Vocational nursing programs in Appalachia: The effects of technology efficacy across traditional and non-traditional post-secondary students

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Kelly S. Darney

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Kelly S. Darney

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Signature: ____

Kelly S. Darney, student Date

Approvals:

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Dr. Karen Larwin, PhD, Dissertation Advisor Date

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Dr. Salvatore A. Sanders, Committee Member Date

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Dr. Patrick Spearman, Committee Member Date

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Dr. Steven Toepfer, Committee Member Date

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Dr. Salvatore A. Sanders, Dean of Graduate Studies Date

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"Leadership and learning are indispensable to each other."

John F. Kennedy

Abstract

This study examines the effects of technology on the success of traditional and non-traditional, post-secondary students in nursing programs in an Appalachian vocational setting. A survey was developed for use in Columbiana County, Ohio, a designated Appalachian area at a county vocational school with several programs in the nursing field. The survey was used to measure technology self-efficacy, perceptions about the impact of technology on the educational experience, and preparation for future employment.

The survey was completed by 205 participants, both traditional and non-traditional in age for comparison. Findings from this study indicate that non-traditional students face more barriers to learning with the use of technology than the traditional set of students. With an ever-changing economy and job market, non-traditional students will continue to be a group that faces different barriers and challenges than others in different age brackets.

Chapter 1

In contemporary post-secondary education, adult students have a variety of options if they want to earn a degree or an occupational certificate. Today's educational marketplace includes options such as online courses or traditionally delivered courses at community colleges and universities, proprietary schools' programming, and career-technical institutes. The options available in any geographic area are contingent upon what the job market in the area demands. In Columbiana County, Ohio, there is a need for many medical based programs. When looking at the top fifteen employers for the area, five of the fifteen are large health care organizations with many branches in the community which creates the most job opportunities in Columbiana County in health care and manufacturing second (Youngstown Warren area largest employers, 2017). With the barrage of choices and fields of study, students, no matter their age or background, make choices based upon their own preferences and convenience. It is important for prospective students to choose the best method of delivery for their learning style. Online schools are a popular choice for students who have a history of technology in the classroom (Julian, 2009). Other students choose traditional college life and live on campus to earn degrees. Still, others need to get to work as quickly as possible, so they choose to earn a certificate; they enroll in a career-technical program to facilitate earning a credential in a short amount of time.

The students enrolled in short term training programs at the career-technical schools are different from traditional college students. Many are looking for second careers after a lay-off or a downsizing. Many are non-traditional, being of the age of thirty-five or older. This may be due to the need to upgrade skills to remain employed through economic downturns (Kennamer & Campbell, 2011). While this type of student is motivated to make an employment change, it is often a difficult transition. Non-traditional students who support themselves, or, who are on public assistance, have special circumstances which make their post-secondary education more complicated. Issues such as child care, transportation, loss of working hours, and lack of a traditional support system are barriers for these students (Tang & Russ, 2007; Russo, 2015; Bryan & Simmons, 2009). While all are obstacles to the educational process, one of the most limiting problems faced by a non-traditional student is the lack of technology background and experience skills needed to survive in today's post-secondary education network.

From the standpoint of career technical administration, the non-traditional student demographic is especially important. As dictated by the governing entities for career-technical adult education departments, the Ohio Board of Regents and the Ohio Department of Education have set forth a list of six criteria for scoring adult education departments success and as a funding apparatus. Data is gathered from every adult education department in the State and goals are set for each school individually. These goals and the data for Columbiana County Career are included in Appendix A.

The funding for adult education departments, being contingent upon reported data in six areas, makes the six areas vital to the survival of adult education at career technical centers. The six areas are: technical skills attainment, credentials earned, student retention, student placement, nontraditional participation and non-traditional completion. With a focus of 1/3 of the data collected being on non-traditional students, the importance of their success cannot be underestimated by any adult education director looking to earn

Perkins funds for their department. The importance of this demographic to the state funding mechanism makes this demographic group very important to study.

Technology is a very important component of post-secondary educational programs. Training in the 21st century includes the use of technology. Students enrolled in medical career options, like a state tested nurse's aide or a medical biller and coder program, must be able to use technology as it relates to the occupation. Students in industrial career training programs must also use technology as part of the skill set needed to be successful in the area they are learning. With constantly changing technology, the practice of nursing and other medical personnel will change, and these professionals will need to keep up in order to perform their duties (Huston, 2013). Nursing students, at all levels of training, receive training through technology. Electronic charting, digital imagery, online testing, and e-books are used in many programs. Nursing students, at all levels of training, must adhere to each medical facilities' technology requirements and be able to use electronic resources quickly and efficiently to determine and assist with direct patient care (Curriculum for A Practical Nursing Education Program, Ohio Board of Nursing, 2016).

With technology becoming more and more infused in all types of employment, the lack of technological skills must be overcome by those students with no formal or informal technology training (Safford & Stinton, 2016). The pursuit of a post-secondary education causes students to wrestle with the technology necessary for their chosen field of study, without regard to their current skills levels.

Research is lacking in the field of non-traditional students' abilities in the digital education age; Does the generation that did not grow up using technology, every day, start behind and stay behind, or do they overcome and adapt based on what is needed to be successful? There are limited studies on how non-traditional students face this digital education issue and whether their assimilation into the post-secondary program of study is easily overcome, or if it hinders their educational process (Caison, Bulman, Pai & Neville, 2008). Some adult students are able to adapt as they have remained technologically savvy, but are the educational processes too technologically dependent for older non-traditional students who have not had technological education exposure? The intent of this proposed research was to examine the relationship of the background technology skills and the impact the skills have on non-traditional students in medical careers. To further complicate matters for the non-traditional student, Columbiana County, Ohio, is a designated Appalachian county and poverty plays a part in many county households.

The poverty rate and other economic and educational disadvantages in Columbiana County, an Appalachian county, create unique educational and economic issues. Many of the students at Columbiana County Career and Technical Center and surrounding school districts are the first to be on track to earn a high school diploma (Bryan & Simmons, 2009). In Columbiana County, a large part of the adult population does not have a high school diploma or GED. In 2015, 18% of the county population had less than a high school diploma (United States Quick Facts, Columbiana County, 2015). Thus, the GED program in Columbiana County is very successful.

Outreach to this demographic is especially difficult due to the number of non-readers, lack of interest in school and school activities, and a general malaise towards the educational system. It is a constant struggle to engage the "no diploma" demographic in the county.

Problem Statement

With the proliferation of technology in the medical field and the impending importance of the professional usage of such in today's workplace, non-traditional students may face hardship and have a difficult time keeping up with today's young nursing students who are often technologically savvy young adults (Merrill, Reinckens, Yarborough, & Robinson, 2006).

Purpose of the Study

The purpose of this study is to explore how non-traditional students relate to technology as needed for successful completion of programs in the nursing field. Non-traditional students attempting to enter the medical field are the focus, because, according to the U.S. Bureau of Labor Statistics (BLS), health care is one of the areas projected for the most growth between 2014 and 2024. Thus, the research question that this study seeks to answer is "Do non-traditional students have more difficulty than traditional students with their use of technology in their studies?" And further, "Does the lack of formal training in technology affect the success of post-secondary, non-traditional students differently than it impacts traditional students?" Additionally, this investigation will seek to understand the students' perceptions, across these two groups, regarding technology and its impact on their educational experience. Finally, the students' self-reported level of success (expected GPA) across the two groups will be examined as a potential moderator. If students and their lack of technology skills affect their success rate, then strategies for improving retention of non-traditional post-secondary students in medical career technical programs can be suggested and utilized in Appalachia.

Definitions of Key Terms

Appalachian Region: This is a 250,000-square mile area that encompasses all of West Virginia and parts of 12 other states, including Ohio. The economy in these regions was, at one time, dependent upon natural resources (The Appalachian Region, 2016).

Career-Technical Programs: These are programs of study that are a year or less in length, and grant industrially recognized certifications rather than degrees. "High-quality CTE programs engage a wide range of students through hands-on, technical training and prepare them for in-demand career fields beyond a traditional high school program" (Post-Secondary Credit Opportunities in Career-Technical Education, Ohio Higher Education, 2014, p. 5).

Non-Traditional Student: For the purpose of this study, a non-traditional student is defined as a student, aged 25 or older, who is entering a career-technical field of study (Student Success for Adult Learners, 2015, p. 3). Typically, these types of students graduated from high school and entered directly into the workforce, started a family, immediately, and did not work outside the home, or was specifically trained for employment that does not relate to their current area of study.

Summary

Research is lacking in the field of non-traditional students' abilities in the digital education age. Does the generation that did not grow up using technology, every day, start behind and stay behind, or do they overcome and adapt based on what is needed to be successful? There are limited studies on how non-traditional students face this digital education issue and whether their assimilation into the post-secondary program of study is easily overcome, or if it hinders their educational process. Some adult students are able to assimilate as they have remained technologically savvy, but are the educational processes too technologically dependent for older non-traditional students who have not had technological education exposure? The intent of this proposed research is to examine the relationship of the background technology skills and the impact the skills have on non-traditional students in medical careers.

Chapter 2

Review of the Literature

The current investigation focused on student success with post-secondary education when they have had little formal training in technology. The students who were studied live in the Appalachian sector of Ohio, and, therefore, have regional challenges with post-secondary education. The poverty rate in the county, and barriers for non-traditional students, add to the challenges of the post-secondary students, and are reported in this review. The current chapter presents a history of career technical post-secondary options and the challenges present for adult students in Appalachian Ohio. It also explores the importance of non-traditional student's self-efficacy with the use of technology.

History of Post-Secondary Career Technical Training

In Ohio, in 1966, the Adult Education Act (AEA) was formally accepted by the U.S. Department of Education. There was a previous clause in federal legislation, the Economic Opportunity Act (1964) that addressed Adult Education, but, it was not until 1966 that the states took action (Rose, 1991).

