, Table 5, “Types of Internet. . . ”). This gap is not surprising because it illustrates the disparity that exists when characterized by age. Further, numerous researchers defined inspection of the term digital

divide in two ways: 1. lacking access to technology and 2. limited Internet use (Epstein, Nisbet, & Gillespie, 2011;Valadez & Duran, 2007). The lack of access to technology is described as limited resources in environments like colleges and university, as well as personal access to computers. The lack of Internet use is not only a global concern, but it can be a concern for students unfamiliar with navigational skills. Valadez and Duran argued, "A more accurately defined 'digital divide' does not simply describe the division between technology 'haves' and 'have nots' but addresses inequalities in technology learning" (p. 34). An effective line of defense in this case is "an approach focusing on technology literacy. . . to avoid present and future technological divides" (Amiel, 2006, p. 235). Thus, this study examined the digital divide of first-year students from the lens of inequalities in the use of technology not to exclude the Internet.

Underprepared college freshmen are categorized as traditional or nontraditional students, and age determines their status; the determining number varies between studies. However, in this study, traditional students are below the age of 25 years old while nontraditional students' ages range from 25 years old and older (Wooten, 1998). Nontraditional and traditional learners enter into college below academic level to be recognized as a college scholar. Levin and Calcagno (2008) asserted, "Large numbers of students accepted into colleges and universities are underprepared for the content and rigor of coursework at this level" (p. 181). In both student populations, VanOra (2012) found that college students in developmental writing classes had consternation about their writing abilities. College students' writing insecurities magnify the potential problems they face related to coursework, persistence to continue, and other barriers toward completion. The problem is further compounded by the nature of including technology

into the learning process. Learning technology becomes critical to nontraditional adults, especially in developmental writing courses. In particular, recent studies conducted on the use of Information and Communication Technologies (ICTs) showed ". . . a digital divide becomes more pronounced in the academic use of ICTs" (Ricoy, Feliz, & Couto, 2013, p. 267), where nontraditional adult learners are expected to gain content knowledge in writing and computer knowledge with supplemental online resources.

Efforts to address academic deficiencies in developmental writing courses are managed by colleges and universities in various ways. Investing in supportive programs like computer labs, writing centers, and other technological resources are meant to improve student performance. Cleary (2011) supported these investments and believed that they demonstrated a connection with writing and college success. Technology investments can also serve to cultivate performance in developmental writing. In a study conducted by de Smet, Broekkamp, Gruwel-B, and Kirschner (2011), high school students in a Dutch college preparatory school participated in the use of electronic outlining, a tool that allows students to work online to create their outlines. de Smet et al. found "the study indicates that electronic outlining has a great potential to improve students' writing performance . . ." (p. 571). The benefits of electronic outlining are typical of the progress that can be made with other technological supports. Wang, Wu, Chiu, and Wu (2011) conducted a study to explore the use of writing in English using "e-Campus blog technology" (p. 1832). Researchers found students experienced multiple gains with "knowledge of sentence patterns and confidence in paragraph writing . . ." (p. 96). Computer literacy does have an impact on learning in the classroom; however, special consideration is needed to ensure that nontraditional learners in college

environments are able to manage various technologies. Adult learners in developmental writing courses are required to learn sentence structure and paragraph development, which are often generated by computers. In the context of this research study, computer literacy and technological skills relate to the levels of skills needed to perform writing tasks in English 098. All instructors are required to incorporate Blackboard® into the curriculum, which is an Internet course-management system for distributing the course syllabus, sending and receiving email, attaching files within Turnitin®, and other media-related tasks. Developmental writers will also need to utilize computers for word processing.

Nontraditional adult learners and their possible computer deficiencies were driving forces behind this study. In conducting this investigation, five primary concepts surfaced about nontraditional adult students enrolled in a community college in the Midwest: 1. computer literacy; 2. computer literacy and age; 3. computer literacy and course performance; 4. age and performance; and 5. value of technology and attitudes about technology as a course supplement.

For nontraditional students, developmental writing is the first stage of the writing sequence in many community colleges where students must successfully complete basic composition before advancing on to college-level English. Bahr (2010) purported, "The goal of remediation is realized when a student, beginning with a course that is appropriate to his or her level of preparation, navigates the sequence of increasingly advanced courses and completes a college- level course in that subject" (p. 214). Adequate writing skills are necessary for succeeding in other disciplines (Johnson & Krase, 2012). Because undergraduate traditional and nontraditional students matriculate through their college

experience with the expectation of producing writing assignments across the curriculum, it is imperative to acknowledge the importance of a solid foundation in writing. While these studies do not address the technological aspects of the college experience, there remains a connection between how well students will achieve success even though their technology skills may be subpar and how well students will perform in the writing content area.

Statement of the Problem

The research problem is nontraditional adult learners in developmental writing courses face challenges with technology in the early stages of their academic progress. Recent studies on developmental writing focus on characteristics of developmental learners based on ethnicity, factors that predict student success using personalized instruction, and the impact writing centers have on writing performance of developmental writers (Cederholm, 2010; Harrington, 2013; Ries, 2005; Villarreal, 2012). These and similar studies, however, do not focus on older adult learners' writing abilities in developmental writing courses, and their computer deficiencies have not been thoroughly examined. The aspect of computer deficiencies is relevant because technology in academia is a common practice for both traditional and nontraditional learners. When nontraditional adult learners lack facility to navigate technology, they may experience difficulty maintaining the coursework in a specific discipline like English. The expectation to understand concepts, write, and perform computer skills require investigation to understand how the digital divide impacts nontraditional adult learners. Researchers authenticated the concept of adult learners and technology deficiencies as the

digital divide (Enoch & Soker, 2006; Ricoy, et al., 2013), but what is scarcely known is how the digital divide impacts developmental writers.

Educators use multiple technological platforms for writing instruction. Nontraditional students lacking adequate technological skills experience anxiety and lack of confidence with succeeding in developmental writing courses (Eppler, Carsen-P, & Harju, 2000; Hashim, Ahmad, & Abdullah, 2010; Rovai & Childress, 2003). Although some returning nontraditional learners have minimal computer skills, Hashim et al. believed, "It can be assumed that previous computer experience doesn't make any difference to usefulness, confidence, liking and anxiety" (p. 132). Approaches to using supportive technology for adult learners in developmental writing courses have been minimally explored (Osei, 2001; Zhang & Espinoza, 1998).

Research is needed to investigate attitudes of nontraditional adult learners and technology in developmental writing courses to determine whether or not technology training is needed in the curriculum (Karsten & Roth, 1998; Liu, Maddux, & Johnson, 2004). More specifically, Karsten and Roth asserted, ". . . results using a self-reported measure of perceived computer literacy appeared to offer support for continuing a basic training approach in college courses. . . " (p. 21). Therefore, offering a supplemental lab for training nontraditional learners in a developmental writing course is congruent with Karsten and Roth's assertion.

Examining the developmental writing course allows the researcher to add to the current body of literature (Crews & Aragon, 2004; Harrington, 2010; Huse, Wright, Clark, & Hacker, 2005). Although the literature addresses writing at the developmental level and technology in general, it does not sufficiently address grade performance

related to technology skills of nontraditional adult learners in developmental writing courses. More importantly, nontraditional adults who return to college and are placed into developmental writing courses are beginning a journey of continued exposure to technology in academia (Ricoy et al., 2013). Therefore, this researcher sought to gain an understanding of how a working facility of technological skills in the early stages of matriculation could have a positive impact on nontraditional students' academic success.

Background

Developmental education research has been a concern for over three decades. The discussion about developmental education primarily focused on traditional students, as well as primary and secondary education. Recent studies show the discussion moving toward post-secondary education where traditional and nontraditional students are entering into colleges with poor facility to write. Remediation in writing, reading, and math served as the solution to the developmental educational student. When one problem is addressed, another one surfaces. Adult learners are finding their way back into the classrooms in this current day for various reasons, and poor writing skills, the foundation of college success, follow them into the classroom that reflects a new paradigm—instructional technology.

Developmental students are in their own class and have been for decades. The National Center for Developmental Education was founded in 1977 to meet the growing concerns about underprepared college students (Boylan & Bonham, 2007). By definition, developmental education is the larger structure that determines the allocation of resources and services to aid students needing remediation (Boylan & Bonham). The idea that students are lacking in basic educational skills but who intend to obtain a college degree,

is met with the challenge for educators to meet their need for academic success (Boylan & Bonham; Brothen & Wambach, 2012).

Boylan (1999) asserted, "The data clearly suggest that, with appropriate assistance, underprepared students can be just as successful in higher education as their better prepared colleagues. . . [and] at community colleges, they are slightly more successful. . . " (para. 19). While good efforts are in place to aid the general developmental student learner, the awareness of complex issues has risen. These complex issues involve the changes that technology has brought to the educational sphere. One of the most impactful changes to arise in modern times is the pervasive use of the Internet, and the Internet is a mainstay in colleges and universities; however, it is beginning to emerge as a vital pedagogical instrument where instruction is trending to the online environment, particularly in the area of developmental writing (Carpenter, Brown, & Hickman, 2004). Therein lies a challenge where not only do underprepared college students face stress from developing writing skills that were overlooked during appropriate stages of learning, but the developmental learners are being introduced to a technological component for which they may also be deficient, or worse, lack access (Harrington, 2010). Thus, access to technology is one issue developmental students face but of equal importance is the question of how comfortable adult learners are with using the technology.

For developmental students, the answer to adult learners' comfort levels could raise awareness about the impact newer technologies have on developmental writers as they learn how to use them to become proficient writers. Cederholm (2010) reported, "Nontraditional students greatly benefitted from the use of technology when compared to

traditional age students" (p. 92). Researchers indicate that technology influences student learning (Thiele, Mai, & Post, 2014). However, there remains a gap in understanding the comfort levels of older adults using technology.

Technology evolved from earlier years to the present where resources included books, film, radio, audio/visual communication, Computer-Assisted Technology (CAI), and more recently the Internet. That primitive methods were used to monitor and record student performance and achievement (Levien et al., 1972), the monitoring and recording practices are more elaborate and user friendly for both student and teacher. It is especially true in college settings through the use of the Internet, which initiated course management systems. Further, the Blackboard® course management system is one such system that is predicated on two-way interaction. Not only does the instructor monitor and record students' progress, the student can access the same information to make appropriate adjustments for improved performance, which is an indication for the need to have a technological background.

Modern uses of learning management systems are vital toward academic success. However, learning to use these technologies is the modern-day issue to be addressed. Ironically, Levien et al. (1972) previously thought "the student should not have to learn anything about the computer in order to have it assist him" (p. 78). However, this thought is not the case in modern times. Feurzeig (1998) argued, "Technology will come to have a deep synergetic relationship with education. . . " (p. 113). In other words, technological knowledge and skills will be necessary in modern society.

Technological skills are learned, and Sharpe and Beetham (2010) discussed the impact of learner experience research as it related to informational technology skills.

They found that “the range of skills needed by effective e-learners go beyond IT skills. Learners also needed to use specialist tools, to work in online groups, access and evaluate digital information, and collate what they have found” (p. 91). These tools give students the technological support they will need to advance in their learning. Sharpe and Beetham also emphasized learner practices to include making deliberate choices about how to use technology for specific needs. They argued Maslow’s hierarchy of needs plays well with understanding learners’ needs and “the model can be used to inform curriculum interventions that aim to make learners more capable of acting with purpose and effect in technology-rich environments” (p. 93). The scope of this thinking lays the foundation for using technology in disciplines other than math and science.

While computers are used for word processing across disciplines, more specified uses in writing courses is prominent. Technologies like Blackboard® or Pearson’s Mywritinglab® are used in colleges and universities at various levels of writing. Learning these technologies do not happen in vacuum; in fact, students require information and technology literacy to be effective with computers (Czerniewicz & Brown, 2010). However, students who are underprepared for college must also be given consideration when pedagogical practices lean toward the use of technology. These students are categorized as developmental students who enter college with skill deficiencies that do not support their academic success.

In summary, because the trend towards online technology in developmental courses is inevitable, affective attention to how nontraditional adult learners manage the gravitational pull towards technology to succeed is relevant. Of equal importance is to

understand the degree to which the two constructs, developmental writing and technology, are internalized by nontraditional adult learners.

Research Questions

This study was guided by the following research questions:

1. What level of computer literacy exists with students enrolled in a developmental writing course?
2. What relationship, if any, exists between ages of students enrolled in a developmental writing course and computer literacy?
3. What relationship, if any, exists between computer literacy and classroom performance in a developmental writing course?
4. What relationship, if any, exists between age and classroom performance in a developmental writing course?
5. What value do nontraditional adult learners have with technology as a supplement to developmental writing courses, and what are their attitudes about technology as a course supplement?

Description of Terms

Key terms relevant to this study in alphabetical order were established to contextualize the language used throughout the dissertation.

Computer Literacy. Computer literacy is the ability to have the knowledge and skills to use computers (Childers, 2003).

Developmental writing. Developmental writing is a remedial level of writing that does not meet college-level writing skills (Huse et al., 2005).

Digital Divide. Digital divide is defined as the level of access to technology and the ability to use technology proficiently. In this study, the researcher will refer to the digital divide as not having the ability to use technology (Epstein et al., 2011; James, 2008; Valadez & Duran, 2007).

ICT. Information and Communication Technology is access to using the Internet and other technological devices (Raman & Mohamed, 2013).

Nontraditional adult learners. Nontraditional adult learners are classified by age, length of time since graduating from high school, social status, and economic status (Wooten, 1998).

Remediation. Remediation is the term used for students in college who lack adequate reading, writing, math skills to be considered prepared for college-level coursework. The researcher will use the term remediation in this study to refer to students who are enrolled in pre-credit developmental writing courses (Levin & Calcagno, 2008).

Traditional learners. Traditional learners are students enrolled in college immediately following high school graduation. They are also referred to as traditional students who are below the age of 25 years old (Wooten, 1998).

Significance of the Study

The significance of the study is to determine whether technology skills and age affect performance in developmental writing of nontraditional learners. This study is also significant for gauging the changing trends of educational methodology. The study is equally important for understanding the nature of nontraditional adult learners and the challenges many of them face as developmental writers. These challenges place them in the digital divide. About 52% of all students enrolled in District omega in Illinois

enrolled as nontraditional students (Illinois Community College Board, 2012, Table I-3). Nontraditional students register for developmental courses based on customary placement test scores administered at community colleges (Carpenter et al., 2004). A salient part of the educational path of students in developmental education is the ability to sustain retention and persist to higher college-level courses. More recently, the thrust towards educational technology has extended the goals and expectations of students in developmental courses and other disciplines (Cartwright, 1996; Garner & Raacke-B, 2013; Harris & Hofer, 2011; Levin & Wadmany, 2006; Mouza, 2011; Wright & Wilson, 2009). The secondary challenge for nontraditional adult learners is the digital divide associated with technology skills deficiencies. With limited exposure to technology, it could result in these learners struggling to maintain the coursework and the learning of technological skills to fulfill course requirements (Abad, 2014; Muñoz-C, 2010).

In academia, the trend toward using course management platforms may necessitate that all students enrolled in college courses know how to navigate technology. For nontraditional adults, this reality can be scary and intimidating. These adult learners are forced to gravitate towards learning how to use technology. Specifically, adult learners in developmental writing courses must work to acquire technology skills to enhance their understanding of writing conventions and to be able to use electronic sources for submitting written assignments.

Researchers agree that nontraditional adult learners improve their skill sets with technology the more they are introduced to various modes of technology. Liu et al. (2004) purported, “students who have more positive attitudes tend to spend more time on learning and using technologies, and students who spend more time learning about, or

using, technology tend to have higher computer achievement scores" (pp. 602-603). If this is the case, then examining the nontraditional adult learners' attitudes about computers is an important aspect of this study.

Further, the study will draw out external concerns related to technology as it pertains to online use. In general, colleges and universities provide access to students regardless of their status. Subsequently, nontraditional adult learners who are impacted by the digital divide remain challenged with using the Internet. Park and Choi (2009) argued, ". . . an online course needs to be designed in ways to guarantee learners' satisfaction and be relevant to learners' needs (p. 215). Likewise, Rhodes, Friedel, and Irani (2008) asserted, "It may be difficult for successful integration of such technology if the format does not gratify students' informational needs" (p. 37). What are the technological needs of developmental writing students? Invariably, nontraditional adult learners will want to become adept at using computer technology.

The aim of this study is to learn the level of computer literacy among nontraditional adult learners who have decided to return to college. The study seeks to understand the significance of different levels of computer literacy to determine appropriate pedagogical choices related to integrated technology. Another aim of the study is to learn whether or not nontraditional adult learners and traditional learners want to benefit from enhancing their computer literacy to improve performance in the developmental writing course.

Finally, it is important for nontraditional adult learners to gain proficiency with computer technology at the earlier stages of matriculation to experience long-term computer skills facility. Developmental writing courses are among the first courses

students who test low on placement assessments take in college. Understanding how to close the digital divide for nontraditional adult learners, as it relates to technology and performance in developmental writing courses, adds to the current literature.

