The success of nontraditional college students in an IT world

Amy R. Henson
Mineral Area College

ABSTRACT

The purpose of this research was to determine the extent that computer-related factors affect the success of nontraditional college students. Since nontraditional students typically have fewer skills than traditionally-aged students, they may be less efficacious regarding their ability to use technology. Unfortunately, such reduced confidence may adversely affect college outcomes for students and ultimately, successful employment. When students enter the classroom, they often find that course requirements include considerable amounts of computer use. Therefore, in addition to learning specific course content, nontraditional students must also learn how to operate computers and conduct Internet research. Such expectations may reduce the potential for college success.

Fewer high school graduates and limited numbers of skilled employees are predicted to cause labor shortages in technical fields. The perfect solution for filling this labor gap is older adults who are waiting longer to retire. Many adults are returning to college to obtain skills to begin second careers or to expand existing employment opportunities. It is critical for leaders of higher education institutions to understand the special characteristics of these students to increase their opportunities for success.

Keywords: college, nontraditional, students, computers, efficacy, technology

INTRODUCTION

Computers and Internet technologies have become integral components of today's society. Advertisements almost always include website addresses and social media references. Consumers are expected to have Internet access to make purchases, post reviews, and access product documentation. Banking customers are assumed to have access to online resources to complete financial transactions and access statements. Airline, train, and room reservations are more easily completed online where travelers can compare prices and locate hotels in distant cities. While the lives of millions of people have greatly improved with the advent of computer technology, there are still many people who lack the skills and resources to function in an online environment.

Individuals who lack computer and Internet access or the skills necessary for basic operations, are greatly disadvantaged. In addition to social and consumer-related disadvantages, these people often find that their employment situations change either directly as a result of deskilling and automation or indirectly because they lack the technical skills that are required to maintain existing jobs or obtain new employment.

The most common victims in this scenario are those who were not exposed to computer technology during or before high school and have not used computers for occupational purposes. Their best option for obtaining the skills necessary for employment in this digital age is higher education.

BACKGROUND OF THE STUDY

Typically, traditional and nontraditional students approach higher education differently. Traditional students enter college immediately after completing high school. With parental support, college is merely an extension of their secondary education; they may or may not have a part-time job since college and living expenses are not a primary concern. However, with nontraditional students, some type of catalyst normally drives them into the collegiate environment (Stone, 2008). Unemployment, career changes, and divorce are the most common reasons for returning to college. The changing workforce has eliminated many manufacturing and other blue collar jobs that have typically employed middle-aged to older adults. The resulting displaced workers must find other positions that typically pay lower wages, or learn the technical skills necessary to obtain a professional job (Horn & Carroll, 1996). Consequently, adult students are returning to college in greater numbers than ever before.

Ironically, the colleges designed to provide updated employment skills to students have preconceived expectations regarding computer skills. The majority of campus information is published online and prospective students are directed toward web sites for degree plans, course schedules, and online applications. After enrollment, teachers post announcements and assignments online, then students must complete their work using word processors and then upload them through the campus learning management system. As a result, computer skills for higher education are almost necessary *before* entering college. According to Helium.com[1], one of the most commonly reported skills necessary for college is proficiency with computers.

Students who lack adequate skills, particularly older, nontraditional students, may become anxious or intimidated before they even enter the classroom. Additionally, older students

[1] www.helium.com is a peer reviewed, user generated web site where active members post responses to titles. Poorly written or plagiarized articles are reported by other contributors.

often have concerns about being in a classroom environment with younger students and are afraid that they "won't fit in". They worry that they have forgotten so much since high school that they won't perform well, especially compared to students who have just graduated. When nontraditional students enter the classroom, they find that in addition to learning history or English, they are expected to operate a computer for research and writing papers. Therefore, they not only must learn the subject matter, they must also know enough about current word processing systems and Internet technologies to properly complete assignments. Students who attend college to update their skills often find that the very institution that they expect to provide skills also requires them.