In its beginnings, the AEA was the means by which Native Americans, immigrants, and the elderly could attain education needed to help them assimilate into the American culture. English lessons, a precursor to the GED, and citizenship, were popular programs. Presidents Kennedy and Johnson were instrumental in working on programs to help the United States population with issues in poverty and adult literacy. Funding for the first act that was passed was $18.6 million (Eyre, 1998).

In 1977, the Career Education Incentive Act (P.L. 95-207) was created and passed into federal law, and the appropriation of monies began for career education activities (Greenhaus & Callanan, 2006). In 1977, through grant monies and public funding matches, the Columbiana County Joint Vocational School was built, as well as several other schools in other Ohio counties. Shortly after the dust settled from construction, adult programming began at the vocational schools, usually in the evenings after the high school children had gone home. Programming mimicked the offerings for high school as labs were already built and could be used in the evenings for other learners. Programming for both age groups focused on occupational areas where jobs were plentiful and the occupation relied on hands-on training. Examples of 1970s' programming include Welding, Construction, Agriculture Mechanics, Diesel Repair, Cosmetology, and Secretarial Studies (Wonacott, 2003). As years progressed, programs changed to fit the workforce needs. Programs in automobile body repair and automobile technology were added. In the 1990s, programming that was added in Computer Sciences, Multimedia Design, and other medical programming began to garner interest (Wonacott, 2003). It was in the 1990s that a heavy concentration in medical programs was created and specialty labs were designed to simulate hospital and physician office settings. In October, 1998, the Ohio Vocational Board of Directors voted to change the name of their association to the Ohio Association for Career and Technical Education (Parks & Shoemaker, 2007). It was also in the 1990s that many career centers changed their names to change their image and have a more contemporary feel. Many Joint Vocational Schools (JVS) changed their names from JVS to Career Center and eventually Career and Technical Centers to match the Ohio Association for Career and Technical

Education Superintendents (OACTS) standard. The change was instituted by OACTS by then, and current, Executive Director, Thomas Applegate. He facilitated the changes to "better reflect the environment in which we operate. Joint vocational school is kind of "old school" terminology with "vocational" having a negative image in today's society." (T. Applegate, personal interview, February 8, 2017)

Due to efforts across the nation to address the skills' gap and the number of jobs open, versus the number of unemployed people to work, many states began to rely heavily on getting workers trained quickly at community colleges and vocational schools (Stevens, Kurlaender & Grosz, 2015). Over the course of the last 10 years, vocational training and community colleges have produced almost two thirds of new nurses entering the field (Van Noy, Jacobs, Korey, Bailey, & Hughes, 2008). Clearly, the medical based programs thus continued to be popular into the 2000s, and many schools, including Columbiana County Career and Technical Center, added programs like State Tested Nurse's Aide, Medical Assistant, Pharmacy Technician, and Practical Nursing. Programs such as Welding and Construction continued to flourish. This type of programming not only followed State of Ohio Adult Education rules and regulations, but also had to follow the demands of the perspective industry-based regulators like the Ohio Department of Health, the Ohio Board of Nursing, and the American Welding Society. Students completing this type of programming usually sit for state exams or physical tests of performance in areas deemed appropriate for their chosen area of study.

Welders are given welding tests; both written and skills are evaluated for certifications. Practical nursing student completers are eligible to sit for the state test, the National Council Licensure Examination (NCLEX), in order to become a Licensed

Practical Nurse. Nurses' Aides are given both a written test and a skills' assessment via an Ohio Department of Health tester. These practices continue today. According to the U.S. Bureau of Labor Statistics (BLS), health care and specialized manufacturing areas will be seeing a growth of about 19%, with the newest jobs in health care between 2014 and 2024. This growth is due to an aging workforce and an aging American population. Due to the steady growth, the needs for qualified, certified individuals to fill these openings are required constantly (Healthcare Occupations, 2015).

History of Appalachian Designation

As defined in the Definitions section above, the term, Appalachia, is used to describe a cultural region in the United States located in the eastern part of the country and stretching from New York, to Alabama, and Georgia (see Figure 1). The Appalachian Regional Commission designates areas to be included in this status with an index-based economic classification system which identifies and monitors the economic status of the regions (County Economic Status, ARC, 2016). In 1992, Columbiana County was designated as an Appalachian county. Appalachian areas are typically poor, rural, and dependent on the extraction and manufacturing processes related to the natural resources of the area (Russo, 2015).

Columbiana County, Ohio, is classified as a "transitional" county, according to the Appalachian Regional Commission ([ARC], County Economic Status, 2016). It is white in color, on Figure 1, to illustrate the designation. The ARC defines a transitional county as one that is transitioning from an "at risk" designation to "competitive." The transitional category is the largest economic designation (see Figure 2), as so many of the

Appalachian counties are hovering in between being at risk and showing improvement on the other end of the spectrum (ARC, 2016).

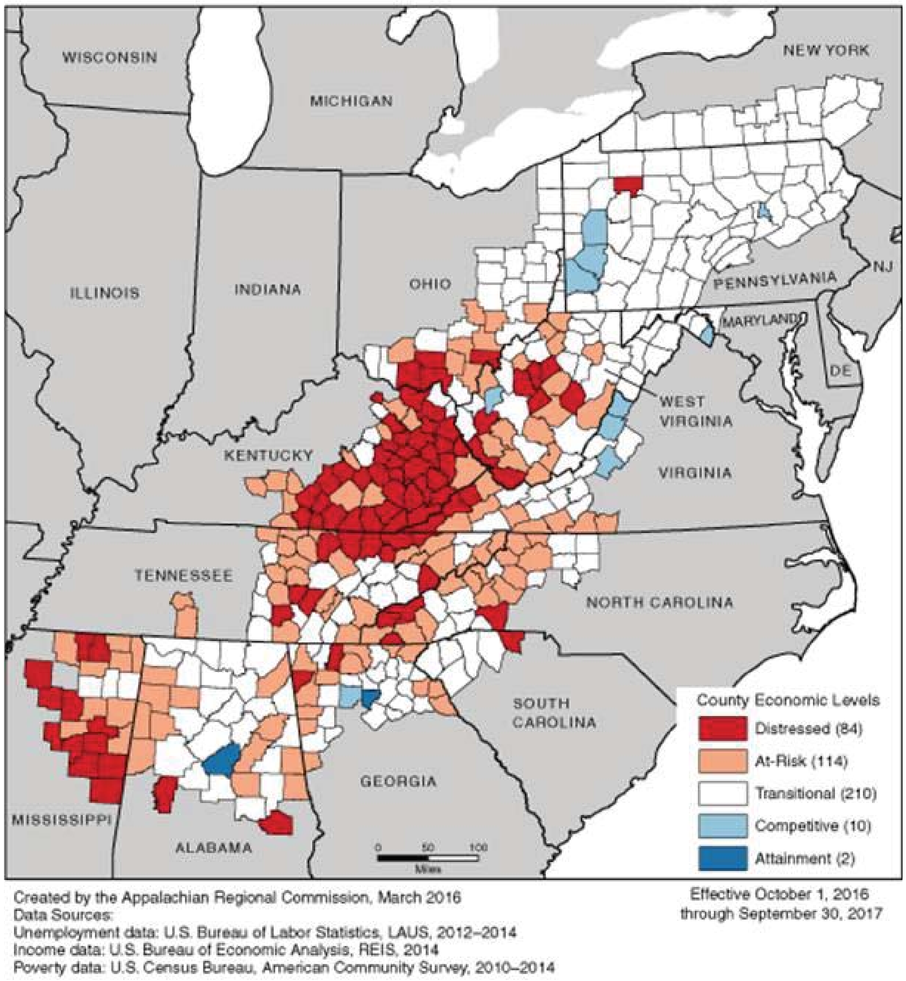

Figure 1. Appalachian Designation Map by Appalachian Regional Commission (2016)

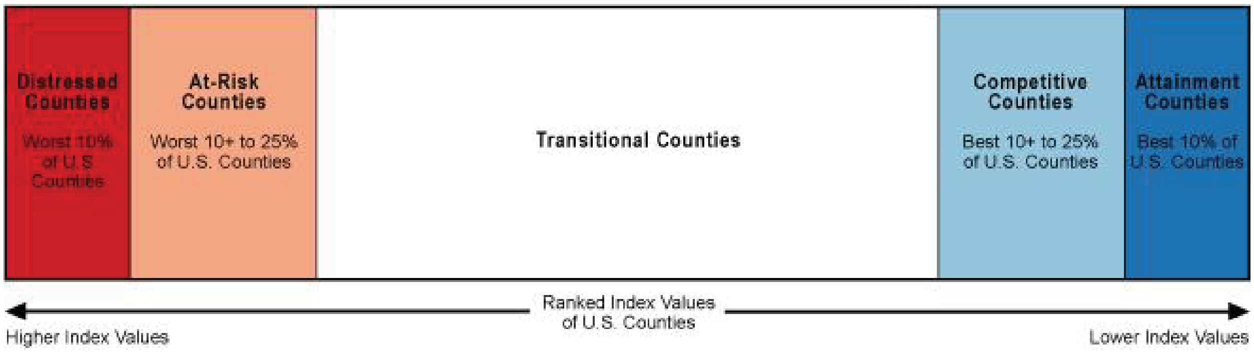

Figure 2. ARC County Economic Status Designations by Appalachian Regional Commission (2016)

The transitional definition of Columbiana County indicates its place on the "Distressed Designation and County Economic Status Classification System, FY 2007-FY 2017". All counties within any of the designation categories are still considered "Appalachian distressed," regardless of their designation in the economic status map.