Process to Accomplish

The purpose of this research was to explore nontraditional adult learners and relationships between literacy and performance in developmental writing courses. The primary focus was on nontraditional adult learners; however, traditional adult learners were included in the study. The conclusions to this study may provide insight into developing pedagogical strategies to incorporate technology-based training in developmental writing courses for older students enrolled in community colleges. In this study, technology is defined as course management systems, PowerPoint® software, and online resources, such as Pearson's Mywritinglab/Mycomplab®, computer word processing, and electronic mail.

This research took place during the summer and fall 2014 semesters at an urban community college in the Midwestern United States. The community college students were enrolled in General Education pre-credit courses. The developmental writing course was a pre-credit course in the school system for this study. For the purpose of this study, participants were recruited from on-campus, and online distance learning and hybrid classes were excluded.

The study was conducted to focus on determining the level of computer literacy that existed with students enrolled in a developmental writing course. Research questions 1-4 were investigated through the use of the Computer Literacy Scale (Sengpiel & Dittberner, 2008). Research question 1 investigated the quantitative value of the variable

computer literacy and how traditional and nontraditional adult learners self-reported their knowledge of computers for which nontraditional adult learners may have had limited exposure. Research question 2 investigated variables computer literacy and age to understand a correlational pattern. Research question 3 investigated variables computer experience, computer knowledge, and classroom performance to understand a correlational pattern. Research question 4 investigated variables age and classroom performance to understand a correlational pattern. Research question 5 assessed learner values and attitudes about technology to determine if technology as a course supplement or with training outside of the class were feasible and acceptable. In the context of this research study, the word supplement has a two-fold meaning. First, course supplement refers to actual lab time learning how to operate basic computer functions and basic computer tasks such as, word processing, emailing, Internet use, and printing. Secondly, course supplement refers to embedding online technology learning modules into the curriculum for the benefit of improving student writing.

The population for the study primarily focused on adult learners ages 25 and older, but all students enrolled in English 098 developmental writing courses were included in the study for analyses. The targeted population profile included nontraditional adults with limited computer skills. Fourteen sections were selected to make up the total population. The total population included 408 students.

The researcher used a mixed methodology research method for the study and used a quantitative methodology to answer research questions 1-4 using the Computer Literacy Scale (CLS) (Sengpiel & Dittberner, 2008). The Computer Literacy Scale was used to determine self-reported computer skills. The scale was ". . . specifically designed for

older adults with little computer knowledge. . . " (p. 2). The Computer Literacy Scale was comprised of two parts: A and B. In Part A, for experience with computers, a metric value was used to calculate duration and intensity. Diversity of tasks was calculated as the sum of frequencies of the single tasks and was based on a four-point Likert scale: never, seldom, sometimes, and often. The four categories were converted to never (0), seldom (1), sometimes (2), and often (3). There were 11 items worth three points each that yielded a possible score of 33. Part B assessed computer knowledge of symbols and terms. Part B consisted of 26 items with embedded distracters. Part B was calculated based on the sum of the correct answers with a total of 26 possible points.

Experts vetted the symbols, terms, and descriptions on the scale. The average completion time was 10-20 minutes. The Computer Literacy Scale had strong internal consistency and high reliability as documented by Cronbach's alpha. The internal consistency was a=0.96. Authors of the instrument also found that "the items' discrimination power ranged from r=0.28 to r=0.89 . . ." (Sengpiel and Dittberner, 2008, p. 7). Sengpiel and Dittberner wrote, "Correlational analysis was conducted to investigate the relationship between CLS-scores and TVM performance . . . [and] performance and computer literacy were highly correlated (r=0.52, $p < 0.01$)" (p. 7). Sengpiel and Dittberner also found "computer literacy and computer experience were highly correlated: duration (r=0.47, $p < 0.05$), intensity (r=0.51, $p < 0.05$), [and] diversity (r=0.53, $p < 0.05$)" (p. 7). The ticket vending machine scores (TVM) were a good measure for validating the scale.

The researcher contacted faculty members from each section of developmental writing courses to gain permission and access into the classroom to solicit student

participants. The researcher visited each class to introduce the subject matter and purpose of the study. The data were collected once within the first week of the semester to establish a baseline computer literacy score, as well as to garner a pure sample prior to students' exposure to the curriculum and subsequent technology. The researcher scheduled the last 30 minutes of the class to administer the surveys. Packets that included two letters of consent, Computer Literacy Scale (Sengpiel & Dittberner, 2008), demographic form with two closed-ended questions, and instructions for completing and returning materials were distributed to participants. All completed surveys were collected the same day. The surveys were conducted prior to midterm assessment and no post survey was conducted. For identification, each envelope packet was assigned a code that was used on the scale, consent letters, and demographic form. The code was linked to the student's identification number listed on the consent letter along with the participant's email address.

Midterm grades were used to determine performance outcomes in relationship to the students' baseline computer literacy scores. Signed consents authorized the researcher to obtain midterm grade scores from the Office of Institutional Research at location site from an existing database. The midterm period was used as an indicator of students' level of exposure to technology within the course. The midterm grade served as an indicator of the level of course performance after technological exposure. A limitation was the potential for students to gain exposure to technology outside of the course environment, which was outside the scope of this study.

The participants completed a demographic form including year of high school graduation or completion year of General Education Development (GED) and experience

with computers. Participants answered two closed-ended survey questions with yes or no responses and provided comments found on the demographic form.

Research Question 1.

What level of computer literacy exists with students enrolled in a developmental writing course?

The researcher used computer experience and computer knowledge for variables in the study. The Computer Literacy Scale (Sengpiel & Dittberner, 2008) was employed to gain information on participants' self-reported computer experience and knowledge and used both Parts A and B of the scale to collect the data.

The researcher used descriptive data analysis to report calculated scores for Part A and Part B, as well as total scores to determine what was found in the data from the Computer Literacy Scale (Sengpiel & Dittberner, 2008) and calculated overall mean and standard deviation scores for Part A and Part B then presented the scores in a table.

Research Question 2.

What relationship, if any, exists between ages of students enrolled in a developmental writing course and computer literacy?

The researcher used computer literacy and age as the variables for this research question. The analysis was correlated between computer literacy scores and the age of students, and the researcher ran three separate correlations for each: computer experience, computer knowledge, and the total score. The researcher performed a Pearson product moment correlation coefficient on collected data. Two variables on a numerical scale were used on literacy and age. The researcher used the Statistical Package for the Social Sciences 21.0 (SPSS) software to conduct the analysis and presented scores in a table.

Research Question 3.

What relationship, if any, exists between computer literacy and classroom performance in a developmental writing course?

The researcher used computer experience, computer knowledge, and classroom performance as variables for this study. Classroom performance was correlated with the total scores from the Computer Literacy Scale (Sengpiel & Dittberner, 2008). The researcher ran a correlation between total score and classroom performance with a Spearman rho correlation coefficient on collected data. Two variables on a numerical scale were used on literacy and performance. The researcher converted letter grades to numeric values to enable a correlation with the Computer Literacy Scale data. Letter grades were converted accordingly: A(4), B(3), C(2), D(1), and F(0). The researcher used SPSS software to conduct the analysis, and scores were presented in a table.

Research Question 4.

What relationship, if any, exists between age and classroom performance in a developmental writing course?

The researcher used the variables age and classroom performance for this study. Age was correlated with the score for classroom performance. The researcher performed Spearman rho on collected data. Two variables on a numerical scale were used on age and classroom performance. Letter grades were converted accordingly: A(4), B(3), C(2), D(1), and F(0). The researcher used SPSS 2.0 software to conduct the analysis. Scores were presented in a table.

Research Question 5

What value do nontraditional adult learners have with technology as a supplement to developmental writing courses and what are their attitudes about technology as a course supplement?

The researcher collected data from a demographic form with the use of two closed-ended questions to obtain learners' values and used attitudes about technology as a course supplement as a variable for the study and obtained participants' written comments. Participants were given prompts to guide their answers. As previously noted, course supplement refers to learning basic computer skills and utilizing embedded online technology like Pearson's Mywritinglab learning modules into the curriculum to improve student writing.

If a supplement to the course were offered to increase your computer literacy, would you take advantage of this:

1. If it were offered during the time already set aside for the course (i.e., in-class)- Yes/No (please circle one).
2. If it were offered outside of class time (i.e., would require students to participate outside of class time)—Yes/No (please circle one).
3. Based on your responses to the two questions above, please provide additional information about the reason for your answers.

Descriptive analysis was conducted to determine the percentage of yes and no answers to obtain a frequency percentage. The conversion for each closed-ended question was Yes (1) and No (2). The researcher conducted a content analysis on any comments provided

by participants from the open-ended question. The researcher used NVivo software to conduct analyses for identifying categories and themes.

Summary

More recently, literature surrounding the concepts of adult learners and technology has become prevalent in lieu of nontraditional students returning to college (Abad, 2014; Hashim et al., 2010; Keengwe, 2007; Muñoz-C, 2010; Osei, 2001; Relles & Tierney, 2013; Wallace & Clariana, 2005; Wilkinson 2006; Zhang & Espinoza, 1998). A growing number of nontraditional students entering into community colleges show the need for remediation in "writing, math, and reading" (Levin & Calcagno, 2008, p. 181). The combination of learning fundamental writing skills and technology skills is the challenge nontraditional learners experience. The aim of this dissertation is to contribute to the already existing body of knowledge of adults and technology in a comprehensive manner. The dissertation is an applied research study that investigates nontraditional learners and their computer literacy skills to determine the need for supplemental technology training in developmental writing courses.

The following chapter methodically reviews scholarly and related literature to further support the dissertation. Understanding the digital divide between traditional and nontraditional adult learners will be impactful by deeply evaluating the nature and characteristics of the nontraditional adult learners. Further, to understand nontraditional adult learners in the context of the first course they take in college, which is the basic writing course, strongly suggests that students are underprepared for college-level work. As such, exploration of the type of impact being an underprepared college student in

writing classes will have on nontraditional learners leads to understanding whether or not their academic success will be complicated by their level of computer literacy.

Thus, chapter two of this dissertation seeks to argue that acquiring computer literacy is a pedagogical imperative. Moreover, students enrolled in pre-credit college classes are targeted as dual learners where it is incumbent upon nontraditional adult learners to gain content knowledge in two areas: writing and computer literacy. I will further argue that training for nontraditional adult learners may have a positive impact on students' abilities to progress to higher sequences in writing, as well as across the disciplines. Essentially, the goal for all students is to become successful writers as they decide upon a field of study, so it is relevant to argue for establishing a foundation in writing and technology at the onset of nontraditional adult learners' academic careers.

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

". . . electronic or digital literacies may not play an overtly significant role in their course designs and teaching practices, but these literacies still play a significant role in how students write" (Shepherd & Goggin, 2012, p. 67).

The intent of this study was to examine and understand the impact of technology on nontraditional adult learners in developmental English courses. Developmental education and technology are not new concepts, but they may present new dilemmas for returning nontraditional students in the college environment. These nontraditional adult learners were introduced to technology in their academic curriculum where software, hardware, and ease of use fluctuated at alarming rates, which some adult users found challenging to keep in step. Further, a close examination of the literature showed that studies pertaining to educational technology were limited in the early 1990s and 2000s to address nuanced academic changes. It was not until the mid-2000s to the present that research had contributed to the technological aspect of teaching with both technology and writing in colleges and universities. Through the literature for this period, research contributed to understanding how technology began to influence the social contexts of writing in college classrooms, and an enriched body of computer literacy research emerged. Between the late 1990s and through 2010, studies also emerged related to

training teachers and students. In particular, and related to this study, research had emerged around the early 2000s to the present on how the Internet and ICTs influenced developmental writing, though limited studies were available. However, this study required a particular focus on three distinct constructs for understanding the influences of technology with adult learners.

This review of literature aimed to explore each construct—nontraditional learners, developmental writing, and technology—to determine connections with age and the need for technology training as a course supplement. In order to make the argument, theoretical discussion of New Literacies was reviewed as a framework for understanding the dynamics of teaching adult learners, especially as they were exposed to technology in writing courses.

Finally, this chapter outlined the nature of New Literacies Study from an historical perspective to support its use as a theoretical framework for this research. The researcher examined characteristics of nontraditional adult learners, developmental learners and writing, and writing and technology to draw a connection between former definitions of literacy to a modern understanding of literacies.

New Literacies Studies

Technology's infantile years were wrought with limited access for some and abundant access for others (Swenson, Young, McGrail, Rozema, & Whitin, 2006). Predicting the direction in which technology would surge was difficult to see, but the realization that it was moving in an upward direction gave credence to its multiple applications in various academic environments such as reading and English. As for scholars, the earlier stages of literacies were uncertain because academia was not ready to

embrace the changes technology brought, along with its new concepts and innovations that had potential to alter the status quo. Additionally, technology and literacies in English experienced growing pains (Swenson et al.).

Literacies research was a productive way to understand the changes that ensued related to accepting technology in academia. Knobel and Lankshear (2006) discussed the former stages of research of new literacies by explaining various interests and focuses for which further research was conducted. Most of the research targeted technological practices of young people and evolved into the area of classroom learning. They posited two concepts that helped frame the paradigm shift for understanding literacies on a new level. Their identification of "technical stuff" and "ethos stuff" opened the discussion for these two schools of thought (p. 80). Knobel and Lankshear argued ethos was responsible for the mental shift that was made for future researchers because they believed that technology would forever change our society and our world. Knobel and Lankshear's contributions were relevant to creating the paradigm shift from basic knowledge related to technology to engaging the conversational discourse toward understanding the global implications for institutions of higher learning to adopt technology into the curriculum.

Using technology in courses was experimental, at best, and was gauged through research studies. One case study, in particular, was conducted to learn whether teacher educators could benefit from utilizing technologies in their courses. Sanny (2007) found no significant impact but admitted to the need for teachers to have professional development to acquire knowledge for best practices. Teachers needed training on the changing technologies that were introduced into educational institutions. Up to this point, digital literacies consisted of the Internet with web-based projects (Swenson et al., 2006),

and the shift towards using digital literacies in the educational setting was apparent and that high technology in the curriculum became the norm.

Although there were strong indications that technology in curricula was desired by educators and of particular interest by researchers, new problems arose from digital literacies, specifically with expressions of disinterest by school officials (O'Brien & Scharber, 2008). What was curious about the nature of disinterested administrators, particularly in primary and secondary education, was the notion that they were unwilling to accept technological advances that were inevitable. Another problem out of advancing technology was identified in a review by Arntzen, Krug, and Wen (2008) on the interpretive meaning of ICTs with respect to being called a "tool" (p. 6). They found "educators and researchers rationalized the use of the term tool to diminish ICTs importance because it [was] a means to an end" (p. 6). Arntzen et al.'s view was not far from Knobel and Lankshear's (2006) view on "ethos stuff" (p. 80) where the mindset and shift toward the perspective of technology changing our worlds was deeply relevant. It was this middle ground where the research struggled to gain momentum in order to deal with the realities of how technology could affect positive change. As such, the relevancy of technology being a critical part of the dialogue and research remained. Scholars tried to define and understand new literacies, and in that process, the use of new literacies was contested but not without determination to find answers.

Recent researchers challenged scholars in the field of literacies to go beyond defining literacies and to expand research to determine how literacies impact learning outcomes (Moje, 2009). While Moje is a part of the New Literacies Studies, she argued that comparative and experimental research was needed to better understand the

distinctions between old media and new literacies and their connection for learning. An example of forging the way was through an interpretive case study that found new literacies helped the student learn (Bailey, 2009). Essentially, this was a period in which theory was being established and concretized. Researchers were practicing by conducting studies in multimodal formats (Bailey; Tan & Guo, 2010). Thus, it was particularly interesting to note how Moje's argument forged a pathway toward scholars developing strong and credible theoretical perspectives on literacies.

New literacies research evolved beyond the scope of technology or hardware to include predominant users of the literacies (Bomer, Zoch, David, & Ok, 2010). Scholars and educators identified the use of these technological literacies within the context of primary education. Sweeny (2010) endorsed New Literacies as a vital component of education and assessment, particularly in writing instruction. She argued that educational standards were important to support new literacies and introduced into the literature a glimpse of technological assessments – Educational Technology Standards for Students. In previous years, these standards were a major contention with the incorporation of New Literacies into the curriculum because print assessments did not align with digital assessments (Beach, 2012; Tan & Guo, 2010). Labbo, Place, and Soares (2010) expounded on uses for incorporating technologies and literacies into the curriculum. In some ways, erecting these technological standards for students promoted validation to integrate technology in the classroom to benefit student gains. Moreover, educational standards for technology ushered in the next wave of research to justify allowing administrators to consider the value of integrating technologies into schools and classrooms. On a larger scale, it was pivotal towards developing new research in the field

because perceptions of paradigms and how educators ought to view the use of digital literacies in the classroom remained important.