Nontraditional college students are typically classified as those over the age of 24 who enroll in college for the first time several years after completing secondary education. In addition to delayed enrollment, the Department of Education, Institute of Education Sciences (2011) considers family responsibilities, financial independence, and employment circumstances when classifying nontraditional students. The extent to which a student is nontraditional is determined by the number of these characteristics that such students possess. If they are employed, do not rely on others for financial support, have dependent children, and have been out of high school for several years they are considered highly nontraditional; if they delayed college enrollment but rely on parental support and have no family obligations of their own, they are minimally nontraditional. With the additional stress introduced by each characteristic, students who exhibit higher degrees of nontraditional attributes may be less likely to persist through college graduation than traditional or minimally nontraditional students.

Most nontraditional students describe their primary role as employees, while traditional students describe their primary role as students (Choy, 2002). Another common role for nontraditional students is parenthood. Employment and family obligations are risk factors that can make persistence through graduation challenging (Horn & Carroll, 1996). They must balance their responsibilities as employee, parent, spouse, and student. Because of competing obligations, they are more inclined than traditional students to drop out before degree attainment, particularly if their circumstances deteriorate (Choy, 2002). Ironically, these family responsibilities create a greater pressure to succeed in college. The well-being of familes often depends on college success and improved employment opportunities.

To improve academic persistence among nontraditional students, college faculty and administrators must understand the students' contextual situations regarding work and family roles. Adult students experience conflict as a result of the various roles in which they serve. Most nontraditional students attempt to balance family and work obligations with academia. Consequently, high levels of stress become a factor in coping with college. Without the proper tools to deal with this stress, students tend to be unsuccessful in coursework and may drop out of college. College leaders must examine the effects of stress and help adult students as they transition back to college. According to a study by Giancola, Grawitch, and Borchert (2009), between family, work, and school, work related issues create the highest level of stress. This is due to the importance of income in students' lives. If academic anxiety or responsibilities create additional conflict by interfering with work obligations, the student may drop out of college to continue providing an income.

Ironically, even as many people lost jobs during the most recent recession, thousands of high-salary technical jobs were unfilled due to a lack of available talent. These vacant positions create a double-edged sword; in addition to lost income for the unemployed, these high-tech jobs typically create the innovative products that are necessary for a growing economy. The skill deficiencies are in the areas of science, technology, engineering, and mathematics (STEM). Projections indicate that approximately 800,000 new engineers will be needed by 2018; however, the U.S. currently graduates only one fourth of that number (Elias, 2011). Unless a new pool of workers is prepared, the U.S. may fall further behind in technological and economic development.

A significant concern regarding this lack of qualified employees is the predicted shift in the age population as the baby boomer generation reaches retirement age. Census Bureau data expectations indicate that between the years 2015 and 2030, the increase in individuals aged 55 and over will be over twice the increase of individuals between 20 and 54. If workers retire at the same rate as in the past, labor shortages will increase as older employees exit the workforce and fewer young workers are available to replace them. Consequently, there won't be enough employees to meet demands (Bluestone and Melnik, 2010, p. 6). An additional study conducted by the Georgetown University Center on Education and the Workforce (Carnevale, 2010) indicates that 46.8 million job openings will exist in 2018. Of these, 63% will require workers with at least some post-secondary education. Over one-third will require at least a bachelor degree. A significant factor in this demand for higher education is the growth of the computer technology industry. Consequently, it is critical for the American higher education system to provide sufficient training to fill technical skills gaps in all students, particularly those within the growing populations of older workers.

Fortunately, many Americans now work beyond retirement age. With increasing and healthier lifespans, some choose to remain active by working longer, while others work out of necessity because of inadequate health care options or retirement funds. Although the delayed retirement of baby boomers seems promising for labor shortages, the primary problem facing the work force is a lack of the skills necessary to perform available jobs.

Nontraditional students often lack the most basic computer skills. With older students, computers may not have existed during their high school years or the skills that they did obtain have become outdated. Unlike their younger peers, they lack the advantages that childhood familiarity with technology brings. Perhaps they gained computer skills in previous employment, but often those skills are specific to a particular position or industry. Although they may have become quite proficient with specific job responsibilities, they are unable to generalize those skills toward competently and comfortably performing other computer-related tasks. In any case, this group of students often enters the college environment unprepared for the demands of the new technological environment.