The Appalachian Regional Commission designates as 'distressed areas,' the census tracts in at-risk and transitional counties that have a median family income no greater than 67 percent of the U.S. average and a poverty rate 150 percent of the U.S. average or greater. (ARC, 2016)

Demographics of an Appalachian District

The Columbiana County Career & Technical Center (CCCTC) was designed to be centrally located in Columbiana County for the residents of Columbiana County and surrounding areas. Columbiana County is located on the eastern edge of Ohio, and is bound on the east by the Commonwealth of Pennsylvania, on the south by the Ohio River and West Virginia, on the west by Carroll and Stark counties, and on the north by Mahoning County. The county is irregular in shape and encompasses a total area of 534 square miles containing 18 townships. The largest city in the county is East Liverpool.

As seen in the following chart (Table 1), the county has very little diversity in race or ethnicity. In addition, the county has a high poverty rate and an elevated high school graduation dropout rate.

Columbiana County, Ohio, is one of Ohio's 29 Appalachian counties. This unique designation, and the fact that, traditionally, the county's economic dependence is from a now defunct manufacturing era, mirrors the decline of the economic state of the county. In the 1970s, over 50% of all workers in Columbiana County worked in a manufacturing area. Today, only 15.1% of workers work in manufacturing. Currently, Columbiana County ranks 70th out of 88 counties in personal per capita income. In today's economy, Columbiana County has a 6.2 % unemployment rate (MCTA Update, August, 2016). The county unemployment continues to fall, and when compared with unemployment rates from last year at this time, there has been a decrease of 33.7%. Adjacent Mahoning County has a poverty rate of 16.7%, and Columbiana County has a rate of 15.9%, which are among the highest in the state (Quick facts, 2015). Currently, Columbiana County ranks 70th out of 88 counties in personal per capita income. It is pertinent to add that the Columbiana County cancer incident rate for all sites/types combined (476.0 per 100,000) is higher than the incident rate for the United States (467.4 per 100,000). The cancer mortality rate for all sites/types, combined, is higher in Columbiana County (201.7 per 100,000), than in the United States (189.8 per 100,000).

Columbiana County air-tested results show that it has the highest risk of cancer and non-cancer death estimates (Division of Air Pollution Control Ohio EPA, 2010).

Table 1. *Columbiana County Census Demographic Information*

Population (2015)	104,806
Age of county residents	
65 and over	18.70%
Under 18 years old	20.90%
19-64 years old	60.40%
Race and Origin	
White	95.50%
Black or African American	2.50%
Hispanic or Latino	1.60%
Native American or American Indian	0.20%
Asian /Pacific Islander	0.20%
Other	1.40%
Income	
Percent of persons in poverty	14.70%
Per capita income in past year	$23,348
Median household income	$44,497
Percent of civilians in labor force 16 + years old	59.40%
Education	
Graduate Degree attainment	4.50%
Bachelor's Degree or higher	13.90%
Associate Degree attainment	26.70%
High School Diploma only	46.47%
Less than High School Diploma	18%
Transportation	
Mean travel time to work	25 minutes
Public transportation	None

Coupled with the depressed economic state of the area, comes an excess of social problems to complicate the population. The poverty rate, and other disadvantages in Columbiana County and the surrounding areas, creates unique educational issues. Many of the students in the school and surrounding school districts are the first ever in their family to be on track to earn a high school diploma (Bryan & Simmons, 2009). There is a large portion of the adult population who do not have a high school diploma or GED, thus, making the CCCTC GED department one of the largest in the state. Outreach to this demographic is especially difficult due to the number of non-readers, lack of interest in school and school activities, and a general malaise towards the educational system. It is a constant struggle to engage the "no diploma" demographic in the county.

The CCCTC is a vocational school district centrally located in rural Columbiana County, Ohio. It is located on a rural 52-acre campus located in Lisbon, Ohio. The facility was built in 1977 and has been well maintained through the years. When it was built, it was quite a showcase (Berdine, 1977). It had central air conditioning and very few windows which was state of the art in the 70s. Through time, the building has undergone many facelifts, keeping it updated and modern, despite the fact it is now over 35 years old. When the school district was created in 1977, a 2-mill operating levy was added to the property tax of all county residents who live in one of the eight partner school areas. There are two area schools, that in 1977, did not participate in the assessment process, and, therefore, do not pay the tax or receive services from CCCTC. These schools are East Liverpool and Salem. In the 35-plus-years of the school history, there has never been a local levy passed. The only time one was ever placed on a ballot was in 2005 when the school board focused on a need for a new boiler/HVAC system and some kitchen upgrades. The levy did not pass, and the work was done through other permanent improvement resources in a phasing system.

While the original footprint of the building has not changed, inside, there have been many changes over the years. The facility has been reconfigured to facilitate new programs and technological needs, driven by the community and business/industry input and job markets.

The CCCTC educates high school juniors and seniors from eight area home schools. Home schools are traditional high schools, in the area, which are served by CCCTC. Students are permitted to enroll at CCCTC as a half-day or full-day student to learn a professional skill field while attending high school. Some of the high school programs include: Welding, Networking, Cosmetology, Construction, Automotive Technology and Auto Collision Repair (CCCTC, 2017).

The CCCTC also offers adult programming geared towards adult students who are not college ready, college successful, or, for those needing to make a career change. The focus of the adult programming is to get people to work in a year or less. Adult programming is different than high school programming due to the age of the students, certification available to adults, not minors, and the community needs and interests. While all adult programming requires the student to have a high school diploma or GED, the testing agencies require a copy of this documentation as well. This prohibits high school students from sitting for many industry credentials like the NCLEX or the Certified Pharmacy Technician (CPhT).

Many programs require background checks, drugs tests, and medical examinations, including immunizations. This is often a difficult high school program requirement due to cost. Adult programming is usually financial aid eligible, and fees can be covered by those funds.

The CCCTC high school department has an annual average enrollment of 400 high school juniors and seniors. The adult education department has an annual average of 350 adult students. Both departments are evaluated by the Ohio Department of Education and the Ohio Board of Regents on student rolls, graduation rates, and employment after graduation rates. Funding for both departments hinges on the successful completion and employment of students in their respective fields of study.

As is the case with the Appalachian culture, family and community play a big role in lifestyles. Family and community ties are strengthened by frequent isolation from mainstream culture and the rural areas where they live (Mei & Russ, 2007). In accordance with this idea, and understanding the importance of community involvement, career technical centers are very active in community roles and events. The community plays a big role in the successes of the Appalachian schools. As part of their job requirements, the administrative staff divides community memberships and organizations so that as many as possible are covered in the area. For instance, administrative team members belong to Rotary clubs, the Workforce Investment Boards' agency partnerships (formerly, the unemployment offices), the local Chambers of Commerce, the manufacturers' coalitions, the local branches of the Cancer Society Board, and many others. Instructors and administrators are part of the communities, and, whether they know it or not, they are the key players in reaching Appalachian students.

In addition to outside the school community activities, both high school vocational and adult departments organize and host advisory panels, twice, annually, in every program of study. This is a requirement of both the Ohio Department of Education and the Ohio Board of Regents. These committees are composed of local business and industry professionals who are considered experts in their fields, who contribute information and ideas to the schools about keeping programming current, what they are looking for in employees, and for clinical/field experiences for students.

Challenges to the Appalachian Career Technical Student

In areas, like Appalachia, with a great number of the population living in poverty, it is likely that one of the primary factors affecting educational attainment is the home culture and family dynamic. People living in poverty are typically involved in day to day survival, and look less to the problems and solutions for tomorrow (Payne, DeVol, & Smith, 2001).

Family and community dedication are of the utmost importance in many Appalachian families due to the isolation from mainstream culture, and from the general feelings of mistrust towards outsiders (Mei & Russ, 2007). Social status is dependent on family; therefore, it becomes increasingly more difficult for a student to make a change in the generational family dynamic. Education in Appalachia is valued, but not at the expense of the family unit and time spent with them (p. 37). As family always comes first, education suffers. Family intrusiveness, as described by Toepher and Dees (2008), differs significantly between Appalachian groups of students and students from other geographical areas. It is also in the family unit that the typical Appalachian student finds the answers to choosing a career and what is a practical choice for lifestyle and goals. This increases the challenge of adequate and appropriate career counseling in the schools. The facilitation of change and pursuit of a career may not be acceptable in the family or community unit. Moving from the family and the Appalachian area is not often a thought or a consideration (Bryan & Simmons, 2009).

It is not uncommon for Appalachian career technical students to be the first in their family to seek any type of higher education (Bryan & Simmons, 2009). This is particularly true with lower income families and those who are examples of generational poverty. Appalachian post-secondary students have a lower educational attainment rate than other parts of the country (p. 391).

Economically, students in Appalachia are unable to keep up with rising costs of attending school, tuition, books, and transportation. It is difficult, or impossible, to seek financial aid or scholarships without assistance from family, as most are income-based. With traditional family attitudes in Appalachia, this can prove to be extremely problematic. Parents fear losing children to the world and higher goals, which is more than the family dynamic can handle. Who is going to take care of the parents, as they get older, is always the child's responsibility, so parents are reluctant to let their children go far (Addington, 2011). Parents are often not supportive as they did not obtain as much education as the children may be able to, thus causing a lack of motivation to assist. These barriers are further complicated when the student is of a non-traditional age of entering the post-secondary educational setting.

Challenges of Non-Traditional Students in Post-Secondary Career Technical Training

Considering the importance of technology in the medical field, and the significance of ability to perform in today's workplace, non-traditional students may face hardship and have a difficult time keeping up with today's young nursing students who are often technologically savvy young adults (Merrill, Reinckens, Yarborough & Robinson, 2006). The needs of this group of students are typically ignored, or the students are expected to have the same skills as those students directly out of high school.