Technology in primary and secondary classrooms evidenced student learning the more these technologies were used (Husbye et al., 2012), but not all classrooms were afforded the use of literacies because not all educators adopted them. This phenomenon provoked an interest for scholars to conduct further research. One study that moved away from direct influences of digital technologies in the classroom by educators to a meta-level study on researching New Literacies using verbal protocols was conducted. In the study, educators were examined to determine their level of knowledge of technological literacy, and Lewis and Chandler-O (2012) found teachers' ranges of knowledge on technologies and individual abilities to address issues concerning technology varied. Understanding the willingness of educators to integrate technology into the classroom made the study relevant. It also added to the current body of literature in respect to educators beyond secondary levels. More specifically, because educators at the college level were not mandated by national standards in technology and were at will to use or learn how to use technology in their classes, it introduced another dynamic to the discussion.

However, when educators at the college level learned and integrated technology into the course curriculum, it provided them with varied teaching methodologies. In addition, exploration on the impact of technology shed light on how technologies were used. McClay and Peterson (2013) realized a breakthrough in educators overcoming the challenges of acceptance of digital technologies in the classroom curriculum. Their case study highlighted two educators who broke barriers with integrating technology. They

identified participants as proponents of New Literacies and found any effort to support digital technologies in the classroom was worth sharing with other colleagues. The study set the tone for a movement whereby educators were willing to engage in digital technological practices. More importantly, research in the area of students who were beyond primary and secondary levels could provide insight into preparedness for learning those technologies.

In summary, New Literacy Studies have evolved from its roots in reading and writing literacy to technology using ICTs and other digital literacies (Lea & Street, 1998). Scholarly research in the area of New Literacies identified interests from the standpoint of *who* was using digital literacies in the classroom, to *how* these literacies were being used. However, limited studies were conducted on nontraditional adult learners at the college level, particularly college students in developmental English writing courses. Although much of the research focused on end users in primary and secondary education, it remained vitally important to consider research that included adult end users (Hagood, 2003). Thus, to better relate to the literature as it pertained to technology and other literacies, New Literacies theory was used as a theoretical framework for examining principles that explained the need for further research among adult learners, particularly focusing on technology in this study.

New Literacies Theory

The term literacy evolved over the past two decades with regards to reading and writing as major forms of communication to mean technologies. Academic literacy referred to traditional disciplines where reading and writing primarily controlled the learning environment. Lea and Street (1998) purported, "Academic literacy practices –

reading and writing within disciplines – constitute central processes throughout which students learn new subjects and develop their knowledge about new areas of study" (p. 158) and Goodfellow (2011) concurred. However, the term literacy evolved to the degree that "literacy itself . . . [was] re-conceptionalized through its harnessing to digital communication in higher education" (Goodfellow, p. 132), and an expanded term for literacy emerged called New Literacies (Leu, Kinzer, Coiro, & Cammack, 2004). For clarification, New Literacies offered two distinct expressions such as New Literacies in uppercase and new literacies in lowercase letters. New Literacies in uppercase represented the theoretical principles that guided new literacies and educational theory, and new literacies in lowercase represented the use of technologies. Instances occurred within this chapter when the lowercase intention of new literacies was quoted in uppercase letters. Further, these distinctions helped to explain and interpret changes and approaches to learning in lieu of newer technologies (Leu et al.). Newer technologies were not only prevalent in individuals' everyday life, but they were influential in the academic environment. Therefore, New Literacies Theory provided a framework for understanding how newer technologies impacted the academic environment. Moreover, New Literacies theory underwent a developmental change and once concretized, it spoke to the ever-changing nature of new literacies.

As a theory, New Literacies is defined as "the new literacies of the Internet and other ICTs include the skills, strategies, and dispositions necessary to successfully use and adapt to the rapidly changing information and communication technologies . . . " (Leu et al., 2004, p. 1572). This definition was by no means static as it evolved as technology evolved, but it did provide a foundational perspective for understanding how

to examine the technological landscape in modern society. Additionally, Leu et al. concluded that to compete in a global society, especially with the infiltration of the Internet, governments, societies, and schools must take a serious forward look at how they were to prepare their citizens and students.

Less than a decade later, Leu, Kinzer, Coiro, Castek, and Henry (2013) embellished the perspectives called New Literacies as it related to instruction and assessment. The primary principles remained the same with the exception of excluding two of the original principles: 1. "The relationship between literacy and technology . . . [was] transactional and 2. Speed count[ed] in important ways within the new literacies" (p.1589). The theory then proffered the following principles in Table 1.

Table 1

Principles of New Literacies Theory

Principle	Definition
1.	The Internet and other ICTs are central technologies for literacy within a global community in an information age.
2.	The Internet and other ICTs require new literacies to fully access their potential.
3.	New literacies are deictic.
4.	New literacies are multiple, multimodal, and multifaceted.
5.	Critical literacies are central to new literacies.
6.	New forms of strategic knowledge are required with new literacies.
7.	New social practices are a central element of New Literacies.
8.	Teachers become more important, though their role changes, within new literacy classrooms.

Note. Leu et al., 2013, p. 1158

Essentially, the principles of New Literacies theory presented a paradigm shift from traditional literacy to technological literacies. Because these technologies were ever changing, the need to critically assess them was relevant. More importantly, teachers make these decisions as they integrate strategies for using various modalities into the classroom. As a framework, New Literacies theory offered an approach to understand how nontraditional adult learners responded to these principles in developmental writing courses.

Each of the eight principles related to both real societies and within educational environments. From a societal perspective, Leu, Kinzer, Coiro, Castek, and Henry (2013) argued that our lives were impacted by new literacies that evolved from the Internet and its variants over time, suggesting that they were forever forthcoming and represented the first principle.

In relationship to educational environments, the New Literacies theory's role illuminated the vast changes in pedagogy and methodology from the once traditional mainstays like lecture, handout materials, and basic forms of technology. Traditional reading and writing strategies were enhanced through the use of the Internet and other ICTs, as represented by the second principle while at the same time recognizing current social practices within the classroom built upon literacies (Leu et al., 2013). Further, integrating technologies into writing courses afforded students with multiple ways to explore the uses of the Internet that exceeded standard practices (Sweeny, 2010). He further posited how traditional writing instruction was enhanced with the use of the Internet. In addition, Lewis and Chandler-Olcott (2012) compared traditional instruction with new literacies to learn the importance of technological integration.

Progressively, New Literacies theory provided an avenue for teachers to find new ways of presenting information for learning in the classroom and continued to do so because of the transformative nature of new technologies, which informed the third principle called "deictic" (Leu et al., 2013, p.1160). Although technological advances were unknown, what was known was that they did not remain the same or serve the same purposes. Educators saw them as fluid and were flexible in the uses of them when approaching traditional curricular formats.

The fourth principle of New Literacies theory was the management of three distinct foundations for why and how technologies were used: 1. Multiliteracies, 2. Multimodal, and 3. Multifaceted. These terms suggested a three-dimensional reality that was not the case in former educational modes of teaching. The Internet's vast array of manipulation and creative potential gave way to more ways for individuals and students to be engaged. A case study on multimedia literacy and practices conducted by researchers Tan and Guo (2010) found weaknesses between multimodal literacies and national assessments because they prevented a move toward systems of pedagogy. The study showed relevance to how complex multimodal literacies were as systems of change.

Moreover, Leu et al. (2013) argued that an exercise of caution was imperative when using Internet and other ICTs to gather information; thus the fifth principle called "critical literacies" (p. 1158) became relevant in the process of managing advanced technology. The information garnered from the Internet was important to examine. Leu et al. argued that information was dynamic and all types of users from various backgrounds could weigh in on issues outside the realm of education, but that these dialogues had the

potential to affect the way users functioned through the vehicle. Their assertion was duly noted from a social academic standpoint. It also suggested a high ability to critically analyze information found on the Internet and other ICTs for individuals in higher education.

The emergence of newer literacies thrust users into learning new ways of maximizing these technologies (Leu et al., 2013). As such, the sixth principle of New Literacies theory was a guide for researchers to determine how educators re-examined traditional paper and pencil activities to alter pedagogical and methodological practices that enabled effective use of literacies. Integrating technology and pedagogical changes were at the core of New Literacies (Arntzen et al., 2008; Bailey, 2009; Doering, Beach, & O'Brien, 2007; Labbo et al., 2010; O'Brien & Scharber, 2008; Sweeny, 2010; Swenson et al., 2006). Meanwhile, an argument was made that teachers need professional development to effectively integrate technology into English education (Sweeny).

While professional development was important for teachers (Coiro, 2003), sharing technological knowledge for the student's benefit was important and was a social dynamic related to curricular practices. These social practices allowed individuals to "distribute knowledge throughout the classroom, especially as students move[d] above the stages of foundational literacy" (Leu et al., 2013, p. 1163), and these practices were foundational to the seventh principle of the New Literacies theory. However, Sanny (2007) argued that it was not sufficient to treat literacy in the same manner when literacies were associated with teaching because it was viewed as a paradigmatic shift rather than merely adding technology to the curriculum. On the other hand, Leu and Zawilinski (2007) suggested that a movement toward using technology in primary levels

fostered an acceptance of New Literacies in classrooms. These were the same social activities Husbye et al. (2012) described in "play-based curriculum" (p. 91). Consequently, differing views necessarily pertained to primary and secondary educational levels, which did not reflect developmental writers in college environments.

The eighth and final principle was germane to education "because teachers . . . [became] even more important to the development of literacy and . . . an expanded focus and greater attention . . . [was] placed on teacher education and professional development in new literacies" (Leu et al., 2013, p. 1163). This assertion suggested that teachers and students were expected to gain new skills using technology for learning. A significant reality with educators using technology was the growing need for professional development (Coiro, 2003; Sanny, 2007). Leu et al. argued, "The appearance of the Internet and other ICTs in school classrooms . . . increase[d] the central role that teachers play[ed] in orchestrating learning experiences for students" (p. 1163), compelling teachers to integrate technological platforms like Blackboard® and other online educational teaching modalities into course instruction. It also required that they understand how to use them effectively.

Although New Literacies theory began from a reading perspective, it evolved into complex technological domains. According to Lankshear and Knobel (2013) noted:

> Near the end of the 1990s[,] it was more common to find literacy researchers and writers using 'new literacies' to formally mark an increasing awareness of the scope and role of post [-] typographic texts in everyday life, and their significance for greater educational attention. (p. 3)

Studies conducted related to the reading discipline evidenced positive learning outcomes when technology was included in the learning experience (Bailey, 2009; Burgess, Price, & Caverly, 2012; Husbye et al., 2012; Labbo et al., 2010; Leu & Zawilinski, 2007; O'Brien & Scharber, 2008). In particular, this study amplified technology and writing from the lens of New Literacies theory and how it explained the convergence of three major constructs: nontraditional adult learners, developmental writing, and technology in the college classroom, with particular emphasis within the technology domain. Therefore, the review of the literature begins with a discussion of nontraditional adult learners to understanding their characteristics.

Nontraditional Adult Learners

Historically, adults returned to school for training and education as a result of the Industrial Revolution, but in recent decades, and especially after the 2008 great recession and up to the present, adults have re-envisioned their place in society and in the workforce. The need for additional education and training became an imperative, because companies were closing their doors, and adults were losing their jobs. The one viable option they had was to return to school to either change careers or strengthen their portfolios. Many of these adults returned and enrolled in community colleges. The researcher examined nontraditional adult learners to garner a deeper understanding of the complexities of returning to college and being faced with multiple challenges. One challenge included college preparedness, and the other challenge nontraditional adult learner faced was perceived or actualized technological skills. This section will defined the characteristics of the nontraditional adult learner in comparison to traditional students and their motivations for returning to school.

Nontraditional adult learners were characterized as those individuals who were at the age of 25 years old and older, part-time employed, and uphold other life expectations (Wooten, 1998). However, Jinkens (2009) had a different perspective on the age being 24 years old. For the purpose of this study, Wooten's definition of the nontraditional adult learner will be employed. As such, male and female nontraditional adult learners returned to college with the hopes of improving the status of their lives. Their life experiences shaped their views about the relevance of educational training for them because they had a "different mindset" (para. 4), and "they are more concerned with what they did with the knowledge . . . from class" (para. 5), which is a reason to pursue higher education. Nontraditional adult learners were in a unique category that distinguished them from traditional students. They had particular needs for returning to school to get an education beyond the scope of transitioning from high school. Holyoke and Larson (2009) conducted a study examining generational differences in college classrooms and motivating factors. They found that baby boomers indicated a readiness to learn when the material contributed to personal growth and gratification and followed a traditional format.

Challenges arose for nontraditional adult learners when the class no longer followed a traditional format, which was typical when technology was involved. Jacko, et al. (2004) noted that "cognitive abilities [were] an integral component of human—computer interaction, which puts this [adult] population at a distinct disadvantage when using computers" (p. 249). A distinction of nontraditional adult learners, according to Jinkens (2009), is the notion that they experienced a change in life that propelled them to return to school, including having to work simultaneously. The distinction is the

generational gap that connotes challenges that nontraditional adult learners may face, particularly when they had limited experience or exposure using technology. Further, nontraditional adult learners who have been "separated from formal education for a number of years" entered colleges and university far "below college level preparedness" and need[ed] remedial courses in "math, English, and reading. . . " (Spellman, 2007, p. 67). She further asserted, "Adults interested in pursuing training, certificate, or degree programs often confront a variety of barriers such as lack of academic preparation, lack of finance, social issues, cultural issues, and overwhelming family responsibility" (p. 63). The challenges underprepared students faced were usually addressed in two-year institutions. Spellman posited, "Students typically underserved in higher education choose to attend community colleges" (p. 66) because community colleges foster developmental courses to build the student up to college level. These opportunities for nontraditional adults underprepared for college work promoted hope and motivation for earning a degree.

Motivation was pivotal for nontraditional adult learners because their journey was wrought with challenges that traditional students never experienced. The nontraditional adult learners who returned to school after being out for long periods of time were motivated by jobs that "required a certificate" and the "desire not to lose their current work" (Dayton, 2005, p. 49). The concern nontraditional adult learners had related to their livelihoods thrust them into deciding that returning to school was their means for survival. Likewise, Jamieson (2012) argued, "The motivations for returning to formal study by older adults were "work prospects" and "further study" (p. 203). The needs of adult learners provided an incentive, and the prospect of nontraditional learners being

successful upon entering college was enough to propel them to do so. Further, Dayton asserted that nontraditional adults were also motivated to return to school because of "encouragement" and "stability" (p. 50). When family members were engaged in nontraditional adult learners' attempts to succeed, the learners gravitated towards achieving the goal. Thus, nontraditional adult learners were pressing forward to earn an education even though they are forced to learn how to manage in the academic learning environment after having been away for extended periods of time.

Through Chartrand's (1990) causal model, an understanding of how nontraditional adult learners adjusted in college was possible, which indicated a positive relationship between the "positive evaluation of oneself as a student" and "commitment to the student role" (p. 70). These attributes aided in nontraditional adult learners finding confidence to proceed even though challenges loomed. In fact, Chartrand discovered that nontraditional adult learners experienced "personal distress" as a result of becoming a student (p. 71). This type of stress was general to the college student; however, it suggested that to do well in college courses, students had to overcome the distress. Spellman (2007) expressed, "Knowing that they need[ed] developmental courses [led] minority students to doubt their ability to perform at passing levels in curriculum courses and may discourage them from enrolling" (p. 68). This notion heightened the potential for "students required to take developmental courses . . . [who were] at risk of academic failure" (p. 70) and exercised self-doubt before actually engaging in academic studies.

Therefore, the nontraditional adult learner was challenged immediately once the decision was made to return to college and was faced with the reality of being categorized as a developmental student. Essentially, nontraditional adult learners were

important to this study because they exhibited weaknesses in their preparedness for college-level coursework. The requirement of non-credit courses supported the notion that nontraditional adult learners needed assistance to be successful in earning a certificate or a degree because they lacked the necessary writing skills. Therefore, this chapter offers a working knowledge of the caliber of students entering into community colleges. As their experiences related to their learning and writing ability, the next section identified the attributes of developmental learners and developmental writers.

Developmental Learners and Writing

Developmental learners are those who required remediation in various subject areas. They had to achieve competency in their writing skills in order to advance to college-level writing, and many nontraditional adult learners fell into the category of needing developmental writing courses to begin their academic matriculation. This section discussed the characteristics of the developmental writer. VanOra (2012) defined developmental students as "those community college students lacking in basic reading, writing and/or mathematics abilities" (p. 22). In a qualitative study on students in community college, in order to discover challenges and motivations, VanOra found nontraditional adult learners "seemed more motivated by the desire to make contributions to larger society" but were challenged by "multiple demands on time," "difficulty of coursework," and "inadequate pedagogy" (p. 25). These challenges presented a larger problem that consisted of their insecurity to finish what they started. "Overwhelmingly, students affirmed that these challenges [made] it less likely that they [were] able to complete developmental coursework and earn their associate's degree" (p. 25).

Subsequently, consideration about adding technology to what developmental writers were expected to know also impacted the success of a nontraditional adult learner in a developmental writing course. Additionally, attention was needed where technology was met with the written text (Lea & Jones, 2011), which will be revealed later in this chapter. Further, Crews and Aragon (2007) examined developmental writers in their first year to determine persistence and goal attainment. They found "a significant difference between participants and non-participants regarding percentages of credit hour completion" [and the percentages were] "85% to 63%," respectively (p. 645). However, Daiek, Dixon, and Talbert (2012) later refuted this finding and claimed, "Developmental education as it [was] practiced [was] not very effective in overcoming academic weaknesses" (p. 37). Daiek et al.'s perspective was bleak, but they felt strongly about it because "developmental students of all ages often lacked direction and goals, motivation, self-confidence, and belief in their own self-efficacy" (p. 38). Self-efficacy not only referred to developmental writers, but later in this study, it referred to their abilities to use technology.

On the other hand, Koch, Slate, and Moore (2012) argued, "Remediation of skill deficits [was] a necessary function of community colleges and universities in order to assist individuals in meeting their potential" (p. 66). In their study on perceptions of developmental learners, Koch et al. identified "negative feelings related to learning they would be required to take developmental coursework. . . " (p. 72), which appeared to be a concern held by developmental learners. Like Daiek et al., (2012) and their position on developmental education being ineffective, a study conducted by Southard and Clay (2004) measured the effectiveness of developmental writing based on course grades in a

composition class. Researchers compared four groups of both developmental and non-developmental students. They found no statistical significance between the groups, but they did find that "the developmental students had better pass and retention rates than did their non-developmental counterparts" (p. 43). There was, at least, some indication that pedagogy designed to assist developmental students was productive. With regard to developmental students monitoring their own progress, strategies regarding self-regulation were explored in the literature.

A multitude of contradictions existed concerning the level of growth developmental learners experienced. On one hand, MacArthur and Philippakos (2013) found students' writing "made some gain in quality" and "made significant gains in self-efficacy and affect" (p. 189). This finding was contrary to Daiek et al., (2012) who argued that developmental students lacked self-efficacy skills. The essential relevance to whether or not a developmental student had facility to work independently on tasks related to writing was pertinent to the question of whether or not this same group of students had the capacity to work independently using technology. Moreover, will developmental writers exhibit self-efficacy with the use of technological literacies like the Internet and other ICTs when expected? What was certain was the idea that self-efficacy was related to technological skills as educational pedagogy advanced. Finally, examining the literature on developmental writers focused this study on the need to validate supporting nontraditional adult learners who experienced writing challenges at a cellular level and who may be forced to face additional challenges on a technological level. Therefore, the next section will discuss technological relevance in the classroom with regard to adult learners.

Writing and Technology

Learners in developmental writing courses were required particular pedagogical strategies for repletion of basic writing skills to aid in their growth and maturation. Nontraditional adult learners were challenged to meet writing requirements when technology was introduced into the curriculum. For this reason, embarking upon attitudes of perceptions using technology to perform writing tasks was the focus of this section. In the 1990s, studies conducted in the literature on writing and technologies were relevant to current literature. Because earlier generations of computers were basic and involved the use of the Internet, students' challenges were warranted. Today, the increased technology in the classroom and beyond—the online environment – demanded attention. In other words, the academic culture that adults experienced was saturated with technology in one form or another and for one purpose or another. From New Literacies theory perspective, newer technologies were examples of principles one and two.

Despite the acceptance of the Internet and other technologies, Carpenter et al. (2004) asserted, "The rapid growth of online education across the nation produc[ed] a challenge for many developmental education programs" (p. 14). Any innovation brought with a set of problems, and technology was one of those innovations. Carpenter et al. raised a very interesting point when they asserted, "Two main concerns faculty and administration often express[ed] about creating online versions of developmental courses [were] fears about retention and students' ability to handle the technology" (p. 14). Students' computer technology abilities were the crux of this study toward understanding how nontraditional adult learners managed using technology in a developmental writing course. Ratliff (2009) argued, "A significant number of them [participants in community

college] were less than adequately prepared for a technology-rich learning environments" (para. 19). An environment where technology was in the forefront suggested the third principle of the New Literacies theory whereby technologies were ever changing. As technology changed, the more educators were finding ways to integrate it into the classroom.

Principle four addressed these changes as instructors were incorporating online technological platforms like Blackboard® and Pearson's Mywritinglab® into classroom environments (Leu e al., 2013). Blackboard® afforded teachers and students with the capacity to review documents, interact with learning tools, engage in online discussion, and utilize communication features. Further, Thiele, Mai, and Post (2014) found that the more educators used technology for instruction, students gained confidence and efficacy. Ironically, this finding did not suggest the impact technology had on developmental writers when introduced to technology into the classroom on a regular basis. In fact, Harrington (2010) argued, "Little evidence exist[ed] which demonstrate[d] the extent to which developmental students lack[ed] technology" (p. 10). However, including technology into the curriculum maintained its perceived acceptance as a vehicle that supported learning (Keengwe, 2007) although there were more technological advancements than in previous decades. Landry, Griffeth, and Hartman (2006) found "Perceptions of Usage and Usefulness [were] closely related and that as students perceive[d] that Blackboard [was] easy to use, they . . . perceive that Blackboard [was] useful" (p. 94).

Students were encouraged to participate in the use of these technologies to enhance their writing skills. In particular, developmental educators used them to facilitate

learning beyond the traditional classroom model, but they did so with challenges. These challenges suggested that developmental writers experienced difficulty managing both writing and technology. Harrington (2010) argued, "Many educators and administrators were leaving online delivery and embracing hybrids" (p. 4), which was presumed to be a more effective approach to teaching for the convenience of the student. However, Harrington noted, "The literature on hybrids ignore[d] that the same problems which plague online students – lack of technology access and skills, poor reading skills, and poor overall student skills—also affect[ed] hybrids" (p. 5) and that more research was needed to examine developmental writers' technology skill levels to understand if technology skills influenced adult learners in developmental education. For instance, Smith and Smith's (2010) findings suggested that adults who utilized the Internet and email would inevitably engender strong literacy skills, but Enoch and Soker (2006) claimed, ". . . the mature students. . . [were] more reluctant to use new media" (p. 107).

However, these findings did not suggest the impact introducing technology into the developmental writing classroom on a regular basis would have on adult learners. Jacko et al.'s (2004) assertion that "older adults interact with computers differently based both on their changing abilities and based on their acquired and practiced computer skills" (p. 250) was a concern for educational leaders and educators in the classroom. In this case, principle six of the New Literacies theory was employed (Leu et al, 2013), and some nontraditional adult learners gravitated towards other strategies to compensate for their lack of computer skills. Another element that complements the use of technology in writing classes included social qualities.

Based on the seventh principle of the New Literacies theory, social interaction played an important role in understanding levels of anxiety in writing with technology (Leu et al., 2013), particularly because broader uses of technology were becoming increasingly demanding (DeCosta, Clifton, & Roen, 2010). Further, DeCosta et al. affirmed, ". . . New Literacies movement provide[d] useful lenses through which to confront these anxieties and better understand the role of technology in students' lives and the ways they collaborate[d] with others" (p. 17), especially within the writing environment where social activity was abound. Moreover, while the concept of social interaction was examined over three decades ago, the viewpoint remained prevalent in the modern classroom. Ng (2008) conducted a qualitative study exploring the social-cultural perspective of adult learners of technology. He found, ". . . consistent supports from different social arenas . . . encourage[d] older adults to try new technologies, develop interest in them, and utilize them for their own good" (p. 12), and support was critical to the process of engrafting adult learners into the use of technology with their writing expectations.

In fact, in a case study on older adults' use of technology conducted by Banard, Bradley, Hodgson, and Lloyd (2013), they found that "participants who [were] not expert users often organize[d] support, usually from family. . . [or] from someone very competent. . . " (p. 1720). These social strategies aid in adult learners building confidence in the computer skills, especially because computers remained a part of society and a part of education. "Computers [were] no longer a futuristic choice proffered by technology enthusiasts; they [were] the mainstream access route for /resources and communication within academe" (Relles & Tierney, 2013, p. 482). Therefore, nontraditional adult

learners were enabled to engage in the use of technology. Further, the social principle was applicable in the online class environment, as well. Wei and Chen (2012) asserted, "When a learning environment has a friendly user interface and rich media, learners can easily share social cues with each other" (p. 539). Even as technology took on different forms, it was incumbent upon educators to learn how to integrate them in classroom settings effectively. Wei and Chen purported, "In online classrooms, improving learners' social presence can enhance their learning interaction, which would lead to improvement in their learning performance" (p. 540). As it related to writing, these social skills supported the improvement in their writing skills performances, and the eighth principle of New Literacies theory supported the role of the teacher as these technologies evolved (Leu et al., 2013).

As evidenced, New Literacies theory appropriately framed the discussion on the practical uses of technology within academia. It demonstrated how educators and students experienced literacies in writing in order to develop technological efficacy.

Summary

Overall, the literature in developmental writing and developmental education was relevant with the evolution of literacies (Leu et al., 2004). As such, the literature for this study demonstrated that nontraditional adult learners bore the burden of obtaining proficiency with technology in writing courses in order to succeed.

Authentic research in digital literacies occurred during the early 2000s and an examination of the literature on technology and adult learners over a five-year period beginning in 2009 of related research to the current study showed that similar characteristics for nontraditional adult learners and technology were prevalent but limited

in scope (Becking, 2011; Cederholm, 2010; Hamid, Waycott, Kurnia, & Chang, 2010; Harrington, 2013; Matas, 2014; Pierce, 2012; Wan, 2009). The previous studies offered an opportunity to further explore adult learner literacies and the need for supplemental training.

The body of literature was built upon the increase in adults returning to school to enrich their lives or careers, but there were few empirical studies to validate the need for training nontraditional adult learners on the proficiency of using technology in basic writing classes (Harrington, 2010).

The literature pointed in the direction of technology in primary and secondary educational levels and within reading and writing disciplines (Hsu, Wang, & Runco, 2013; Husbye et al., 2012; Leu & Zawilinski, 2007; Sweeny, 2010). Moreover, research at the post-secondary level with nontraditional learners and technology focused on comparisons between course delivery methods (Cederholm, 2010), adult student demographics and computer use (Smith & Smith, 2010), and students' perceptions about using technology (Chang, Shieh, Liu, & Yu, 2012). My research filled the gap where adult learners in developmental writing and technology were examined to determine whether nontraditional adult learners required supplemental training in their initial writing classes to meet the learning objectives of the course.

Conclusion

Given the limited presence of research findings on the relationship between nontraditional adult learners and integrating technology into developmental writing courses in higher education and technology deficiencies among developmental writers (Harrington, 2010), this study investigated self-reported computer literacy skills and

knowledge against students' writing performance in developmental English writing courses.

Thus, the chosen methodology for this study was fundamentally grounded in quantitative research; however, qualitative responses were captured to gain a deeper perspective of developmental writers' perceptions about the need for technological training. Therefore, chapter three explains adult learners and technology towards understanding the digital divide in developmental writing courses based on the five research questions presented in the study.

CHAPTER III

METHODOLOGY

Introduction

". . . results using a self-reported measure of perceived computer literacy appeared to offer support for continuing a basic training approach in college courses. . . " (Karsten & Roth, 1998, p. 21).

Nontraditional adult learners and their level of computer technology experience and knowledge were examined in this study to determine whether supplemental training provided a benefit to their learning experiences. As returning students, nontraditional adult learners who have been "separated from formal education for a number of years" entered colleges and university far "below college level preparedness" and need[ed] remedial courses in "math, English, and reading. . . " (Spellman, 2007, p. 67). Thus, the need for building writing skills for college readiness was one of the challenges nontraditional adult learners faced, and re-entering the high-tech college environment was a new prevalent challenge. Carpenter et al. (2004) asserted, "The rapid growth of online education across the nation produc[ed] a challenge for many developmental education programs" (p. 14). Approaches to using supportive technology for adult learners in developmental writing courses have been minimally explored (Osei, 2001; Zhang & Espinoza, 1998). Therefore, understanding the technological needs of nontraditional adult learners was relevant to this study.

The purpose of this dissertation and the intention of the study investigated computer literacy skills of adult learners in developmental writing courses, particularly nontraditional adult learners to determine if there was a relationship between their computer knowledge and how well they performed in the course. In addition, age was considered important in determining a relationship with performance. Subsequently, this study addressed the relevance of affording nontraditional adult learners with the opportunity to gain supplemental technological training to support their proven deficiencies with experience and knowledge in technology. The study also addressed the attitudes of adult learners regarding wanting technology as a supplement to the developmental writing course. This chapter identified each stage of the research methodology beginning with the demographical make up of participants and the population, data collection, analytical methodology, and limitations to the study.

The study's aim was to answer the following research questions:

1. What level of computer literacy exists with students enrolled in a developmental writing course?
2. What relationship, if any, exists between ages of students enrolled in a developmental writing course and computer literacy?
3. What relationship, if any, exists between computer literacy and classroom performance in a developmental writing course?
4. What relationship, if any, exists between age and classroom performance in a developmental writing course?

5. What value do nontraditional adult learners have with technology as a supplement to developmental writing courses and what are their attitudes about technology as a course supplement?

The demographic form offered an informed way of gathering quantitative and qualitative data. Research question five was uniquely designed as a mixed methodological question. The quantitative data to be garnered from the questions was based on nominal data by asking the participants to select either yes or no. The qualitative element of research question five asked participants to further elaborate on their selections by writing brief responses. The following questions depict the language used in the demographic form.

If a supplement to the course were offered to increase your computer literacy, would you take advantage of this:

1. If it were offered during the time already set aside for the course (i.e., in-class)- Yes/No (please circle one).
2. If it were offered outside of class time (i.e., would require students to participate outside of class time)—Yes/No (please circle one).
3. Based on your responses to the two questions above, please provide additional information about the reason for your answers.

The following section outlines the research design for this study to include a research philosophy for mixed methodology. Further, the data collection procedures incorporated in this study were comprised of quantitative and qualitative data for interpretation through analytical methodologies. Further rationale was given for the use

of each research question to establish the viability of the study. Finally, limitations to this study were offered to include methodological limitations.

Research Design

The research design for this study was expounded upon in this section of the dissertation to include methods and procedures used to answer the research questions. This study was designed with the use of a survey instrument and a demographic form. In addition, the survey instrument was appropriate for capturing self-reported technological scores for each participant as they relate to age and performance (research questions one through four). Further, the demographic form was designed to provide both quantitative and qualitative outcomes (research question five). According to the design of this study, participants experienced no harm and minimal risk of exposing personal identifying information through researcher's careful concealment of data.

The research questions put forth in this study were addressed using a mixed methodological approach. This research study specifically focused on the use of convergent design (Creswell, 2015). The quantitative method was selected to analyze relationships between multiple variables. The researcher explored computer literacy scores with age and performance using the sample population. The qualitative method was selected to further explain the outcomes of quantitative analyses and to gain a deeper understanding about attitudes related to technology and training as a course supplement. Mixed methodology is practiced for the benefit of gaining deeper insight into the intentions of the participants of the study (Creswell).

Research Philosophy

Pragmatism is the underlying philosophy of combined quantitative and qualitative research as purported by Duemer and Zebidi (2009), who argued for a "third paradigm," which they identified as mixed methodology (p. 163). This alternative paradigm established the framework for merging outcomes from both perspectives and proffered a unique understanding and interpretation of the data to thoroughly answer the research questions (Creswell, 2013).

Convergent Design

This study's methodology is grounded in convergent design where collection of both quantitative and qualitative data, analyses of both datasets, and merging the results served the purpose of confirming data (Creswell, 2015). Each method, in isolation, produced useful outcomes; however, when combining the outcomes, the meaning of the data was richer. Therefore, using mixed methodology in general and convergent design in particular answered research questions in a comprehensive way instead of a mere partial understanding (Creswell).

Procedures

The research was conducted over a five-month period, which included two semesters beginning in June 2014 and concluding in November 2014. The study was conducted at a single site.

The researcher selected a community college in the Midwest because it yielded high a population of adult students returning to college. As such, community colleges are institutions that accommodate returning students who are not prepared for the rigors of higher learning (Spellman, 2007). In addition, the underprepared students at the research

site were tested and placed into developmental writing courses. Prior to this study, it was not clear whether or not there was a relationship between nontraditional developmental writers and their ability to perform well in the course as a result of deficient technology skills.

Therefore, research question 1 explored the level of technology skills nontraditional adult learners had to remove all non-confirmed assumptions about computer deficiencies. Using actual computer literacy scores served as the basis for comparing variables like age and classroom performance. Moreover, the researcher was given permission by the institutional IRB and by each faculty participant to visit 14 English 098 developmental writing courses at the designated campus to administer surveys to student participants.