Thus, the problem of non-traditional aged students without the skill set to keep up in class emerges. The transition into post-secondary education is often a painful experience for students. They have natural fears and anxieties, and when technology is introduced, the fears and apprehension multiply as they are expected to write papers and use the Internet for Blackboard, and email. (Safford & Stinton, 2016). For students over the age of 45, it has been reported that the group faces greater barriers to their studies than other students (Tones, Fraser, Elder, & White, 2009). From lack of course availability to lack of awareness, or lack of technological skills, these students are overlooked and left to do the best they can within the parameters of the institution.

Some literature has been developed with regards to non-traditional students in programs that require different skill sets than with what they come equipped. Several studies have linked lower retention rates and lower successes with non-traditional students due to their lack of post-secondary skills than the younger, more traditional student would have (Buerk, Malmstrom, & Peppers, 2003; Forbus, Newbold, & Mehta, 2010). Non-traditional students often lack technology skills such as word processing, using the Internet for educational purposes, and common Windows skills used in most applications. Studies also suggest that, while younger people may have more technology experience, they are at the same disadvantage as non-traditional students (Lai & Hong, 2015; Rasheed & Saunders, 2016) because their technology experience does not include technology for educational use. Their main experience is in social media, Internet searching, and entertainment.

Other studies have focused on insufficient background knowledge of non-traditional students in areas such as chemistry (Kimbrough & Weaver, 1999), those with cultural differences (Brown & Cope, 2012), and science and math (Wladis, Conway, & Hachey, 2015). These studies, while relevant and useful to the current research, did not address the concerns that are posed regarding the use of technology with students who have no formal training in the area of technology. Non-traditional students may or may not come to the post-secondary arena with computer training that is sufficient for the type of work that will be involved in their studies.

There is evidence that non-traditional students lack the skills needed for continuing education (Dearnley, Dunn, & Watson, 2006; Miller & Lu, 2002; Sivakumaraan, 2011). However, women and minorities have been targeted as being marginalized in a study by Ntiri (2001) and are in need of extra attention and learning opportunities to support the success of their intended program of study.

Sometimes the non-traditional students have little to no post-secondary experience and forget what it is like to be in school again. Study skills, time management, and test-taking skills are likely forgotten. The ability to adapt to a teacher's style, and study for tests, has been studied with non-traditional students in mind (Bear, 2012; Forbus et al., 2010, & Ott, 2011). Other surveys and research experiments were completed looking at the effectiveness of teacher modeling and instructional methods (Mahon, Nickitas, & Nokes, 2010; Caison, Bulman, Pai, & Neville, 2008), and have experienced some success with their programs, but these isolated incidents include small control groups in isolated areas, in the United States. Studies also looked at problem areas which relate to technology like the use of eBooks (Cheverie, Peterson, & Cummings, 2012), but faculty have been shown to report that they are very satisfied with the use of technology in their courses (Bossaller & Kammer, 2014). While some studies have found no relationship between self-reported computer experience and success in courses with online work (Calvin & Freeburg, 2010), other studies push for the acceptance of a national curriculum to ensure the training, (McNeil, Elfrink, Beyea, Pierce, & Bickford, 2006) and successes of non-traditional students in a technology based environment.

However, a student's lack of technology skills can be the result of many barriers, and it is important to examine, more deeply, what moderates this lack of experience. Overcoming barriers can be successfully accomplished and non-traditional students can thrive in a post-secondary program of study. Successful non-traditional students overcome barriers to their educational process.

Access to technology is still a problem for many students, not just non-traditional students, especially, in an Appalachian area of the United States. These students typically have limited or no access to Internet at home, and limited resources available in their town or county (Russo, 2015). In Appalachian Ohio, there is a persistent broadband availability, adoption, and use gap. If internet is available, one in three families cannot afford it (Shanahan, 2016; Ntiri, 2001). Faculty interventions and remediation opportunities are helpful, according to some studies (Merrill et al., 2006). Several studies suggest that the non-traditional student is more driven by familial support and/or pressure, self-satisfaction, and intrinsic motivation (Park & Choi, 2009). Familial, socio-economic status has been shown to have an effect on the success, and support services are not only necessary, but critical, to the success of the non-traditional student (Tones et al., 2009). Those with limited technology experience have more obstacles and frustration associated with the continuation of their program of study (Ellaway, Fink, Graves, & Campbell, 2014). Student satisfaction and encouragement from others are factors that many research studies have taken into consideration (Hurtienne, 2015; Liu, Courtenay, & Valentine, 2011). In addition, non-traditional students have reported the need for validation of skills and the need for social capital to continue in their chosen profession, so these factors also affect a student's willingness to stay enrolled in the program of study, with or without technology issues at hand (Isopahkala-Bouret, 2015; Knipprath, & DeRick, 2015; Dai Fei, Catterall, & Davis, 2013).

On the other hand, familial pressures can work in an opposite way for some non-traditional students. Opposing studies show that familial issues such as child care, transportation, and finances also persistently keep the non-traditional student from achieving success in post-secondary education (Kimbrough, & Weaver, 1999). Most researchers agree that, with a few adaptations and considerations for the non-traditional community in their schools, the non-traditional learner has great promise for success with a few alterations and supports set up by the institution (Lake & Pushchak, 2007; McMahon, Gurstein, Beaton, O'Donnell, & Whiteduck, 2014; Safford, & Stinton, 2016). Still other research determined that there is no difference in academic performance between those who have no technology skills and those who do, regardless of age or type of student (Duvall & Schwartz, 2000), but these results are not typical.

Most of the adult theory applied to contemporary research studies has shown that non-traditional students are generally more affected by external environments than students of a traditional age (Bean & Metzner, 1985) and that there is a disconnect between the non-traditional learner and the acquisition of technology skills needed for a post-secondary education (Meyers & Bagnall, 2015).

It is generally, negatively regarded that non-traditional learners report lower levels of efficacy with the use of technology and that they have many issues with regard to using technology for educational purposes (Bear, 2012; Henson, 2014; Ott, 2011). However, most researchers agree that differing instructional methods and differing modes of classroom delivery are the most beneficial ways to assist non-traditional learners with the use of technology in their desired programs areas of study.

It has been reported that students who have positive experiences with using technology with their instructors, under supervision, generally report positive experiences using work-based technology outside of the classroom (Baillie, Chadwick, Mann, & Brooke-Read, 2012). Many studies were conducted about the trend towards using eTexts and eBooks for required classroom readings and the reviews on the experiences are mixed. Some researchers reported that it makes no difference to students (Duvall &

Schwartz, 2000), while others reported a negative impact (Bossaller & Kammer, 2014). Either way, it seems schools across the nation are embracing the use of electronic books and texts for use in the classroom (Cheverie et al., 2012).

Positive experiences with technology can stem from feelings of self-efficacy with non-traditional students. Self-efficacy with technology is defined by Cassidy and Eachus (2002) as students having a feeling of confidence and competence about the use of technology and this is part of a healthy concept of self. There have been studies reporting that self-efficacy with technology is an important part of the development of a student and the student's success in a program (Lagana, et. al., 2011; Wang, Shannon & Ross, 2013). Other studies report that self-efficacy with technology does not affect student outcomes, regardless of the age of the student (Ozerbas & Erdogan, 2016; Rahman, et. al., 2016). Non-traditional students often have feelings of inadequacy when entering school after a long hiatus (Lagana, et. al., 2011) and the infusion of technology with their fear of shortcomings can be detrimental to their success. This idea needs investigated in Appalachia with Appalachian, non-traditional students.

The question remains of the validity of the use of electronic materials with groups of non-traditional students who may be lacking in their technology skills. In several studies, the data indicated that using this mode of media is not best for non-traditional students and that the continued use causes lower retention rates and scores on national exams (Porter-Wenzlaff & Froman, 2008; Radovanović, Hogan, & Lalić, 2015; Harrington, 2014) . Other studies reported the opposite and say that it creates a positive learning experience and the non-traditional student excels with the challenges of using new technology (Farrell, Cubit, Bobrowski, & Salmon, 2007; Hon Keung, & Lai Fong, 2012; Pantziaras, Fors, & Ekblad, 2015). The results of a recent meta-analysis indicated that there is a positive effort with the use of eText, but that effect was not found to be significant (Larwin, Larwin, & Erickson, 2016).

In a career-based field of study like Practical Nursing, Medical Assistant, or an industrial career like Machine Trades or Welding, students are expected to perform certain hands-on aspects of the intended career field, which are technology related. Every nursing program includes an electronic billing and charting segment. Machinists are taught to use AutoCAD. In this type of career training, there is typically not a remediation for technology skills. College courses require writing, and the writing is done through the use of technology. The current investigation will research the successes and implications of non-traditional students and their lack of formal technology training as it relates to their studies.

Summary

Since the 1970s, when many career technical schools began, adult students have had the option of pursuing a skills' training program in Appalachian Region of Ohio. These schools focus on current employment opportunities in their local areas and train for such. The challenge of training adults for current job openings is often infusing the technology skill set into programming to ensure graduates are equipped with relevant, applicable skills when entering the entry-level workforce. Technology is often a challenge difficult for Appalachian non-traditional students to overcome. This may be due to lack of technology available, lack of formal training prior to entering post-secondary training situations, and familial pressures working against the non-traditional students.

Chapter 3

Methods

Research Design

The current investigation is seeking to investigate factors leading to success of non-traditional, post-secondary students enrolled in medical programs at an Appalachian career technical center. Specifically, this investigation will address the following research questions:

1. Do non-traditional students have more difficulty than traditional students with the use of technology in their studies?
2. What are students' perceptions, across these two groups, regarding technology and its impact on their educational experience?
3. Is there a relationship between a student's self-efficacy with technology and their success in a medical program of study?
4. What are students' self-reported levels of success (expected GPA), across the two groups, and does this expectation moderate their responses regarding the use of technology?
5. What are students' self-reported levels of success (Expected GPA), across the two groups, and does this expectation moderate their responses regarding their educational experience?