The researcher contacted each faculty member selected to be a part of the study based on the researcher's permission to access classes that would not conflict with the researcher's contractual teaching obligations. Each faculty member was provided two forms of communication inviting him or her to participate in the study. The first form of communication was through email where a letter explaining the purpose of the study. An electronic faculty consent form was also submitted to faculty members. The researcher wrote a brief memo that explained the need for participating faculty, as well as explained the attached documents. Faculty members were given a timeline to respond and instructions on how to submit executed consent forms. The second form of communication was a complete packet including a letter of invitation and consent forms along with flyers for faculty to share with students. Instructions were provided in the letter for faculty to distribute a copy of the flyer to each student during the first week of

the semester to prepare students for the visitation and survey administration. The researcher collected faculty consent forms, and the researcher began conducting data collection utilizing a brief script when administering the survey for each classroom visitation. The process lasted between 15 and 30 minutes. The rationale for the script was to ensure continuity of language and preserve time limits to avoid undue disruption of class instruction. Upon completion of surveys, the researcher collected and placed them in envelopes prior to leaving each class. This step ensured safety and security of participants' personal information. The researcher was solely responsible for handling all data.

The researcher began the process of collecting the data during the first week of the summer semester in June 2014. The researcher reviewed student consent forms and explained the purpose of the study, minimal level of risk to participants, benefits of the study, and obtained consent from participants. After the surveys were administered, the researcher instructed participants to complete all the questions on the Computer Literacy Scale (Sengpiel & Dittberner, 2008) and the demographic form based on the pre-written script. The literacy scale is found in Appendix A. In July 2014, the researcher contacted the institution's director of Research and Planning and met and obtained individual midterm data. The researcher created a master data spreadsheet and collected and stored the date in Microsoft Excel. The researcher collected and stored midterm grades in the master spreadsheet. During August 2014, the researcher began a second round of data collection for the fall semester. Surveys were administered during the first week of the regular semester. The researcher followed the same script and procedures for administering the data as was performed during the summer semester. The regular

semester consisted of 16 weeks of instruction. Surveys were also collected during the first week of the mini-session semester from four class sections. The mini-session semester began in September 2014, which was equivalent to a third set of data collection. During the midterm period for both regular and mini-sessions, the researcher communicated with the director of Research and Planning via email and requested individual midterm grades from all student participants for the fall semester. Emailed documents from the director were passcode protected to secure personal identifying information and deleted from email after the study was completed.

The completed Computer Literacy Scale (Sengpiel & Dittberner, 2008) surveys were collected, compiled in numerical order labeled *P* along with the number to represent each participant, and grouped numerical by sections between one and 14 for accessible cross-referencing. The researcher used a master spreadsheet for inputting datasets from Part A and Part B of the scale and all other categories for analyses. Manual calculations of Part A and Part B were performed directly onto the surveys and double-checked before importing into the master spreadsheet. Formulas were created in Microsoft Excel using the combined parts (A and B) of the instrument to accurately calculate participants' scores. This double-checking process was designed to prevent calculation errors. Demographic information was included on the master spreadsheet, such as age, gender, graduation status, experience using technology, hours per week using technology, support training in class, support training out of class, and narrative responses. The researcher entered data into the spreadsheet from each survey by hand and cross-referenced the data with the physical survey two times to prevent recording data errors. After completing the inputting process, the researcher copied categories and corresponding data from the

master spreadsheet into a Microsoft Word file for importing the data into IBM SPSS version 21.0 software and Nvivo qualitative software. The researcher verified data accuracy a third time by reviewing each category against the master spreadsheet to prepare for multiple analyses.

Each research question was devised to gain understanding about adult learners and whether or not their understanding of technology was related to their ability to succeed in a developmental writing course. The following justifications support the utilization of each research question. Research question 1 was designed to determine where participants' self-reported technology knowledge and experience lie on a measurement scale. The Computer Literacy Scale (Sengpiel & Dittberner, 2008) addressed this question appropriately because the authors found significant validity with the instrument as it was applied to understanding technology skills of adult learners. Selecting the Computer Literacy Scale (Sengpiel & Dittberner) was primarily used for the benefit of capturing a numeric value that could be statistically analyzed. Thus, the literacy scale was the foundation for analysis of other variables. Research question two was designed to determine whether or not a relationship between age and computer literacy existed. In a study conducted by Shuster and Pearl (2011), they believed that capturing computer literacy scores of traditional and nontraditional nursing students were foundational and that their competencies were necessary for success in college courses. In addition, they found that there was a direct relationship between the age of the student and the computer score. In fact, "The total computer competency score was higher for traditional students than for RN students. . . " (Shuster & Pearl, 2011, p. 140). This study supports the findings of Sengpiel and Dittberner where the design of the instrument

validated the same outcomes. Therefore, the rationale for constructing research question 2 was to show a relationship between the ages of participants and how strong their computer skills were. As a result, research question 3 was informed by this knowledge.

In research question 3, the obtained computer literacy scores were filtered through knowledge on how well participants performed in the developmental writing course. This decision was based on the understanding that if a relationship could be determined, there could be implications with building stronger computer skills. If a relationship were to exist, it could implicate building computer skills training. Engstrom (2005) argued that adequate technology skills support writing skills in a developmental curriculum. Thus, the use of technology to support classroom instruction was further validated and enriched the scope of understanding the digital divide. Debevec, Mei-Y, and Kashyrap (2006) found an indirect correlation between technology and performance but also suggested that multiple ways of performing in the course could be achieved. In part, understanding the scope of the digital divide further informed research question four where classroom performance was viewed through the lens of age. Also, Chyung (2007) conducted a study examining performance relationships with age and other demographic variables to determine online behavioral differences. Chyung found that nontraditional students posted more messages, but that this finding was paired with exercising caution with conclusions about this relationship. However, the importance of examining these potential relationships is relevant.

Research question 4 examined the type of relationship age and performance may have had. It is important to note that the impetus for this study was primarily based on how nontraditional students would perform in the course, especially given that they

functioned at lower technological skill levels. Gaining knowledge about the relationship could generate a better understanding of the digital divide and potential pedagogical strategies.

The nature of research question 5 suggested that the convergent design (Creswell, 2015) be more directly applied. The examination of values for training as a course supplement carried a stronger evidentiary base for confirming participants' desire for classroom training. Hubbard (2013) identified the relevance of technology training as a general means for supporting successful outcomes; however, it was also important to recognize the need for developing training that learners would value and use. Foulger and Jimenez-S (2007) argued that technology training was an effective means of supporting student writing. Ultimately, research question five sought to validate the need for offering technology training as a course supplement.

Because the second part of research question five was qualitative in nature, the examination of attitudes was appropriate. Researchers asserted that perceptions about attitudes could be engendered through qualitative analysis (Creswell, 2015; Leedy & Ormrod, 2013). Based on this assumption, the researcher elected to examine attitudes about technology training, as a course supplement, to determine if the digital divide could be better understood, because quantitative data omitted personal perspectives and did not yield deeper insight into the relationship between how participants' self-reported technology score compared with their corresponding and collective responses. Thus, examination of both revealed robust interpretive results.

Population

This section reflected all adult learners participating in this study. More specifically, emphasis was given to the size of the population, attributes of the sample, and any demographic information related to the participants. Participants either tested into English 098 through e-write testing and COMPASS testing, matriculated from foundational writing courses, or transferred from the campus GED program. The population was comprised of adult learners enrolled in English 098 – developmental writing classes (*N*=408) and were recruited during the summer 2014 semester and the fall 2014 regular, including the mini-session semester. The maximum enrollment for class size was 25 students; however, the retention rates by midterms were reduced per class section. Pertaining to the number of participants identified, adult learners (*n*=276) represented the sample size for this study. Ages between 17 and 24 years old 70% (193) were represented; ages 25 years old and over 30% (82) were represented. Gender representation in this study was females 71% (197) and males 29% (79). Represented were participants who graduated from high school 56% (154), GED 8% (18), and incomplete surveys 38% (104).

Quantitative Data Collection

This section explains the chosen measurement instrument, variables examined, data collection, and measurement procedures. All surveys were organized in a filing system that corresponded with the entries in the master spreadsheet in Microsoft Excel.

Measurement Instrument

The measurement instrument was selected based on its relevance to understanding technology skills of adult learners. Research question 1 addressed the level of computer

skills that existed among nontraditional adult learners. The researcher used a scale that was ". . . specifically designed for older adults with little computer knowledge. . . " (Sengpiel & Dittberner, 2008, p. 2). The Computer Literacy Scale was comprised of two parts: A and B. In Part A, for experience with computers, a metric value was used to calculate duration and intensity. Diversity of tasks was calculated as the sum of frequencies of the single tasks and was based on a four-point Likert scale: never, seldom, sometimes, and often. The four categories were converted to never (0), seldom (1), sometimes (2), and often (3). There were 11 items worth three points each that yielded a possible score of 33. Part B assessed computer knowledge of symbols and terms. Part B consisted of 26 items with embedded distracters. Part B was calculated based on the sum of the correct answers with a total of 26 possible points. Experts vetted the symbols, terms, and descriptions on the scale. The average completion time was 10-20 minutes. The Computer Literacy Scale had strong internal consistency and high reliability as documented by Cronbach's alpha. The internal consistency was a=0.96.

The researcher used purposive sampling in order to obtain a sufficient sample size based on targeted characteristics of participants. The focal characteristics were all students enrolled in English 098 developmental writing in a community college. The criteria for the purposive sampling excluded foundational writing (FS Writing) and second-level developmental writing (English 100). Also excluded from the criteria were online and hybrid writing courses. To further meet the criteria, participants had to be in attendance on the day of administering the survey. Additionally, surveys that demonstrated a lack of intention to complete, as defined by leaving a disproportionate

number of unanswered questions for both the quantitative instrument and the qualitative survey, were removed from the study.

Variables

Obtained scores from the Computer Literacy Scale (Sengpiel & Dittberner, 2008) were used to compare variables: age and performance. The rationale for selecting age was to investigate the range of ages with regard to self-reported computer literacy scores. By investigating age, the researcher could determine whether nontraditional students were adept at using computers or not. By selecting performance as a variable, the researcher could investigate whether or not a relationship was prevalent between performance and age and whether or not nontraditional students could perform well in the course. Likewise, the performance variable was compared to the computer literacy score to determine whether or not a relationship existed. The rationale for this pairing explained the degree of the relationship. The first variable examined was the computer literacy scores, which were measured by calculating the scores on each survey. Surveys were calculated in two phases. In the first phase, the researcher conducted hand calculations directly onto the survey for cross-referencing. In the second phase, the researcher transferred the calculations of both parts of the survey into a master spreadsheet with embedded calculation formulas for obtaining summations of all computer literacy scores: Part A, Part B, and combined totals. The second variable examined was age, which was given a specific consideration based on the distinction between traditional and nontraditional adult learners. Age was used as a comparative element in correlations with all variables, particularly with computer literacy and performance. In addition,

performance was measured using participants' midterm grades. The measurements determined whether or not nontraditional students performed well within the course.

Data Collection Irregularities

Data authenticity is paramount to this research study, and data irregularities were found in the course of collecting the data. All surveys were usable with the exception of one that was signed but the survey was incomplete; therefore, the sample was discarded from the study. A second data discrepancy was the missing midterm grades for 50 participants, which was out of the control of the researcher. Instead, the researcher used mean scores to analyze the performance variable as it related to midterm grades.

Qualitative Data Collection

This section discusses data collection for qualitative examination of participants' written survey responses. In connection with the convergent design, qualitative data was collected at the same time as quantitative data in a one-phase process. A demographic form found in Appendix B was attached to the Computer Literacy Scale (Sengpiel & Dittberner, 2008), and students were instructed to complete the demographic form and briefly respond to one open-ended question provided.

The Computer Literacy Scale (Sengpiel & Dittberner, 2008) found in Appendix A was used to determine levels of computer literacy skills as reported by participants to answer research questions related to how long they used a computer and how much ability they could demonstrate through identifying compute-related icons. It was important to use this scale to gauge the results of performance by nontraditional adult learners and traditional learners.

The purpose for the demographic form was to obtain information related to status in high school or GED, length of time beyond graduation, implementation of two closed-ended survey questions to obtain quantitative values related to training as a course supplement, and an open-ended question addressing attitudes about training as a course supplement in response to the values questions. The demographic form was necessary to fulfill the convergent design of the research methodology.

Procedure

The researcher read each of the responses from the open-ended question on the demographic form and transcribed each response verbatim into the master spreadsheet in Microsoft Excel. Each participant was assigned a number after the letter P, which represented the succeeding order and corresponding response. The series of numbers correlated with the total number of responses whether they were completed or left blank. After all responses were entered into the master spreadsheet, the researcher hand checked the spreadsheet against all physical surveys for accuracy. The researcher did not alter grammatical errors found in participants' responses. The completed numbered transcript was copied to a Microsoft Word file and imported into Nvivo qualitative research software. The researcher used Nvivo 10 for Mac to perform qualitative analyses. Nvivo for Mac was less robust than Nvivo for Windows 10, but it allowed the researcher to perform tasks related to coding, categorizing, establishing abstract hierarchies, and developing themes.

Analytical Methods

The researcher used inferential and descriptive statistics, both parametric and nonparametric, to identify correlations between variables used to determine levels of

computer literacy skills for all adult learners. The researcher used correlations between age, computer literacy score, and classroom performance. Descriptive statistics were used to determine frequency counts on closed-ended questions from the demographic form. Descriptive statistics were used to determine the following demographic variables: age, gender, level of education, number of years past high school or GED, number of years using a computer, number of hours per week using a computer.

Quantitative Research Questions

In order to answer research question 1, the researcher calculated both Part A and Part B of the Computer Literacy Scale (Sengpiel & Dittberner, 2008). The calculations were completed in two phases. In the first phase, the researcher manually tallied scores from parts A and B of the Computer Literacy Scale. Once the totals were obtained, researcher transferred the scores into a spreadsheet. In the second phases, the researcher created calculating formulas in the spreadsheet to sum the totals for accuracy. This double layer of checking provided additional accuracy. The researcher obtained a combined total score for analysis using descriptive statistics. The mean and standard deviation scores were represented in a table.

To address and answer research question 2, the researcher used data for variables age and computer literacy score. The researcher ran statistical tests on combined literacy score and age. Equal interval data were presumed, and Pearson's product moment correlation coefficient was selected for the researcher to analyze the data. Data were analyzed using IBM SPSS 21.0 software.

To address research questions 3 and 4, the researcher used interval and ordinal data where age and performance and computer literacy score and performance were

analyzed using Spearman rho correlation statistics test. The purpose for using this statistical test was to accommodate a correlation between the interval data and the performance grades, which were converted into numerical scores. This statistical test allowed researcher to determine that there was a relationship between age and performance.

Research question 5 contained a quantitative portion, and the researcher used descriptive analysis to determine the frequency of yes and no answers. This procedure contributed to researcher's knowledge of the level of value participants had with technology training as a course supplement.

Qualitative Research Question

Research question five also contained a qualitative component where the researcher asked participants to share attitudes related to technology training as a course supplement. The researcher transcribed and analyzed the survey responses of participants to interpret the data. The researcher's justification for answering the qualitative question was to determine, based on attitude, if training was wanted or needed for adult learners to succeed in developmental writing courses. In addition, collecting qualitative data was performed during the same time as collecting quantitative data.

Procedure for Analyzing Qualitative Data

The researcher systematically collected qualitative data for analysis by the following process. All responses from the demographic form were transcribed verbatim as accuracy is important during the transcription process (Gibbs, 2011). Each participant was assigned a sequential participant number for anonymity and ease of cross-referencing. A Microsoft Word file containing participants' number and narrative was

uploaded into Nvivo 10 for Mac. The file was identified as the general file to obtain emergent themes. However, four Microsoft Word files were created to capture participants' sequential number and narrative response for each variable category. The primary categories for analysis were age and narrative, computer literacy score and narrative, performance and narrative, and gender and narrative. Each category was uploaded separately into NVivo 10 for Mac software. By doing so, the researcher could perform hierarchal analysis to gain a deeper examination of the language within each category.

The researcher then coded the data for analysis. Gibbs (2011) asserted, "Coding is a way of indexing or categorizing the text in order to establish a framework of thematic ideas about it" (p. 38). Coding the data required a systematic approach where consistency of terms for codes, note taking and memo writing were employed, and compiling a master data sheet were all important steps for ensuring thorough analysis (Gibbs). Therefore, meticulous care was given to the data to enhance accuracy. Subsequently, a primary rationale for selecting this method of data collection was to amplify the dearth of information gleaned from the collected data. By employing a quantitative aspect to the research question, the researcher was able to learn the frequency of how often participants selected training or not and the times training was offered. The qualitative implementation of the research question deeply illuminated participants' perspectives on why they favored technology training or not.

Limitations

As with any research study of this magnitude, valuable insights are gained relevant to the literature in the discipline. This study was believed to provide

understanding about the relatedness of technology to academia; however, it also indicated limitations. Some methodological limitations resulted from the researcher being unable to access percentages for midterm grades to run statistical tests using only interval data. In addition, the survey had missing data, which impacted frequency counts when performing descriptive analyses. Further limitations resulted in the researcher not being unable to use midterm grade data for students who withdrew from the course prior to midterm. Twenty-eight percent of the participants out of 50 who withdrew were nontraditional adult learners. Moreover, the impact of the missing midterm data could not be determined using Pearson product moment correlations or Spearman rho correlations.

Although the primary focus of this study was on nontraditional adult learners, and with respect to research question 3, the outcome of participation yielded a higher percentage 70% (193) for traditional students. Further, the results of nontraditional adult learners 30% (82) represented an imbalance between the two age categories. Therefore, one explanation for this discrepancy was the narrowed focus of the study, particularly as it related to a specialized course—English developmental writing.

Other limitations were related to instrumentation regarding answering the qualitative component of research question five where responses would have been comprehensive by changing the language of the question. However, changes to the demographic form could not be made once the researcher obtained approval from the IRB at the site of the study. Finally, the researcher limitations occurred when distributing the surveys to participants. The researcher was constrained by a script that allowed minimal time to double-check to ensure that all answers were filled in the surveys. The researcher's pace for collecting all surveys prevented opportunities to verify data entry

for legibility within the classroom setting. Additionally, the researcher was limited to one location.

Summary of limitations

Overall, conducting studies over multiple site locations is needed to establish generalizability, particularly in the area of the age of nontraditional adult learners and their performance abilities. In addition, researchers should test nontraditional adult learners for their motivation to learn with or without technology background. Investigation of motivational behavior could be studied to further explain the digital divide through the use of relevant and established motivational scales.

Summary

In this chapter, the researcher provided a thorough explanation for the methodology, procedures, and analyses for answering and understanding research questions for this study. The researcher constructed a theoretical framework for the use of chosen methodology, along with a philosophical underpinning. Finally, the fourth chapter will elaborate on the results of the data and the findings, report conclusions to the findings, explain implications, and provide recommendations.

CHAPTER IV

FINDINGS AND CONCLUSIONS

Introduction

"Nontraditional students greatly benefitted from the use of technology when compared to traditional age students" (Cederholm, 2010, p. 92).

Adult learners are challenged with technology skills in an era when technology is pervasive in academia and beyond. In addition, they have had to overcome their apprehensions about returning to school for a higher education. At the core of their challenges was the evolution of the classroom environment. A result of research grounded in New Literacies paved the way for academicians to better understand and manage the conceptual changes of the classroom curriculum. Thus, a more enriched approach to New Literacy Studies is where this study takes shape. Specifically, the current study attempted to fill the gap in the literature related to understanding technological deficiencies among adult learners and to determine where there is a desire for adult learners to have supplemental training offered as part of curricula instruction.

The main purpose for this study was to explore relationships between computer knowledge and performance as they pertained to nontraditional adult learners in developmental writing courses. The results of this study enhanced the literature in the area of technological knowledge and adult learners. As such, the following research questions enabled the researcher to conduct the study.

1. What level of computer literacy exists with students enrolled in a developmental writing course?

2. What relationship, if any, exists between ages of students enrolled in a developmental writing course and computer literacy?

3. What relationship, if any, exists between computer literacy and classroom performance in a developmental writing course?

4. What relationship, if any, exists between age and classroom performance in a developmental writing course?

5. What value do adult learners have with technology as a supplement to developmental writing course and what are their attitudes about technology as a course supplement?

The researcher answered research questions 1-5 related to quantitative data. Because research question five was two-fold, the researcher answered the first part of research question five during the reporting of quantitative data.

This mixed methodology was carried out in one phase. The quantitative data focused on computer literacy (research question 1) and its relationship to age and classroom performance (research questions 2-5).

To answer research question 1, the researcher used descriptive statistics to analyze mean and standard deviations of computer literacy scores. Data were described in a table to reflect adult learners' scores.

To answer research question 2, the researcher analyzed variables age and computer literacy. The researcher ran three analyses: Part A, Part B, and combined totals. The combined total computer literacy score was used, and interval data were assumed for

both variables to determine if a significant correlation existed. The researcher analyzed the data using Pearson product moment correlation coefficient. The researcher used a significance level of $p < 0.05$. SPSS 21 software was used to analyze the data.

To answer research question 3, analysis of variables computer literacy and classroom performance was performed. Again, the combined total literacy score was used for analysis. Classroom performance letter grades were converted to ordinal data to conduct analysis and to determine if a significant correlation existed. The researcher used Spearman rho correlational coefficient to analyze the data. A level of $p < 0.05$ was used to test for significance. Data were analyzed using SPSS 21.0 software.

To answer research question 4, the researcher analyzed data collected using age and classroom performance. Again, classroom performance letter grades were converted to ordinal data to perform analysis. The researcher performed Spearman rho correlational coefficient using SPSS 21 software. A level of $p < 0.05$ was used to test for significance.

To answer research question 5, the researcher analyzed value as a measure for determining if nontraditional and traditional adult learners desired supplemental training whether it was during class or outside of class. The researcher ran frequency counts and used descriptive statistics to present the data.

The qualitative data were collected from the demographic form where participants gave brief written responses expressing their perceptions about technology as a course supplement from research question 5. The researcher reported general findings of qualitative data. Narrative responses were converged with quantitative constructs for analysis: computer literacy score, age, and performance. Specific categorical themes were identified from analysis of narratives.

This study explored adult learners in the context of understanding the digital divide between nontraditional and traditional learners. Chapter four reports results of the data collection and analyses, answers research questions, and provides discussion and implications of findings. Lastly, the researcher offered recommendations resulting from the investigation.

Findings

Quantitative

Research question 1. What level of computer literacy exists with students enrolled in a developmental writing course?

The first research question aimed to determine self-reported computer literacy knowledge and experience. A rationale provided the necessary clarification for electing to use the combined total for all analyses.

Rationale for acceptable scores. Combined scores on the literacy scale determined technological proficiency or deficiency. Each part of the scale was reviewed and evaluated to reflect independent proficiency levels. A proficiency level score was determined at 70% (42) or higher. Part A of the scale was based on a total of 33 points, and Part B was based on a total of 26 points. The combined score was based on a total of 59 points. Table 2 reflected varied scores.

Table 2

Acceptable and Average Proficiency Scores

	Acceptable Proficiency Scores	Average Proficiency Scores
Part A	24	18.67
Part B	19	21.71
Total CLS	42	40.33

Part A suggested participants had minimal hands-on experience using technology on task-related activities. Part B suggested that while students did not have a strong foundation practicing using technology, they were competent in recognizing technological symbols and terminology. Essentially, Part A fell below proficiency levels, and Part B demonstrated higher than average proficiency. As such, the obtained combined total computer literacy score was used for running all analyses in this study. The computer literacy means and standard deviations of adult learners were reported in Table 3.

Table 3

Adult Learners' Computer Literacy

	Adult Learners		
Sections of Scale	*N*	*M*	*(SD)*
Part A – Experience	275	18.67	(7.40)
Part B – Knowledge	276	21.71	(4.50)
Computer Literacy Score	276	40.33	(9.19)

Adult learners had limited years of experience using computers and devoted minimal hours per week to tasks related to technology. Table 4 exhibited the mean score for number of years and hours per week.

Table 4

Time Experience Using Computers

	N	*M*	*(SD)*
Number of Years	268	9.37	(4.87)
Hours Per Week	263	11.23	(11.16)

Research question 2. What relationship, if any, exists between ages of students enrolled in developmental writing and computer literacy?

Research question 2 enabled the researcher to determine whether a correlation existed between age of participants and computer literacy scores. All adult learners were included in the examination of age and computer literacy score.

A Pearson product moment correlation was performed to determine whether or not a relationship between age and computer literacy scores could be found. The findings showed that there was a statistically significant indirect relationship and as age (M=24.36, SD=8.92) increased, computer literacy (M=40.33, SD=9.19) decreased, $r(273) = -.348$, $p = .01$. Based on Cohen's guideline, the coefficient had a medium effect size. Table 5 describes the continuum of high and low scores in relationship to traditional and nontraditional adult learners.

Table 5

Adult Learners' High and Low Literacy Scores

	Scores						
	1-20	21-30	31-40	41-50	51-59	No. Participants	
Traditional Learners	1	18	53	92	29	193	(70%)
Nontraditional Learners	4	17	28	28	5	82	(30%)
Totals	5	35	81	120	34	275	(100%)

Research question 3. What relationship, if any, exists between computer literacy and classroom performance in a developmental writing course?

Research question 3 enabled the researcher to determine whether a correlation existed between computer literacy score and classroom performance. All adult learners were included in the examination of score and performance.

A Spearman rho analysis was performed to determine if a statistical significant relationship existed. The researcher found no statistically significant relationship between computer literacy (M=40.33, SD=9.19) and classroom performance (M=2.39, SD=1.17), $r_s(224) = -.018$, $p = .790$. Any relationship was considered due to chance. Table 6 contextualized literacy scores in relationship to classroom performance.

Table 6

Number of Performance Grades Based on Literacy Scores

Range of Literacy Scores	A	B	C	D	F	No. Participants	
1-20	2	3	0	0	0	5	(2%)
21-30	5	10	9	2	4	30	(13%)
31-40	13	17	21	5	7	63	(28%)
41-50	14	30	33	14	8	99	(44%)
51-59	9	7	9	2	2	29	(13%)
Totals	43	67	72	23	21	226	(100%)

Research question 4. What relationship, if any, exists between age and classroom performance in a developmental writing course?

Research question 4 enabled the researcher to determine whether a correlation existed between age and classroom performance. All adult learners were included in the examination of score and performance.

A Spearman rho analysis was performed and determined that a positive significant relationship was found wherein as age (M= 24.36, SD= 8.92) increased, classroom performance (M=2.39, SD=1.17) increased, $r_s(224)= .146$, $p < .05$. Table 7 illustrated the statistical significance of adult learners.

Table 7

Number of Performance Grades Based on Adult Learner Categories

	A	B	C	D	F	Total No. Participants	
Traditional	23	51	47	19	18	158	(70%)
Nontraditional	20	16	25	4	3	68	(30%)
Totals	43	67	72	23	21	226	(100%)

Note. Participants without midterm grades were excluded from this table.

Research question 5. What value do nontraditional adult learners have with technology as a supplement to developmental writing course and what are their attitudes about technology as a course supplement?

Research question 5 was designed as a mixed methods research question. The first part of question five was intended to examine the level of value nontraditional and traditional students had regarding supplemental training with technology. The results of the findings were identified in Table 8.

Table 8

Training During Class

	Frequency	Percentage
Yes - During Class	216	78.5%
No - Not During Class	44	16.0%
Total Number	260	

The findings showed that adult learners preferred supplemental training of technology during class. The remaining participants felt minimal in training as a course supplement as indicated by low frequency counts.

When participants were asked if they preferred training outside class, responses were relatively balanced. The responses showed mixed views. However, training outside of class was valued as preferred. Table 9 outlines preferential frequencies.

Table 9

Training Outside Class

	Frequency	Percentage
Yes - Outside Class	136	49.5%
No - Not Outside Class	117	42.5%
Total Number	253	

In relationship to training outside of class, adult learners were relatively evenly distributed. Both nontraditional and traditional learners, however, preferred training outside of class. It was important to note that 42.5% (117) of the adult learners were not in favor of training outside of class. Adult learners did not want to engage in training on their own time.

Qualitative

In relationship to the second part of research question 5, it was designed to explore attitudes about supplemental training during class or outside of class. For the purpose of this study, and to fulfill the requirements of convergent design (Creswell, 2015), the researcher reported general findings of the qualitative data. Subsequently, narrative examples were extracted from each thematic category based on constructs being

explored: computer literacy, age, and performance to provide a general depiction of the data. Examples explained relevance of computer literacy scores, age, and performance scores. The selected narrative examples appropriately aided in validating the qualitative data analyses as interpretive measures to support, confirm, or disconfirm quantitative findings.

Attitudes Based on Literacy

Participant responses regarding supplemental training were evaluated on the basis of high and low literacy scores. High scores were determined by a score of 42 and higher, and low scores were determined by a score of 41 and lower. The evaluation yielded general observations and specific sub-themes. For clarification, each record of participants' responses began with the letter *P* and a corresponding number referencing the narrative response. Next to the participants' number was the corresponding literacy score. Each response was translated verbatim.

Generally, the evaluation yielded 136 references to high scores and 140 references to low scores. Narratives associated with high scores showed participants were in favor of training 60% (80). Narratives associated with low scores showed participants agreed 62% (87) and expressed that training was important and needed. Subsequently, both groups shared in disinterest for supplemental training where 14% (19) of participants who scored high did not desire training. Participants who scored low disinterested were 15% (21). Moreover, specific characteristics of each group were further delineated.

With regard to high scores, several sub themes emerged: enhance personal knowledge, build skills, and societal norm. Subsequently, the terms enhancements and increase are used synonymously. Other extraneous terms surfaced throughout the

investigation. Therefore, to begin, participants expressed how they felt about wanting training to enhance their knowledge of technology. Table 10 describes participants wanting training to enhance knowledge.

Table 10

Desire to Enhance Knowledge

Participant	Score	Narrative
P4	54	The training will enhance my skills in computers and help learn the different softwares so that i know how to use them for class.
P46	48	I think if the supplement course was offered I wouldn't mind taking it not only to enhance my knowledge with computers, but also enrich myself to learn more things I possibly don't know. Doing so would not only keep me in the game of computers but it would also help me know what I am doing when working on a computer.
P177	42	Computer literacy is very interesting and I think having a course set aside would be good to help people advance their computer skills.

The examples provided demonstrated a range of high scores and showed that enhancing one's knowledge of technology extended beyond participants on a lower scale who would benefit more and then to extend to participants on a higher scale who already

possessed proficiency with technology. These example narratives were reflective of traditional learners. Table 11 references desire to increase knowledge.

Table 11

Desire to Increase Knowledge Sub-theme

Participant	Score	Narrative
P10	44	If the course were offered to increase my computer literacy i would take advantage of this because it will help me learn more about a computer. . .
P147	49	It will help increase your chances of passing the class.
P163	47	I think students can learn more better with online assignments and improve their computer skills.
P188	43	I would take advantage because I would like to see how much I would improve and learn something new.

Participants who scored high affirmed their desire to learn more about computers for the benefit of succeeding in their academic coursework. The findings also suggested even though participants scored high, they did not feel totally confident with their technological skills.

Attitudes about keeping up with societal norms was the third sub-theme identified within the category of high scores. Table 12 identified attitudes about societal norms.

Table 12

Attitudes about Keeping up with Societal Norms

Participant	Score	Narrative
P15	42	It's very important to have computer skills in today's society. Everything is now computerized or linked to the web in some aspect. Computers are helpful with giving and receiving information that is needed
P41	42	I like computers and technology is on a rise so its good to know computers.
P162	44	Computers are the future and everyone should be computer literate
P216	45	I believe the reason why we need computer materials is because our knowledge today will be more modern in the time the future is changing. In addition, we will have those skills in case we meet those requirements.

Participants viewed technology as relevant in the classroom, and those who scored high perceived that adequate technology skills extended beyond the classroom. Participants needed to know and apply technology pertinent to their lives.

Aside from reasons why participants with high scores felt the need for computer training supplement, alternative views were expressed. Participants who were not interested in the training supplement believed that lack of interest, time, and skill level

were major contributors to their points of view. Table 13 identified participants' lack of interest in training.

Table 13

Adult Learners' Lack of Interest in Training

Participant	Score	Narrative
P114	46	This course will stand in my way. . .
P258	49	I don't feel like I need the class. . .
P271	48	I'm just not interested

The next sub-theme mentioned by participants giving explanation for not wanting supplemental training was time. Table 14 identified limited time.

Table 14

Adult Learners' Limited Time

Participant	Score	Narrative
P99	47	No time.
P112	54	Full-time mother and full-time job
P228	44	Waist of time. . .

The final sub-theme mentioned by participants who scored high was skill level. Table 15 referenced participants' skill level.

Table 15

Adult Learners and Skill Level

Participant	Score	Narrative
P92	44	I think i'm pretty good with working with computers, so I don't think it will work for me.
P189	47	No, because I already know most of these things.
P257	47	Well, I am already certified in Word, PowerPoint, Excel,
P274	43	I seem to work better on my on . . . I would rather focus more on classwork than other stuff.

Based on the previous themes, the higher the score, the less desire they had for sacrificing their time or felt the need for additional computer training. Even though the majority of high scorers wanted additional training, several respondents gave relevant reasons why training was not feasible. In this instance, participants who scored high on the literacy scale would accept training.

Participants who scored low, 41 and below, responded with the following themes: building skills, gaining knowledge, and societal norms. In addition, several miscellaneous categories were important to note: hands-on experience, refresher, achieve goals, and significant use. Table 16 referenced low scores based on skills, knowledge, and societal norms.