This study employs a survey research method. An existing survey, currently in use, at the end of each semester at the CCCTC will be used for this investigation. This will be administered to students at four career technical schools, although only the data from participants from Columbiana County will be studied. The directors of these schools have agreed to participate and program directors will administer the surveys to the target population of students. The surveys will be disseminated electronically in the same system as their course evaluations are administered, through SurveyMonkey. Students are familiar with the collection method; thus, data will be collected without hardship on faculty or students.

Participants

All students enrolled in post-secondary, medical based, career technical training programs will be surveyed at the participating career technical centers. For the purposes of the investigation, non-traditional students are defined as those who were 35 years of age or older. Students will report basic demographic information including gender, race, age, and number of children, marital status, and county of residence. All participants will remain anonymous to the researcher. No identifying data will be collected nor will specific schools be identified. A copy of the invitation to participate in this study is provided in Appendix B.

Instrumentation

The researcher will be using a 31-question survey developed by the administration of the CCCTC to obtain information from non-traditional students with regards to their experiences with using technology for educational purposes.

Questions one through seven are demographic in nature and provide the researcher with the necessary differentiation to study different age groups. Participants will be various ages as the survey will be administered to all students in the classes. Comparison and data filters can be used to separate non-traditional aged students from traditional. Participants will be attending a post-secondary, medical program of study in the Appalachian area. Their program of study is also identified in this section. No other identifying information is collected from participants.

Questions eight through eleven ask the participants about their experience with using technology. Questions identify software programs in which students have had formal training. If a student has not had formal training, they are also asked, in this section, where they learned what they know about technology. Questions twelve through fourteen ask the participants about their access to technology, specifically their access to Internet at home and which devices they have and can use. Questions fifteen through eighteen ask participants about educational usage of technology in their current program of study. Questions nineteen through thirty-one ask participants to identify their feelings about using technology in school and their feelings about how it affects their success in school.

The survey was designed to be simple and short with an estimated time of five minutes for the participant to complete. This survey was originally developed for program evaluation purposes at the local career technical center. While there were open ended boxes for responses of "other", the survey was designed for participants to quickly be able to click radio boxes as needed and move on to the next question. No participants have reported any user issues in the past. A copy of the survey questions is provided in Appendix C.

Procedures

An exempt protocol for the current research is to be submitted for review and oversight by the Youngstown State University Internal Review Board (IRB). Once approval was acquired, the survey link will be distributed to four Appalachian career technical centers for additional surveys to include with the preexisting data. The directors of these career and technical centers have agreed to offer their post-secondary students the opportunity to participate in the investigation when completing their course evaluations. Each director will be provided with an explanatory statement and disclaimer about the study. The directors will be asked to read to students a disclaimer statement and information about freely opting out before the survey is administered. At that point, students are to be provided with a copy of the survey link, and they will be free to complete the survey without any oversight or coercion.

Limitations of the Study

A small sample size is one limitation of the study; 205 participants from one academic year were surveyed. A larger sample size in the same geographical area could be achieved across several academic years. Since surveys are completed in four Appalachian career technical schools, it cannot be assured how many students will participate. Student absenteeism, or refusal to answer questions, could be an issue with the number of surveys completed.

In addition, this study focuses on the medical-based programming in career technical centers; therefore, industrial or other service areas of study are not included.

While these other areas may have the same needs, with regards to the use of technology, these areas are not included in this research.

Proposed Data Analysis

In order to address all stated research questions in this analysis, both descriptive and inferential statistics will be used. Reliability estimates will be calculated where appropriate (Sullivan & Feinn, 2002). It is likely that some form of regression analysis will be used to evaluate existing relationships.

Summary

A preexisting survey was used to survey participants at four Appalachian Career Technical Schools that offer post-secondary medical programming. These participants will be asked to answer a 31-question survey regarding their experiences with using technology for educational purposes. The survey will be completed with other course evaluation surveys and was created in SurveyMonkey as this is the same software used for course evaluations. This survey was designed to take less than five minutes. A disclaimer and explanatory statement will be read as part of the survey process.

Chapter 4

The current investigation examines the experiences of Appalachian, post-secondary nursing students, both traditional and non-traditional, regarding their education and the role of technology in their experience. These adult students were surveyed using a 31-question instrument. The research instrument was developed previously for internal use at the schools. For the purposes of this study, other questions were added to focus on the self-efficacy and feelings of the students in this programming area. Some existing data was used and all surveys were completed in the 2016-2017 school year.

The research questions guiding this analysis include:

1. Do non-traditional students have more difficulty than traditional students with the use of technology in their studies?

2. What are students' perceptions, across these two groups, regarding technology and its impact on their educational experience?

3. Is there a relationship between a student's self-efficacy with technology and their success in a medical program of study?

4. What are students' self-reported levels of success (expected GPA), across the two groups, and does this expectation moderate their responses regarding the use of technology?

5. What are students' self-reported levels of success (Expected GPA), across the two groups, and does this expectation moderate their responses regarding their educational experience?

This chapter outlines the specific data analyses that were run to explore the data collected from the survey group. First, basic demographic information about the students who participated is provided, followed by a section where each research question is addressed using the most appropriate analysis.

Demographics

In order to understand better the Appalachian demographic, data were collected from survey participants with regard to gender, race, background, etc. All participants were post-secondary, career technical nursing students from Appalachian career technical institutes. Both traditional aged and non-traditional students were surveyed. For this study, a non-traditional student is defined as a student over the age of 35. Student participation was not required. Survey links were provided on the same day as course evaluation links to eliminate the need to use additional class time for the surveys. Since most post-secondary, career technical centers share the same semester / quarter system, the surveys were completed in the same general time frame. The response rate was estimated to be 95%.

There were 205 participants in the survey. Of the 205, 90.24% were female, 9.27% were male, and .49% preferred not to answer about gender.

Table 2 shows the distribution of traditional aged students to non-traditional students who participated in the study. Non-traditional students are defined by their age as 35 years old and older. Of the 204 participants, 130 were of traditional post-secondary ages, 75 were non-traditional students.

Table 2. *Distribution of Traditional and Non-traditional Students*

	Frequency	Percent
Traditional	130	63.4
Nontraditional	75	36.6
Total	205	100

As reported earlier, Columbiana County has very little diversity and difference in ethnicity (Figure 2: Quick facts: Columbiana County, 2015 from US Census Bureau). The respondents to the survey showed typical results with regard to race/ethnicity. 91.5% reported their race as white, there were none reported as Hispanic or Latino and 8.59% reported as Black or African American. There were none reported as Native American, Asian, Pacific Islander, or other.

To understand the demographic of the family situations of those seeking post-secondary career technical nursing education, the participants were asked to define their marital status. The majority of the participants reported they were single parents (50.73%). Married participants were reported as 32.68%, widowed or divorced were 12.68% and 3.9% preferred not to answer. The total of unmarried participants was 63.41%, including single and widowed/divorced.

The distribution of those participants with children showed that 64.39% of the students are parents. 35. 61% (or 73 of the total participants) reported having no children. There were 12.68% who reported having one child, 23. 41% with two children, 21.46% have three or four children, and 6.83% have five or more children in the household.

Questions numbered eight through eleven asked the participants to identify their levels of experience and comfort with using technology. Of the 130 traditional students, 68 (52%) reported they have above average skill experience with technology. Only 3 participants (2%) responded that they had limited experience. Comparatively, 19 non-traditional students (25%) listed their ability as above average and 17 participants (22%) reported no skill or limited skills with technology.

A Cronbach's reliability estimate was computed for responses to the eight survey items about technology impact on education. The computed estimate was α=.924. This level of internal consistency is considered to be excellent by established standards (Field, 2009).

Since this investigation sought to answer the five research questions listed above, the data gathered from the survey is described with each question investigated.

Research Question 1

The first research question posed by this study was "Do non-traditional students have more difficulty than traditional students with the use of technology?" There were three questions in the survey that addressed this research question. All participants responded to these questions. Those questions included:

Item 19: "My computer skills made many of my assignments easier."

Item 22: "I am comfortable with schoolwork and assignments done with technology."

Item 23: "I feel I can complete assignments using technology with no assistance."

In an effort to distinguish if there are differences across the two groups (traditional versus non-traditional), an Independent *t* test was deemed most appropriate for this analysis. A Levene's Test of Equality of Error Variances was found not to be tenable; therefore, an adjustment to the degrees of freedom was made prior to the *t* test analysis. These results are presented in Table 3.

Table 3. *t test, significance, and degrees of freedom*

	T Test	df	Significance
My computer skills made many of my assignments easier.	-6.119	114.52	0.000
I am comfortable with school work and assignments done with technology.	-5.485	115.98	0.000
I feel I can complete assignments using technology with no assistance.	-6.295	99.97	0.000

As indicated in Table 3, there are significant differences on all three items based on group membership.

Table 4 summarizes the responses given by the students for questions 19, 22, and 23. One hundred three (79%) traditional students showed a higher level of agreement by selecting “strongly agree” and “agree” to this statement than the non-traditional students. Thirty-five (46%) non-traditional students selected the “strongly agree” and “agree” answers, while 65 non-traditional students chose “undecided”, “disagree”, or “strongly disagree.”

Table 4. *Distribution of Participants' Responses to Items 19, 22, and 23*

Items		SA	A	N	D	SD
19	traditional	58	45	21	6	0
	nontraditional	10	25	15	16	7
22	traditional	64	51	10	2	3
	nontraditional	12	32	12	11	9
23	traditional	62	54	10	4	0
	nontraditional	14	23	13	16	6

Research Question 2

The second question asked by current investigation is “What are the students' perceptions, across these two groups, regarding technology and its impact on their educational experience?” To investigate this question, item 27 was used with a Likert scale to investigate both the traditional and non-traditional students' perceptions about the impact of technology on their educational experience. The survey question asked the student to respond to the statement: “The use of technology in my course has a positive effect on my grades and my educational process.”