Table 16

Adult Learners' Skills Based on Low Scores

Participant	Score	Narrative
P18	33	The reason I would like time to increase my computer literacy is because I rarely spend time on the computer, If I do my main focus is internet surfing on social networks. I am always on my phone. on Facebook or either playing games
P36	38	I would like to enhance my computer skills, I believe it would help me in the future
P39	25	I am computer illiterate but is reding to learn and be better at it. Its been a long time since I've been in school so everything is new to me. I am looking forward to this and any challenge.
P87	39	. . . I could use the extra help and get better. . .

Participants' responses demonstrated how they conceded to having a lack of computer skills, which was confirmed by their literacy scores. Participants were interested in gaining computer skills but did not necessarily connect their computer knowledge with academic instructional learning.

The next theme identified was gaining knowledge. Table 17 identified gaining knowledge based on low scores.

Table 17

Adult Leaners' Ability to Gain Knowledge Based on Low Scores

Participant	Score	Narrative
P23	38	. . . I feel left out sometimes because I don't know as much as I would like to know.
P51	24	I would participate because knowing how to use a computer that would just benefit me. . .
P190	33	Because I'm not really good at using computers yet. But every lil bit helps.
P193	33	I would take advantage of it because I know I do not know everything about computers.
P207	25	I noticed education requires a complete knowledge of techology to keep up. The class offered could provide opportunities and flexibility to all.

Participants held a positive attitude about gaining knowledge, and in some instances, knowledge was associated with meeting educational requirements. They also expressed an inadequacy with existing knowledge.

The final theme identified was connected to societal norms. Table 18 recognized the following responses about societal norms.

Table 18

Adult Learners' Connection to Societal Norms Based on Low Scores

Participant	Score	Narrative
P13	40	Because nowadays mostly everything is on computers or internet so I would want to know what I am doing so yes I would take the training.
P23	38	I want to become more computer literate because its the way of the world right now. . .
P51	24	. . . technology is important for anyone now these days.
P87	39	. . . Because im going to need those skills in the future.

Participants considered the long-term impact of technological inclusion and wanted to be prepared for success. In the same way as high scores, participants who scored lower on the literacy scale held the attitude that keeping up with society was very critical to gaining success, whether it was in a classroom setting or in society, as a whole.

Similar to participants who scored high on the literacy scale, participants who scored low also disagreed with supplemental training. Thus, several themes emerged giving their reasons: pre-existing knowledge and valuing time. Table 19 identified themes for disagreement with training.

Table 19

Pre-existing Knowledge

Participant	Score	Narrative
P54	24	I don't need a lot of help on computers
P139	33	Because I think I know enough about techongly already and I don't need the training.
P206	38	I have registered for a computer class and currently enrolled.

These responses demonstrated a small proportion of the population; nonetheless, they represented viewpoints held by participants who scored below proficiency levels with technology.

Further investigation revealed the level of value that adult learners demonstrated with regard to time. Table 20 provided examples of reasons why adult learners would not participate in a supplemental training program.

Table 20

Adult Learners Value Their Time

Participant	Score	Narrative
P5	30	I really would like to stay focused on my school work and do the computer on the side.
P6	21	I need to make time for another class or training.
P26	41	I have so much going on already, I'd rather do it on my freetime away from school.
P69	27	. . . Im not interested.
P135	33	I would not participate outside of class because it will interfere with my job.
P173	40	The reasons for my answers is because I'm not interested in increasing my skills on computers. I wouldn't mind but I'm just not interested.

Again, the time factor was a critical concern for explaining the disinterest of participants who scored low. These participants gravitated toward other priorities in their daily lives.

Attitudes Based on Age

Based on age, general responses from nontraditional adult learners and traditional learners illustrated varied perspectives. Nontraditional adult learners reported a familiarity with technology as it related to their academic programs or professional needs; however, a proportion of nontraditional adult learners expressed value in receiving supplemental training. On the other hand, traditional adult learners reported a desire for

supplemental training, and common terms were used interchangeably: (a) improve, (b) enhance, (c) help, (d) better, (e) further educate, (f) increase knowledge, (g) learn, (h) benefit, (i) take advantage, and (j) advance.

Nontraditional adult learners.

Age was paired with corresponding narratives as a construct for investigation. In an attempt to avoid duplication of narrative examples during the merged analyses, the researcher provided a column for participants' computer score. Moreover, emergent themes by nontraditional adult learners yielded computer skills and value. Thus, Table 21 expressed computer skills.

Table 21

Nontraditional Learners Correlated with Computer Skills

Participant	Age	Score	Narrative
P19	56	28	I would like to attend a course to increase my computer literacy I do not have much knowledge about computers.
P27	28	53	I feel like I already have a lot of computer skills, but if offered while in class I can always learn what I don't know or share what I do know.
P30	28	42	Yes I would love to learn more about computers I hardly know enough and busy day has to be in same time frame as class
P32	28	29	Yes, I would like to take classes on computers. Im a little rusty on computers and since it's essential in college. it would be a good idea to provide in class and out of class workshops on computers.

Nontraditional adult learners feared not being able to keep up with technology and felt the need to obtain training. Table 22 related to value based on time.

Table 22

Nontraditional Adult Learners' Value Based on Time

Participant	Age	Score	Narrative Response
P60	25	34	I would be unable to attend course outside of class time for y personal issues and also personal life.
P95	25	46	If it offered during in-class, yes I would take advantage of the time given to us. But if it was offered outside of class I wouldn't due to being I rather spend my time doing on other things.
P184	27	33	I am a mother of four children and I work in the evenings. If it's offered during school, I will attend.

As evidenced by the narrative responses, nontraditional adult learners were willing to obtain training, but time needed to be at their discretion. Thus, their willingness was predicated on supplemental training being offered during class.

The following responses related nontraditional participants' value based on societal norms, which are found in Table 23.

Table 23

Nontraditional Adult Learner and Value Based on Societal Norms

Participant	Age	Score	Narrative Response
P13	34	40	Because nowadays mostly everything is on computers or internet so I would want to know what I am doing so yes I would take the training.
P42	25	32	If the class was offered I would gladly participate I have some computer knowledge but could benefit from learning more especially the way technology is thriving.
P146	29	51	I think that offering computer classes is a great idea because in this day of age almost everything requires you to use computers email, bank, pay bills, work, etc.

In reference to the age construct, nontraditional adult learners held a positive value related to learning technology to keep up with societal norms. They expressed an eagerness to become proficient in the use of computers.

Aside from the primary themes identified from nontraditional adult learners, classroom support emerged as a sub theme. Table 24 provided examples of classroom support.

Table 24

Nontraditional Adult Learners and Classroom Support

Participant	Age	Score	Narrative Response
P2	45	33	It would be beneficial while in class to me due to having the hands on experience with the instructor while in class.
P196	40	55	If the course was offered during class then if a question would arise pertaining to the assignment the instructure can assist rather than waiting for the next day.
P235	40	36	I would have loved some training in-class on how to sigh into Blackboard and help with assignments for mymathlab.
P243	33	47	It would be beneficial to be educated how to use certain tools that may be needed for assignments that relates to the use of computers.

Nontraditional adult learners were keenly concerned about supplemental support in the classroom. They recognized the integration of technology into the curriculum as nontraditional and something they needed to be familiar with in order to accomplish learning tasks. Thus, nontraditional adult learners understood the need for technology training to be successful in their coursework.

Traditional Adult Learners.

With respect to traditional students, participants reported that preference for supplemental training was during class time. The emergent themes related to time, knowledge, and obligations. Table 25 provided examples related to time.

Table 25

Traditional Adult Learners and Training During Class as Related to Time

Participant	Age	Score	Narrative Response
P126	18	43	I choose yes to part A because I feel like it would be helpful I choose no for part B because I already have a busy schedule.
P142	22	41	It would be better if it were during class because it would be less time consuming.
P186	17	35	I would only have time to work in class on computer courses because of my schedule out side of class.

Traditional learners desired training during class. The previous excerpts were captured from participants who graduated up to four years beyond high school. Table 26 represented examples related to knowledge.

Table 26

Traditional Adult Learners and Training Based on Knowledge

Participant	Age	Score	Narrative Response
P48	19	37	I would take it if is offered during class because I can inprove on my computer skills.
P86	18	51	It is better for this course to be offer in class, because I'll learn more in class than out of class
P267	18	52	I would want it during class because it would give me better understanding with asking questions instead of rushing trying to do something after class.

Traditional adult learners valued the knowledge they gained from training but were not necessarily willing to sacrifice their time to that end. Examples related to obligation are identified in Table 27.

Table 27

Traditional Adult Learners and Obligations

Participant	Age	Score	Narrative Response
P7	22	42	I think it would be better during the time already set aside for the course because some people might have other priorities to do during the day. Also people would take advantage of it, because it's in class.
P93	19	43	If this course was offered during class than most likely I will do it as opposed to after school because I might not feel like taking that extra class.
P105	22	46	If its offered during school time (in class) I would take it. I wouldn't do it outside of class time, because I work.
P107	19	38	Yes, to in class because it would be apart of my grade. No, because I have a job outside of class
P208	19	42	. . . Also I would take the course in-class because I would have a better chance of retaining the information, plus I would feel obligated.
P255	19	50	Our teacher already gives us enough work, and we have other classes to attend, so during class will be best.

Other substantial reasons for traditional adult learners' unwillingness to sacrifice their time outside of class for supplemental training stemmed from obligations such as children, work, and course load.

The use of interchangeable terms in Table 28 (see Appendix C) made up a significant portion of responses detailing the attitudes of traditional adult learners of which connoted a desire for training. Again, there were responses where a lack of interest existed, but the majority of the responses leaned toward supplement training.

Attitudes Based on Performance

Participants' midterm grade performance was evaluated based on narrative responses from the demographic form. Midterm letter grades were converted to numerical scores wherein A, B, C, D, and F were respectively equal to 4, 3, 2, 1, and 0. Emergent themes from the responses included: intrinsic and extrinsic values for supplemental technology training. Each value determined what participants felt were meaningful reasons for the training. In some cases, participants reported negative values.

Across the board, there were commonalities with having responsibilities outside of class, which participants delineated. Specific to individual midterm grade categories, participants reported work, other responsibilities, and disinterest in another class as reasons for desiring training during class. The following examples in Table 29 illustrated participants' views.

Table 29

Views Based on Performance

Participant	Midterm	Age	Score	Narrative
P22	4	35	18	I need the course time while in class it fit my schedule, no outside time have to pick my kids up from school.
P66	2	21	55	A) I rather do it during school hours and times besides on outside class time because I will lose focus and not want to do it with other things involved in my life.
P93	3	19	43	If this course was offered during class than most likely I will do it as opposed to after school because I might not feel like taking that extra class.
P105	1	22	46	If its offered during schooltime (in class) I would take it. I wouldn't do it outside of class time, because I work.
P241	0	18	57	I would rather learn during my class time then to learn outside of class which would take alot of my day.

Traditional adult learners who did not perform at a passing level recognized the value of training but only as a part of the classroom structure. Perceptions about supplemental training varied based on the range of performance grades. The higher the

performance grade, the more positive the perception of training was expressed. Participants who performed low did not feel confident with technology skills but also perceived supplemental training as important.

Table 30 illustrated categorical themes related to performance or midterm letter grades.

Table 30

Performance Scores and Meaning of Narrative Responses

Performance	
A	Improving computer skills
	Common to everyday life and job market
	Another tool for learning
B	The way of the world
	Computer literacy
	Helpful
C	Need the help
	Want to learn more
	Good for future
D	Better understanding
	Hands on experience
F	No computer literacy skills
	Need help

Based on the categorical themes, the higher the performance grades, the more willing participants were to improve computer skills. Also, themes revealed that the lower the performance grade, the less technology skills existed.

With respect to attitudes based on performance, training during class was important to nontraditional and traditional adult learners even though nontraditional students performed better. Thus, the next section will discussed conclusions drawn from the analysis of data to further explain the findings in conjunction with the research questions. The researcher used the three constructs for analyses.

Conclusions

In this section of the study, the researcher merged quantitative and qualitative data using constructs and themes from the general analysis in order to provide an insightful account of participants' computer competencies, values, and attitudes (Creswell, 2015). The researcher reflected upon each research question in successive order and discussed--by comparisons--the richness of the combined data from the perspectives of score, age, and performance.

Research Question 1

1. What level of computer literacy exists with students enrolled in a developmental writing course?

Based on computer literacy scores for all adult participants, the quantitative results showed that traditional students scored higher than nontraditional students. When comparing the scores with the corresponding narratives, the researcher found traditional students scoring slightly higher who did not want supplemental training based on time and skill informed the researcher to look into providing potential alternatives for these

students. It also informed the degree to which a technology training program could be successful.

Moreover, participants who scored low on the literacy scale demonstrated how integrative technology in the classroom curriculum was beneficial. If students were required to increase their technology use, it could precipitate a stronger desire to learn. However, if students were minimally exposed to technology, then the implication was a lower desire to obtain training. With regard to time, consideration of alternative offerings would be necessary in order to include this population of participants in the training supplement.

The researcher reported that participants preferred training during class, but training outside of class time illustrated split views. Traditional learners whose scores were higher wanted training to enhance their knowledge of technology and perceived training as a means for improving academic coursework. These attitudes extended to keeping up with societal norms. In as much as high scoring participants felt training was good, some objected to training on the basis of time commitments and existing skill level. On the other hand, participants who scored low identified building skills, gaining knowledge, and societal norms to be important and warranted an opportunity for training.

2. What relationship, if any, exists between ages of students enrolled in a developmental writing course and computer literacy?

Ages of students and computer literacy had a significant indirect relationship where nontraditional students scored lower than traditional students. When comparing the narrative responses to findings on attitudes of adult learners for supplemental training, one finding was the level of commitment students would give towards supplemental

training. This was an important finding on the grounds that a mandatory training supplement would be impeded by participants' will to adhere to his or her priorities and external responsibilities. In addition, attitudes based on age were varied. Both nontraditional and traditional adult learners acknowledged a desire for supplemental training. Time was noted as a key factor for agreeing to receive supplemental training. Moreover, the general qualitative analysis on age suggested that nontraditional adult learners were anxious about their confidence levels using technology. It also demonstrated urgency and desire to learn and improve their skills. These findings confirmed that technology was relevant to nontraditional adult learners. It also confirmed that the potential to improve technology skills required buy-in from participants to support the changing times in society and in the classroom learning experience.

Another important finding of this study was how traditional students valued their time outside of school obligations. It further suggested a lack of willingness to participate in developing their technological skills relevant to academic studies on their time, which meant that a feasible time would be during class. Therefore, consideration for appropriate scheduling needs to occur to encourage this population to participate in a training supplement.

Finally, the findings on attitudes about supplemental training based on age were nuanced through the process of merging the data analysis and revealed that traditional adult learners felt stress learning new technology and reported weaker computer skills. Thus, analyzing general themes were incapable of garnering the same results. However, this finding does not confirm the results of research question 2 because traditional adult learners scored higher than nontraditional adult learners. In addition, the data indicated

that students under 25 years old expressed feeling less competent with technology. Conversely, nontraditional adult learners had a desire to learn more, build confidence, and understand the technological age. They reported being amenable towards learning the technology, which suggested a willingness to close the digital gap. This finding, however, does confirm research question 2 in that it explained the connection between low scoring adult learners and seeking to gain technological skills and that a relationship based on attitudes existed.

3. What relationship, if any, exists between computer literacy and classroom performance in a developmental writing course?

The results from research question 3 indicated no statistical significant relationship was found. However, compared to qualitative findings on attitudes of performance from the general analysis, the quantitative data confirmed participants' narrative responses, which supported supplemental technology training as necessary for course success. Adult learners who earned an A or B recognized the benefits of supplemental technology training. However, the qualitative findings disconfirmed supporting a relationship between how well students performed and their obtained score. Learners, who performed on average or below average, while they supported supplemental computer training, also expressed their skill deficiencies. A partial explanation to this phenomenon could be due to their expressed lack of knowledge, dislike for computers, or lack of interest, which may have played a role in the disconfirming results.

4. What relationship, if any, exists between age and classroom performance in a developmental writing course?

A statistically significant relationship was found between nontraditional adult learners and performance. The quantitative findings contradicted the performance of nontraditional adult learners. The results were interpreted to mean that nontraditional adult learners performed better than traditional adult learners even though nontraditional adult learners had lower literacy scores. DiBiase and Kidwai (2010) supported these findings with their study on nontraditional students performing better than traditional students.