A *t* test was deemed most appropriate for this analysis. A Levene’s Test of Equality of Error Variances was conducted to determine if the factors demonstrate homogeneity of variance. The Levene’s Test was tenable and there was significance. The results of the *t* test indicate that there are differences across the two groups, $t\,(200) = -6.259$, $p < .001$, $CI_{95}[-1.11, -.589]$. Table 5 provides the distribution of responses by the participants.

Table 5. *Participants’ Responses to The Use of Technology in My Course Has a Positive Effect on My Grades and My Educational Process.*

		N	Percent
traditional	Strongly agree	34	26.5
	Agree	56	43.7
	Undecided / Neutral	33	25.7
	Disagree	3	2.3
	Strongly disagree	2	1.5
	Total	128	
nontraditional	Strongly agree	3	4.1
	Agree	23	3.1
	Undecided / Neutral	30	41.6
	Disagree	9	1.2
	Strongly disagree	7	9.7
	Total	72	

There were 92 (70%) traditional students who answered that there has been a positive effect with the use of technology, while only 26 (34%) non-traditional students endorsed the same level of response.

Research Question 3

The third question asked in the current investigation was: "Is there a relationship between a student's self-efficacy with technology and their success in a medical program of study?" A Factorial Analysis of Variance (ANOVA) was deemed most appropriate for this analysis. A Levene's Test of Equality of Error Variances was conducted to determine if the factors demonstrate homogeneity of variance. The Levene's Test was not tenable. This violation of the test of homogeneity of variance is not a concern since the error degrees of freedom is greater than 20 (Field, 2009). The results of this analysis are provided in Table 6.

Table 6. *Results of Factorial ANOVA for Question 3 Regarding Self-Efficacy*

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Model	768.106a	7	109.729	19.208	0.000
Intercept	1604.357	1	1604.357	280.838	0.000
Group	109.904	1	109.904	19.238	0.000
Success Complete	244.183	3	81.394	14.248	0.000
Group * Success Complete	26.162	3	8.721	1.527	0.213
Error	548.423	96	5.713		

As indicated in Table 6, a significant, main effect on reported self-efficacy was found across the two groups and across the reported likelihood to successfully complete their program. No significant interaction was revealed. A graphical image is provided in Figure 3, demonstrating these relationships. The factorial analysis data were derived from four questions in the survey. The items, 20, 27, 30, and 31 dealt with students' feeling of self-efficacy.

As seen in Figure 3, there is no interaction of the two groups on their reported level of self-efficacy.

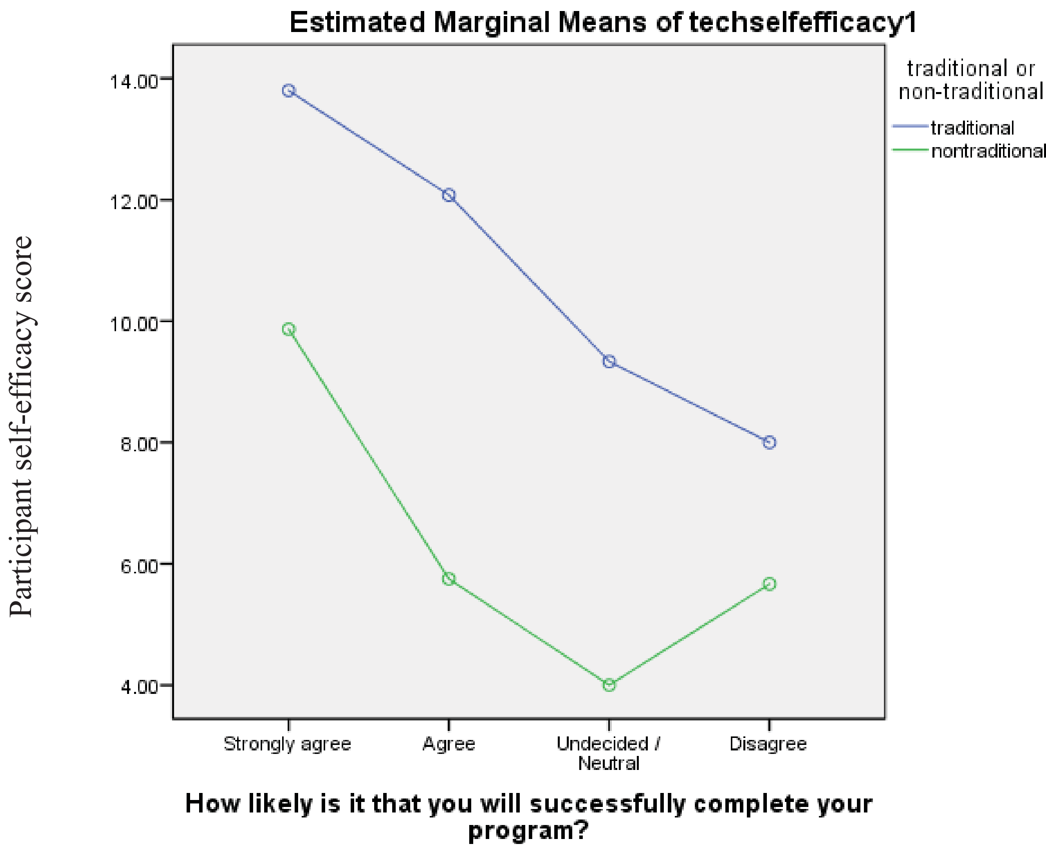

Figure 3. Participants' Responses to How Likely Is It That You Will Successfully Complete Your Program?

Research Question 4

The fourth question asked in the current investigation was: "What are students' self-reported levels of success across the two groups and does this expectation moderate their responses regarding the use of technology?" Responses to items 20 and 28 were used to address this research question. Item 20 asked participants how likely it was that they would successfully complete their program. Item 28 asked participants to report their expected GPA. A factorial ANOVA was deemed the most appropriate way to analyze this question. A Levene's Test of Equality of Error Variances was conducted to determine if the factors demonstrate homogeneity of variance. The Levene's Test was not tenable. This violation of the test of homogeneity of variance is not a concern since the error degrees of freedom is greater than 20 (Field, 2009). The results of this analysis are presented in Table 7.

Table 7. *Results of Factorial ANOVA for Question 4 Regarding Tech Usage*

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	5.616a	7	0.802	1.509	0.174
Intercept	530.548	1	530.548	998.181	0.000
Group	0.469	1	0.469	0.883	0.350
Tech Use	0.685	3	0.228	0.430	0.732
Group * Tech Use	1.797	3	0.599	1.127	0.342
Error	49.962	94	0.532		

As indicated in Table 7, no significant main effects or interaction effect was revealed. The reported level of use by both traditional and non-traditional students is provided in Table 8.

Table 8. *Results of Reported Level of Technology Use in Hours*

	Over 10 hours	7-10 hours	2-7 hours	1-2 hours
Traditional	1	27	13	19
Non-traditional	8	16	14	4
Total	9	43	27	23

As seen in Table 8, and Figures 4 and 5 (below), the non-traditional students reported greater usage, above 10 hours, while the traditional students reported greatest usage in the 7-10 hours' range. However, these differences were not found to be statistically significant.

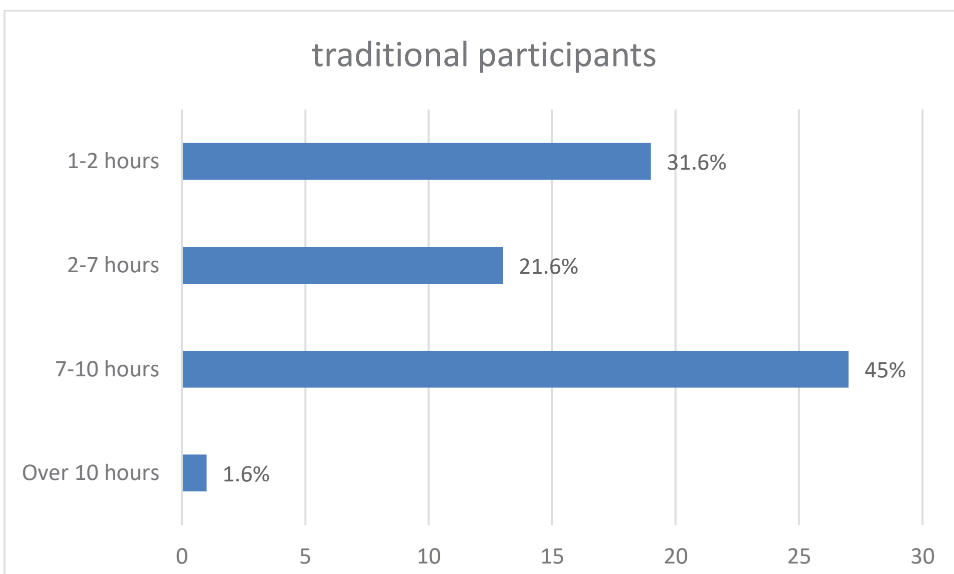

Figure 4. Traditional Participants' Weekly Technology Usage

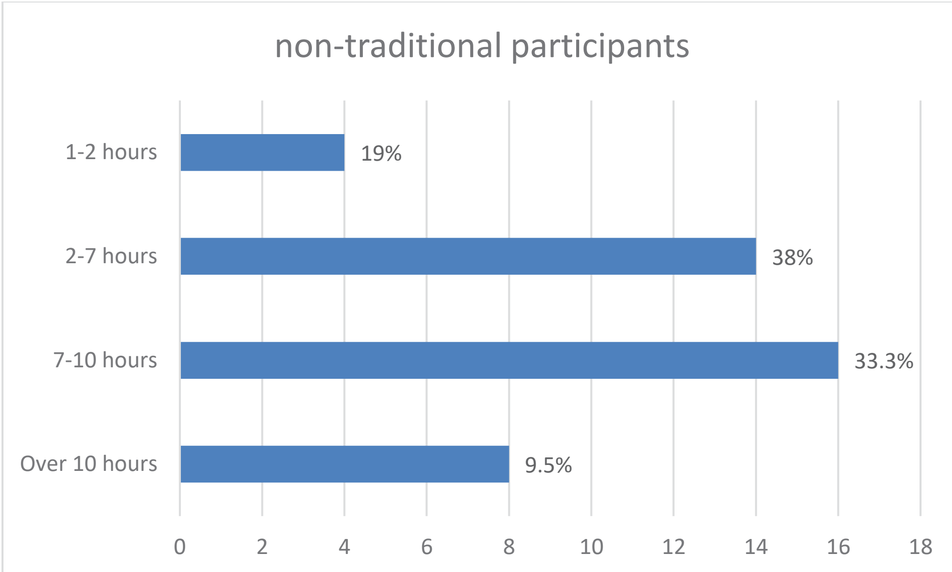

Figure 5. Non-Traditional Participants' Weekly Technology Usage

Research Question 5

The final question asked by this research is "What are students' self-reported levels of success across the two groups and does this expectation moderate their responses regarding their educational experience?" Two questions from the survey were used to answer this question, numbers 27 and 28. The expected GPA, as reported by the student, was used as the dependent variable. A factorial ANOVA was deemed the most appropriate way to analyze this question. A Levene's Test of Equality of Error Variances was conducted to determine if the factors demonstrate homogeneity of variance. The Levene's Test was not tenable. This violation of the test of homogeneity of variance is not a concern since the error degrees of freedom is greater than 20 (Field, 2009). The results of this analysis are presented in Table 9.

Table 9. *Results of Factorial ANOVA for Question 5 Regarding Positive Effect*

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	5.851a	9	0.65	1.252	0.266
Intercept	888.656	1	888.656	1711.922	0.000
Group	1.073	1	1.073	2.067	0.152
Positive Effect	0.733	4	0.183	0.353	0.842
Group * Pos. Effect	3.176	4	0.794	1.53	0.195
Error	98.629	190	0.519		

As indicated in Table 9, no significant main effects or interaction effect was revealed.

Chapter 5

Discussion

The data gathered and studied in Chapter 4 was the result of a survey completed by 205 post-secondary students in nursing programs. The students surveyed comprised two age groups as defined by this research: the traditional in age (34 years and younger) and the non-traditional in age (35 and older). The goal of the study was to seek evidence on the level of difficulty that the non-traditional-aged students experience in their program of study with regards to the use of technology.

Some of the results were not significant, but other questions that were asked in this research provided data showing significant differences between the two groups of students. The data are reviewed in this chapter, and suggestions are listed for addressing each of the issues that arose in the study.

Research Question 1

Research question 1 asked, “Do non-traditional students have more difficulty than traditional students with the use of technology in their studies?” To study this question, the participant responses from three survey items were reviewed: Item 19: “My computer skills made many of my assignments easier.”; Item 22: “I am comfortable with schoolwork and assignments done with technology.”; and Item 23: “I feel I can complete assignments using technology with no assistance.”

Participants provided responses to these three items in the survey using a Likert scale. There were significant differences on all three items with regard to their group, either traditional or non-traditional. Seventy-nine percent of the traditional students answered either “strongly agree” or “agree” to the statements showing their ease with using technology. Only 47% of non-traditional students reported ease with technology. These results were significant and indicate a 32% difference in the two groups of students.

This difference in groups of students may be due, in part, to the geography of the area since Appalachian students typically rely on the family unit for educational needs, educational choices, and, typically, many are first in their family to seek any type of higher education (Bryan & Simmons, 2009). One possibility is that local schools did not have much technology programming, thus, a generation now exists of post-secondary students with little to no experience with using technology for purposes other than entertainment. It is also possible that those in a lower socio-economic situation may be less able to afford technology, or the access to technology. Both reasons may affect the difference between groups of students.

To bridge the gap between the levels of difficulty reported by the two groups of students, the following lists of suggestions should be provided for instructors, administrators, and State-wide best practices.

Recommended actions for instructors include:

- Provide classroom opportunities for students to work together on technology based projects (Woodward et al., 2013).
- Not avoid using technology; the more practice students get in the classroom, the more skills there are to carry over into the employment area (Swenty & Titzer, 2014).

- Distribute a handout with written steps on performing certain technological functions. If students need a reference, or they need to follow step-by-step, the resource will be there (Vandenberg, 2005).

Recommended actions for administrators include:

- Develop a class orientation to technology and administer a technology pre-test to determine skill level before students begin courses, and remediate those who need it (Vandenberg, 2005).

- Post resources electronically and in hard copy format until students have had ample time to understand and learn to use the online technologies available (Vandenberg, 2005).

- Create an "open lab" for students to use technology on site and with assistance if needed (Woodward et al., 2013).

Recommended actions for state consideration:

- Explore allowing hours of credit for technology introductions and remedial work with students for full time courses.

- Create a state-wide assessment for the use of technology in the classroom (Rosen, 2015).

Research Question 2

Research question 2 asked, "What are students' perceptions, across these two groups, regarding technology and its impact on their educational experience?"

Participants provided responses to item 27 in the survey which asked them to respond to the statement "The use of technology in my course has a positive effect on my grades and my educational process." The responses were given using a Likert scale.

The responses given by participants in the two groups, both traditional in age and non-traditional, were very different. Only 26 (34%) of the 75 participating non-traditional students reported that they feel that technology has a positive effect on their grades and educational process. Ninety-two traditional students responded that they felt that technology has a positive effect.

These significant findings indicate that the non-traditional age group do not feel as though the use of technology is a positive factor in their education. This factor is possibly the result of feelings of inadequacy with the use of technology (Patterson & Paulson, 2016). If students do not feel confident with the use of technology, then the results of this question would be less feelings of a positive effect.

Existing research indicates that adult students with limited technology experience have more obstacles and frustration associated with the continuation of their program of study (Ellaway, Fink, Graves, & Campbell, 2014). These factors also affect a student's willingness to stay enrolled in the program of study, with or without technology issues at hand (Isopahkala-Bouret, 2015; Knipprath, & DeRick, 2015; Dai Fei, Catterall, & Davis, 2013).

Recommendations for instructors, administrators, and State governance for the amelioration of the discrepancy in these results, in an effort to encourage non-traditional students to demonstrate more technology self-efficacy and to appreciate greater relevance to the technological piece of their educational process, are listed below.

Recommended actions for instructors include:

- Assign partners when learning new skills in technology. A "buddy system" between two students may alleviate the fear and gap a non-traditional student may experience with the use of technology (Harris, 2017; Vandenberg, 2005; Woodward et al., 2013).

- When possible, allow students to explore technology simultaneously with instruction. In other words, use an instructor-led method with students at their own laptop or computer in a lab. A "follow along" approach may assist non-traditional students with learning applications and basic functions.

- Use a portion of class time for students to work on completing technological tasks. Instructor circulation in the classroom to answer questions and provide one on one instruction will be helpful to those students feeling technologically inadequate. For students who complete tasks quickly could be asked to circulate and assist others (Jensen et al., 2010).

- Be sure to show the benefits to lightening workloads during employment and the benefits of technology being showcased. If adult students think a task will help them later in their careers, they will be more likely to want to learn it (Smith & Smith, 2010).

- Recognize that repetition is key. Assign important technological tasks, such as electronic charting, consistently with each assignment in classroom and clinical area (Jensen et al., 2010; Smith & Smith, 2010; Vandenberg, 2005).

- Adhere to 45-minute sessions when teaching a new task, which are enough for adult students to try to absorb. Use breaks strategically and practice should follow every task session (Heaggens, 2012).

- Allow students to choose seating in technology labs. Often, eyesight is a cause of a student not learning technology tasks (Heaggens, 2012).

- Seek frequent, yet anonymous, assessment of instruction with technology. Using an anonymous ballot, or a "wad and toss" approach, will allow the instructor to have a current idea of how instruction is progressing ("wad and toss" involves students writing their feelings or level of understanding on a scrap piece of paper and tossing it in a bin or on a desk when leaving for a break).

Recommended actions for administrators include:

- If possible, assign a teaching assistant on days when technology skills will be taught. The extra help in the classroom can assist with students who need help with technological tasks.

- Allow for the "trading" of classrooms. Some instructors are better at teaching technology than others. Perhaps the instructor who is best at using technology should be the instructor to instruct it as well (Swenty & Titzer, 2014)

- Provide “open lab” opportunities for students. If a lab is available before and after class time, allow students to catch up or practice assignments using technology (Harris, 2017; Woodward et al., 2013).

- Empower instructors to collaborate with other instructors and to seek professional development opportunities with organizations that can assist with classroom strategies for all age levels of students. Often, book publishers host webinars and other opportunities for faculty to upgrade skills in teaching with the product.

- Seek feedback about feelings of self-efficacy on classroom surveys (Vandenberg, 2005).

Recommended actions for state wide consideration include:

- Develop funding suggestions and assist with the organization of cooperative purchasing groups with regards to technological equipment and supplies.

- Provide professional development opportunities with experts in technology instruction for faculty and administration at state level meetings and conferences (Jensen et al., 2010).

- Adopt a state-wide assessment for student satisfaction and feeling of self-efficacy. Course evaluations are currently a requirement, but there is no required format or question set.