A closer examination of age and performance of nontraditional adult learners revealed that these learners were highly motivated and demonstrated an ability to perform regardless to technological deficiencies. The concept of motivations was supported by researchers who explained how nontraditional adult learners took into consideration more than the achievement of a degree but other factors pertaining to their well-being in life (Dayton, 2005; Jamieson, 2012). Unlike Daiek et al. (2012) who disagreed that motivation was apparent in nontraditional adult learners, this study disputed their claims and supported the notion that motivation was a contributor to their performance. Further, Enoch and Soker (2006) believed that older students were disinterested in new technologies; however, this study disproved their beliefs and demonstrated that nontraditional adult learners initially began their journeys with consternation about their technology skills but gradually became willing to improve. Additionally, nontraditional adult learners' attitudes about supplemental training remained the same with regards to it being a necessary part of their education.

5. What value do adult learners have with technology as a supplement to developmental writing course and what are their attitudes about technology as a course supplement?

Research question 5 is a mixed methods question comprised of two parts. The first part of the question addressed value, and the second part of the question addressed attitudes. To that end, the quantitative results determine a high frequency count in favor of supplemental training during class. Based on the general analysis of responses according to age, nontraditional adult learners were interested in training as long as they controlled time. In regards to the theme of societal norms, the qualitative analysis was confirmed. Nontraditional adult learners believed computer skills and training were relevant in modern times. However, the mixed responses related to outside of class training indicated an uncertainty about the value of training on their time.

The researcher analyzed quantitative results with qualitative narratives and demonstrated that nontraditional and traditional adult learners wanted supplemental technology training during class time. The study sought to clarify the desires of nontraditional adult learners, and it was discovered that traditional adult learners shared the same desire for supplemental training within the classroom. Helsper and Eynon (2010) recognized the reality of "digital natives" in much the same way this study confirmed (p. 506). Ironically, these digital natives' or traditional adult learners' attitudes suggested a need for more technology training. The researcher captured the importance of developing technology skills to be successful in academic programs when students begin learning to write at the developmental level in college environments. The narrative data suggested a history of nontraditional learners fearing returning to school on the basis of

not feeling adequately prepared for the academic learning experience. These learners also feared being technologically deficient; as a result, returning to school to achieve a higher degree was beyond their reach. However, employment circumstances and the increased presence of technology necessitated deliberate action, which forced nontraditional learners to face their fears and return to college to gain better employment opportunities in some cases, and in other cases to sustain employment.

In this study, the researcher examined nontraditional and traditional adult learners through the lenses of technology and developmental writing to understand relationships with age, computer literacy skills, and course performance. In addition, the researcher explored how learners valued technology training as a course supplement, as well as their attitudes about technology training as a course supplement. The researcher learned that while computer literacy was an important factor in this study, age was critical toward understanding relationships based on significant findings in the quantitative results. This study confirmed what Karsten and Roth (1998) claimed in that literacy evaluations of nontraditional adult learners necessitated technology training.

Also relevant to this study was Liu et al. (2004) assertion that increased technology experience improved technological skills. This assertion coincided with the findings in this study on the basis of participants' desire for supplemental training. Shuster and Pearl (2011) confirmed similar findings with regard to traditional learners scoring higher on computer literacy than nontraditional learners; however, their findings were disconfirmed in this study because nontraditional adult learners' literacy scores did not determine college success.

While this study was unable to directly support higher literacy scores were equivalent to better course performance, it did, however, show that nontraditional adult learners surpassed their fears and inadequacies; thus being successful in the course encouraged retention. Moreover, the narrative data suggested that nontraditional adult learners perceived themselves as being outside societal norms with regard to technological skills, but they felt that more practice would give them confidence to feel like they were not being left behind. It was a motivating factor in the continuation of the course.

If the goal was to support student success in developmental writing courses, and technology training was one avenue for providing that support, then it was reasonable to surmise that this study showed the value of learning technology, which Thiele et al. (2014) concurred. Further, adult learners' expressed attitudes in favor of a training supplement were congruent with Liu et al. (2004) where higher computer achievement scores were the byproduct of a desire to invest in learning technology. Subsequently, nontraditional and traditional adult learners valued the idea of technology training during class instruction in much the same way as Labbo et al. (2010) emphasized the relevance of the technological integration. Their values hinged upon the reality that technology had formed permanency in the curriculum. If so, then training provided as a course supplement could, in fact, benefit nontraditional adult learners.

Another relevant component to this study was the New Literacies theoretical framework. While Bailey (2009) was able to determine through case study how new literacies supported learning, this study was unable to make the connection that technology was equated to learning. In fact, this study focused on exposure to technology

rather than experimenting with task-based technology. Further, through the efforts of researchers and New Literacies Studies, incorporation of technology into the curriculum became a common practice. As such, the principles of the theory were applicable to the inclusion of Blackboard®, PowerPoint®, and other technological platforms that modern-day students experience in curriculum and beyond. With deictic technology, supplemental training remained relevant. Additionally, critical literacies engaged adult learners to examine and explore technologies and eventually matriculate to higher skills. The potential to utilize technology on a deeper level makes training a necessity starting at the developmental level – particularly in writing – and progressing forward. Thus, critical literacies suggested an ability to grow intellectually with technology.

Implications and Recommendations

Given the implications of this study, administrators have an opportunity to implement supportive policies into the curriculum to aid nontraditional adult learners within the developmental writing course. Traditionally, students are expected to fulfill a stand-alone computer course, which they may not be prepared to take at the developmental writing level, but the findings of this study implicated that offering supplemental computer training within the course and providing technology-safe environments may attract nontraditional adults who are willing to try to challenge themselves to improve their skills. Therefore, several other implications and recommendations were noted in this study.

In order to improve student success in developmental writing courses, administrators could integrate curricular policies that would impact the physical nature of the classroom and the number of credit hours for the developmental writing courses.

Lewis and Chandler-Olcott (2012) supported technological integration into the curriculum, as they believed that there was an inherent value in combining the two. Ratliff (2009) supported creating environments conducive to helping adult learners succeed with technology. As such, offering a one-credit hour lab and electronic tutorials to be used at the students' discretion through Blackboard® were appropriate strategies garnered from this study. Further, Landry et al. (2006) supported this implication based on the belief that if students could identify the relevancy of technology, they would be inclined to apply it.

Other implications for additional improvements included developing training applications (apps) for electronic devices, given the proliferation "deictic" technologies. Application devices on cellphones and tablets lend themselves to the convenience of downloading training in connection with the learning institution to foster increased exposure and experience. Based on the findings of this study, the average adult learner devoted approximately 11 hours per week using computers. If they could access tutorial opportunities from their personal devices more frequently, there is potential gain with the added experience using technology.

Another implication of this study was the creation and development of the Adult Technology Learning Center (ADLC). The training center would serve as a conduit for offering periodic writing and technology clinics for all adult learners but particularly for the benefit of nontraditional adult learners at the beginning of a developmental writing course. As a safe haven, nontraditional adult learners could building confidence with newer technologies and bridge the technology with writing. Further, the role of ADLC would provide training workshops for newly admitted students. Nontraditional adult

learners would be required to take a technology enrichment learning class, which could be offered as a one-credit hour class. Because participants in this study felt obligated to take required classes, consideration would be given to a mandatory one-credit hour class to meet their unique needs. Similarly, Jacko et al. (2004) asserted that adults learned technology differently from traditional students. Thus, the need for technology clinics and mandatory workshops could provide an advantage with using technology before enrolling into the developmental writing course. Thus, recommendations for future research were warranted. Therefore, the researcher offered strategic recommendations to aid in the continued success of returning students in developmental writing courses, especially because they were unique learners, and their story was a phenomenon.

The phenomenon found in this study related to nontraditional adult learners and their abilities to surpass traditional students in their course performance even though their computer literacy scores were lower. In an effort to better understand this phenomenon, the researcher recommends exploring the use of motivational scales for nontraditional students to determine whether motivation had an impact on their ability to perform better within a study. Likewise, Datyon (2005) determined that adult learners had specific reasons for returning to college, which could substantiate cause for studying motivational factors. Additionally, future studies on nontraditional adults and technology in developmental writing courses could explore the use of testing technology skills with related technology tasks. In this way, a researcher would be able to gauge pre and posttest technology skills to determine if a direct correlation between literacy scores and performance exists.

Further, testing confidence levels after mandatory exposure to technology through technological confidence scales could be relevant to understanding baseline knowledge prior to enrolling into a developmental writing course. In addition, researchers could test to determine if a one-credit hour lab were feasible and effective. In conjunction with the one-credit hour lab, researchers could explore *perceptions* of educators related to the benefits of the lab experience, as well as *attitudes* related to developing the lab experience.

In addressing the categorical disparity between traditional and nontraditional adult learners in developmental writing, future researchers would be advised to broaden the scope of adult learners using technology to include nontraditional students within the institution without discrimination. However, by investigating nontraditional students on a broader scale, future researchers should be prepared to refocus the purpose of the study. Thus, these recommendations give future researchers knowledge beyond the scope of this study.

Ultimately, this research study began with an open perspective on the growing population of nontraditional adult learners finding themselves returning back to school after many years of being in the workforce or simply wanting to complete the degree or certificate they once started. The influx of nontraditional adult learners in community colleges raised concerns about their preparedness with writing proficiencies and technological deficiencies. Therefore, the nature of this study was grounded in these two concerns.

Moreover, past researchers identified similar problems where nontraditional adult learners struggled with technological deficiencies but were expected to perform in much

the same way as traditional adult learners. Researchers also revealed distinctions between nontraditional adult learners and traditional adult learners (Jacko, et al, 2004; Jinkens, 2009; Wooten, 1998). Other distinctions were revealed with developmental learners and writing (Koch et al., 2012; Spellman, 2007) and writing and technology (Landry et al, 2006; Ratliff, 2009). Their insights gave rise to understanding the digital divide between the two types of learners. Importantly, New Literacies Theory and Studies provided a solid framework and backdrop for concretizing literacies beyond the former definitions associated with reading, and the growing literature on new literacies plants this study at the heart of building a case for reinvestigating technology in the writing curriculum.

Also at the heart of this study was the particular research methodology, which created a dynamic approach that explored insights about adult learners' capabilities and desires to improve their technological deficiencies. The analysis of narrative data revealed deeper insights that confirmed result in some cases and disconfirmed results in other cases. Overall, conducting a mixed methodology yielded a foundation for promoting policy change within developmental writing curricula.

Outcomes of this study were useful in understanding how technology was different for nontraditional students and their counterparts, traditional students. By analyzing the outcomes, the researcher gained a perspective on where both types of students connected in relationship to desiring technology training. At the same time, the researcher also gained insight into the degree to which a digital divide existed between nontraditional adult learners and traditional learners. These insights aided toward exploring pedagogical practices that included technology in an effort to strengthen

computer skills and potentially close the gap because nontraditional adult learners were willing to commit to supplemental technology training.

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Appendix A

Computer Literacy Scale

#

HUMBOLDT-UNIVERSITÄT ZU BERLIN
MATHEMATISCH-NATURWISSENSCHAFTLICHE FAKULTÄT II
ENGINEERING PSYCHOLOGY / COGNITIVE ERGONOMICS

CLS

The purpose of this questionnaire is to ask about your experience with computers. It begins with general questions about your use of computers (part A) and continues with a task of assigning meanings to computer-related symbols and terms (part B). It will take about 10 minutes to complete. Please read the instructions carefully. It is very important that you answer all questions. Thank you!

Part A: Experience with computers

1. For how many years have you been using computers? _____

   If you have never used a computer, please skip to part B!

2. How many hours per week do you typically use a computer? _____

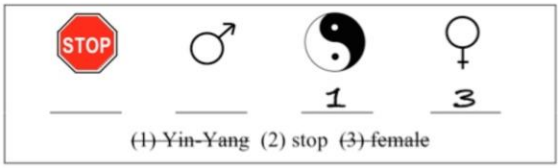
3. How often do you use a computer for the following tasks?

	never	seldom	sometimes	often
Word Processing	❒	❒	❒	❒
Spreadsheet Analysis	❒	❒	❒	❒
Presentations	❒	❒	❒	❒
Image Editing	❒	❒	❒	❒
Computer Games	❒	❒	❒	❒
Programming	❒	❒	❒	❒
E-mail	❒	❒	❒	❒
Internet-Surfing	❒	❒	❒	❒
Systematic information seeking	❒	❒	❒	❒
Online shopping	❒	❒	❒	❒
Online banking	❒	❒	❒	❒

Part B: Assignment of symbols and terms

On the next page, you will see different symbols that are relevant to the use of electronic equipment and computers. Please assign them to their respective meanings by writing the appropriate number under each symbol as illustrated by this example using common symbols:

Please keep in mind that there is not a matching meaning for every symbol so that, in each box, there will be one symbol left over. To make this task easier, cross out the meanings after you have assigned them to their respective symbols.



It is only natural that you will not know all the answers. Please try to assign all meanings to a symbol nonetheless. If you are not sure, just guess which symbol is most likely to fit. If you have further questions, please do not hesitate to ask. If not, you may begin now.

(1) fast-forward (2) save (3) attachment (4) delete
(5) play / start (6) eject (7) switch on / off

(1) backspace (2) escape (3) OK / confirm (4) tabulator
(5) help (6) delete (7) undo

(1) tabs (2) button (3) resize object (4) scrollbar
(5) background activity / please wait (6) check boxes (7) cursor (standard)

Please assign the following terms to their respective meanings in the same way.

File	Cancel	Tooltip	Browser	Hyperlink	Icon
____	____	____	____	____	____

(1) A computer program used to view websites on the World Wide Web (www)
(2) A short explanatory text that can be shown if the mouse remains on an icon for some time
(3) Data that has been saved as a self-contained document under a shared name
(4) Cross reference in hypertext documents that points to another page or place
(5) Abort the current operation

Thank you for completing the questionnaire!

Lastly, please indicate your age and gender. Thank you!

Age ____

Gender ❒ female ❒ male

ALISA FORSCHUNGSPROJEKT

Appendix B

Demographic Form

Demographic Form

Number of Years Past High School/G.E.D. Program –Circle School Program

○ One year or less ○ 2-5 years ○ 6-10 years

○ 11-15 ○ 16-20 years ○ over 20 years

Please answer the following questions and provide comments:

1. If a supplement to the course were offered to increase your computer literacy, would you take advantage of this if:

a. it were offered during the time already set aside for the course (i.e., in-class)

○ Yes ○No

b. it were offered outside of class time (i.e., would require students to participate outside of class time)

○ Yes ○No

Based on your responses to the two questions above, please provide additional information about the reason for your answers.

_____

_____

_____

_____

Student ID.

#_____

Email:_____

Appendix C

Common Interchangeable Terms Related to Value of Training

Table 28

Common Interchangeable Terms Related to Value of Training

	Participant	Age	Narrative
Improve	P73	19	. . . I want to improve on my literacy with my computer skills. . .
	P163	22	. . . and improve their computer skills.
Enhance	P4	21	The training will enhance my skills in computers...
Help	P4	21	. . . and help learn the different softwares so that I know how to us them for class.
	P25	21	I picked yes because it can help me learn more about computer help me understand how to use one better.
	P75	22	I would say that it would help you more.
	P77	20	I would like to take it during class hours because it will help.
	P87	21	The reason for my two answers above are because I could use the extra help and get better.

Participant	Age	Narrative
P89	18	This would help me get around to using new sources of the internet.
P106	18	If it could help me better I would try it. . .
P137	21	Yes because I want as much help as I can get to be a great man.
P147	18	Well, It will help increase your chances of passing the class.
P198	24	The reason I pick yes is because if it's gone help me increase my computer literacy don't matter if its during time or outside I will take advantage of it because I need it and it will help me later on down the line. . .
P218	18	I would take both because I really need the help.
P227	19	I gave this answer because it would help become more computer savy.
P261	20	I selected the answer yes because of students who need to get extra help could get it right then and there.

	Participant	Age	Narrative
Better	P163	22	I think students can learn more better with online assignments. . .
	P202	24	Maybe because it would give the students a better understanding on the martials and they also could be more active.
Further Educate	P11	18	Because I would like my computer literacy to increase in the future.
	P76	20	I choose yes for bouth questions because It would futher our education on computers.
	P162	23	Computers are the future and everyone should be computer literate.
Increase Knowledge	P11	18	Because I would like my computer literacy to increase in the future.
	P18	20	The reason I would like time to increase my computer literacy is because I rarely spend time on the computer, If I do my main focus is internet surfing on social networks. I am always on my phone. On Facebook or either playing games

	Participant	Age	Narrative
	P56	20	I would take the course because you can never have to many computer skills and its to increase my literacy. . .
Learn	P80	19	The reason I answered these two questions because I want to learn more about technology computers.
	P121	21	I would learn more about computers.
	P128	19	I am just eager to learn more about computers. I am free to learn if there is a program.
	P134	20	I would like to learn more about computers for the reason that technology is everywhere and now everything is between computers and many students would like the idea of learning anything that can be done in a computer.
	P163	22	I think students can learn more better with online assignments.

	Participant	Age	Narrative
Advanced Technology	P177	23	Computer literacy is very interesting and I think having a course set aside would be good to help people advance their computer skills.
	P233	21	I think both would help young people advance in the technology world.