Research Question 3

Research question 3 asked, “Is there a relationship between a student’s self-efficacy with technology and their success in a medical program of study?” A significant, main effect on reported self-efficacy was found across the two groups and across the reported likelihood to successfully complete their program. Students who reported a lower measure of success in their program were also the students who reported a lower level of self-efficacy with the use of technology. These results were significant.

Consistent with the previously stated findings, non-traditional student group results were lower than those students of traditional age, and the two groups did not interact on their levels. This is best illustrated in Figure 4. The highest rankings of the non-traditional students on the chart were level 10, while the traditional students' highest point was a level 14. Non-traditional students dipped to the lowest point on the chart, at 4, while the traditional group went to a level between 8 and 9.

Theories on self-efficacy and performance go back decades, and there is no lack of evidence suggesting that students with higher self-efficacy in the educational arena perform better than those with a lower self-efficacy. In the 1970s and 1980s, Albert Bandura, from Stanford University, did extensive work with the effects of self-efficacy and performance (Bandura, 1986), and showed congruence between self-efficacy judgements and performance. The current data set provides an example of this behavior as Bandura described. Recommendations for improving self-efficacy for non-traditional aged, post-secondary students are listed below.

Recommended actions for instructors include:

- Assist students in comprising short term goals with a method of checking progress to show progress in a technological area (Margolis & McCabe, 2006).

- Encourage or require specific learning strategies such as note-taking on technology steps, referring to "help", and asking help in open lab, etc. (Heaggens, 2012).

- Give frequent, focused feedback on current tasks (Margolis & McCabe, 2006; Rosen, 2015).

- Use a daily measure technique to judge classroom levels of understanding (Jensen et al., 2010).

Recommended actions for administrators include:

- Provide frequent, focused feedback to instructors on strategies in practice aimed at improving self-efficacy (Heaggens, 2012).

- Improve flexibility in scheduling to allow for more teachable opportunities and better flow of the school day.

- Practice "outcome expectancy." Let students know that they will succeed, and it is expected that they will learn the technological skill set (Cabana et al., 1999; Woodward et al., 2013).

Recommended actions for state wide consideration include:

- Develop a "best practices" list or website link for post-secondary instructors and administration (Vandenberg, 2005).

- Improve lack of awareness with higher education institutions with regard to non-traditional students and their barriers (Swenty & Titzer, 2014).

Research Question 4

Research question 4 asked, "What are students' self-reported levels of success (expected GPA), across the two groups, and does this expectation moderate their responses regarding the use of technology?" Responses to items 20 (how likely is it that you will successfully complete your program?) and 28 (The overall GPA I expect to receive in this program is?) were used in the study of this question. There were no significant differences between the two groups. Both groups reported that at this level of their program, they expected to be successful.

Since the students surveyed were in their third or fourth quarter of study in a four-quarter program, it is probable that they are advanced enough, and have been successful thus far, in the program, so their success is likely. Most students, in a nursing field of study, drop out at the beginning of programs, not when the end is in sight (Ehrenfeld & Tabak, 2000).

Research Question 5

Finally, research question 5 asked, "What are students' self-reported levels of success across the two groups and does this expectation moderate their responses regarding their educational experience?" Survey items 27 (The use of technology in my course has a positive effect on my grades and my educational process.) and 28 (The overall GPA I expect to receive in this program is?) were used to study this question. Again, there were no significant differences between groups. Both groups reported expected success at this level in their training.

The previous discussion of the dropout rate earlier in programs of study is most likely applicable in this research question as well (Ehrenfeld & Tabak, 2000). Students who have survived to the third or fourth quarter of study in a four-quarter program have typically found a method of study and using technology that works best for them. Since successful completion of courses is required for advancement to the next level in any program, students at this level of study responded as having positive experiences with a high rate of successful completion.

Limitations

Several limitations should be acknowledged for the use of the data from this study. First, the sample of student participants were in their third or fourth quarter of study. Students in the beginning of their program were not included in the study. Students first experiencing technology for educational purposes may have yielded different results. It is expected that the differences across the groups would be greater with students in their first year of study.

Similarly, the questions asking students to report on the likelihood of successful completion of their program and the estimates of their GPA are self-reported; these answers may or may not be a true representation of their status as a student. This is an inherent limitation to survey research, which involves self-reporting. In addition, a larger sample from other Appalachian geographical areas may yield different results. Finally, there were no questions on the survey which would have indicated the socio-economic status to the researcher.

Future Research

A richer, expanded understanding of the backgrounds of post-secondary students could be developed to add the component of socio-economic status in the families and the cycle of poverty as it may apply to the students. Additionally, future studies could be developed with the comparison of Appalachian communities compared to other non-Appalachian areas, or urban versus rural areas. This would diversify the demographics of the study and would provide a greater estimate about how prevalent the impact of technology on academic success is for the non-traditional student. Also, the current investigation targeted nursing students. Future research could replicate the current investigation, and include multiple areas of study.

Finally, another study could be developed using this same survey, but including follow-up research on the students and their actual GPA, the successful completion of their program, and their success in acquiring employment. This study could include questions about their current technological abilities and information about how well the program prepared them for their employment.

Conclusion

With the increase of technology-based tasks in the nursing workplace, the instruction of nursing students in the use of as much technology as possible is imperative (Swenty & Titzer, 2014). To be assured that Appalachian students are being prepared for the workplace adequately, schools must realize the significance of the diversity of the two groups of students studied in this research study: the traditional and the non-traditional.

Findings from this study indicate that non-traditional students face more barriers to learning with the use of technology than the traditional set of students. With an ever-changing economy and job market, non-traditional students will continue to be a group that faces different barriers and challenges than others in different age brackets. Addressing the differences and providing additional remediation and support may provide schools with better student retention numbers and consumer satisfaction.

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Appendix A

2015-2016 Career Development Local Performance Report

Columbiana County JVSD **CTPD: 200015**

Adult Perkins Core Indicators of Performance
Definitions for the indicators of performance are in the Ohio Perkins Five-Year State Plan for Career-Technical Education. The Ohio Department of Education, Office of Career-Technical Education, reached agreement with the U. S. Department of Education on state performance targets for each Perkins core indicator of performance.

	State	Columbiana County JVSD				
Perkins Core Indicators of Performance	2015-2016 Performance Target	2015-2016 Numerator	2015-2016 Denominator	2015-2016 Performance Rate	2015-2016 Performance Target	Met 90% of 2015-2016 Performance Target*
Technical Skill Attainment** (1A1)	91.25%	149	149	100.00%	91.40%	Yes
Credential, Certificate or Degree** (2A1)	70.20%	149	153	97.39%	69.20%	Yes
Student Retention or Transfer** (3A1)	87.00%	28	30	93.33%	83.70%	Yes
Student Placement** (4A1)	85.00%	172	179	96.09%	80.45%	Yes
Nontraditional Participation** (5A1)	9.00%	17	176	9.66%	10.30%	Yes
Nontraditional Completion** (5A2)	9.00%	15	153	9.80%	9.70%	Yes

-- = No data reported

Appendix B

Invitation to Participate

Hello, my name is Kelly Darney. I am Adult Director at Columbiana County Career & Technical Center. I am conducting a study to investigate the how the use of technology affects your educational process.

In this study, you will be asked to answer 31 questions via an electronic survey (SurveyMonkey). I will be asking five demographic questions such as gender and age and where you live but NO PERSONAL INFORMATION other than that will be collected. The surveys are done anonymously as your privacy is very important to me.

The intent of the survey is for me to gather data about the use of technology in the classroom and the benefits or drawbacks you, as the student, have associated with it. Participation is voluntary. Your identity will not be collected. Students must be at least 18 years old. Submission of this survey implies your consent. If you have questions concerning this research, contact Dr. Karen Larwin at (330)941-2231 or khlarwin@ysu.edu. If you have any questions about your rights as a participant in this research project, you may contact the Office of Research at Youngstown State University at (330-941-2377) or YSUIRB@ysu.edu.

I appreciate your honesty in answering the questions in the survey and wish you the best in your educational journey.

Sincerely,

Kelly S. Darney

Appendix C

List of Survey Questions

Demographics

1. What is your gender?
2. What is your age?
3. What is ethnicity origin (or race)?
4. What is your marital status?
5. How many children do you have?
6. In which county do you reside?
7. In what program are you enrolled?

Your experience with technology

8. Were computers used by students when you were in high school?
9. If yes, please mark the applications you were taught.
10. If you did not have a computer class in high school, please mark how you learned the computer applications you need for your current program of study.
11. How would you rank your experience with using computers?

Access to technology

12. Which of the following devices do you own or use on a regular basis?
13. Do you have Internet access at home?
14. Do you use Wi-Fi or a computer lab somewhere other than home?

Educational Usage

15. Do your instructors give assignments that must be done on a computer?
16. Do your instructors post materials online for your use?
17. Does your school use an online platform for learning?
18. How much time do you spend per week using technology for any purpose?

My feelings about technology (Likert scale)

19. My computer skills made many of my assignments easier.
20. How likely is it that you will successfully complete your program?
21. How employable will you be with the diploma that you are earning?
22. I am comfortable with school work and assignments done with technology.
23. I feel I can complete assignments using technology with no assistance.
24. Based on the experience you have had so far, how would you rate your technology skills coming into the program?

25. Based on the experience you have had so far, how would you rate your technology skills NOW?
26. I would do well with a class that was 100% online.
27. The use of technology in my course has a positive effect on my grades and my educational process.

Other

28. The overall GPA I expect to receive in this program is?
29. I am in the (blank) quarter of my program of study?
30. Considering the list below, mark your top three reasons for staying enrolled in school and completing your program of study.
31. Considering the list below, mark your top three reasons for stress in your program of study.