In addition to computer skills and access, students' personal beliefs in their abilities to complete computer-related tasks may affect what is often referred to as self-efficacy. "Self-efficacy" refers to a person's confidence in his or her ability to perform a specific act. Individuals with low self-efficacy are more inclined to abandon a task after less effort; those with high self-efficacy are more inclined to persist until completion. Strong beliefs in their abilities create the expectation that they can accomplish their goals; therefore, they will exert more effort toward them. The term "computer efficacy" refers to a person's belief in his or her computer skills. If low self-efficacy negatively impacts persistence, then low computer efficacy among college students may cause them to avoid higher level technical courses or abandon college before earning a degree or accomplishing other educational goals.

A study by Hargittai (2002) compared the age of participants and their ability to complete various computer-related tasks. Results indicated noticeable generational differences. On average, older individuals take longer to complete tasks than younger ones, and those in their teens and twenties perform the most efficiently. In essence, many nontraditional students typify the person who may have the lowest computer efficacy. They are older, poorer, and were not raised with a computer in the home.

The purpose of this study was to examine the effect that computer skills and computer efficacy have on the success of nontraditional college students as they pursue their educational goals.

THE RESEARCH

A survey instrument was developed to collect data regarding community college students' technical skills and computer efficacy. It was administered at the beginning of the fall 2012 semester to students in various classes at two community colleges. In addition to demographic information, the survey included questions that assess the individual's access and use of Internet technologies and computer-related devices as well as their perceived level of aptitude (computer efficacy). At the end of the semester, course grades, completion rates, and cumulative grade point averages (GPA) of participating students were collected.

Various multiple regression, independent-samples t-tests, and Pearson correlation analyses were conducted using SPSS version 20 to determine relationships between variables. Initially, Pearson correlation coefficients were calculated for each variable to determine the strength and the direction of the individual relationships to the dependent variables. These results indicated if the correlations were statistically significant. Additionally, a level of significance (p value) of less than .05 was used. Thus, there was no more than a five percent chance that differences between the participants in the study were due to reasons other than computer literacy.

Tables 1 and 2 (Appendix) describe the participating courses at College A and College B. Demographic data regarding the fall 2012 populations and samples from both campuses are represented in Tables 3 and 4 (Appendix). Survey information is described and displayed Table 5 (Appendix).

RESULTS AND ANALYSIS

Age was the primary variable that was used to distinguish traditional from nontraditional students in this research. Students over the age of 24 were considered nontraditional; students 24 and below were considered traditional. As expected, nontraditional students in the study generally worked more hours, had more children, enrolled part-time and took more evening and online classes than students just out of high school.

The research revealed that nontraditional students had fewer computer and Internet skills than traditionally-aged students ($r = -.239$, $n = 336$, $p=.000$). They were less capable when using word processing, spreadsheets, and presentations applications as well as performing online searches (Table 6/Appendix). Additionally, they reported fewer operating system skills such as creating, moving, and deleting files and folders and were less likely to own laptop computers and smartphones than their younger counterparts. Older students also indicated significantly lower levels of computer efficacy ($r = -.150$, $n = 337$, $p= 0.003$.). Computer efficacy is the level of self confidence and belief that students have in their technical abilities. Typically, low efficacy impacts individuals negatively because they are less likely to persist in endeavors that require the skills in which they lack confidence. While skills and efficacy appear to be very similar, there are distinct differences. The research revealed a direct correlation between computer skills and computer efficacy; however, it is possible for individuals to overestimate their level of actual skills and consequently demonstrate higher levels of efficacy. Similarly, people may underestimate their actual skills which results in lower efficacy.

In this study, several factors impacted an individuals level of computer skills and resultant computer efficacy. Skills were significantly higher among students who

- had access to more computer-related devices
- began using computers at an earlier age
- had substantial use of computers during high school.

Nontraditional students were negatively impacted by all of these factors. In survey questions regarding access to technical devices, the results indicated that they were less likely to own laptop computers or smartphones than younger students (Table 7/Appendix). They also began using computers at a later age and acquired less (if any) computer experience in high school. Of the 225 traditionally-aged students, 98% had used computers in high school. Only 58% of the students over the age of 24 had used computers in high school. Furthermore, as the sampled students' age increased, the likelihood of computer use in high school decreased. By the age of 46, no students reported any computer use in high school. These students graduated from high school prior to 1985 which was before computers were commonly available in the kindergarten through high school system. Unfortunately for the nontraditional students, a significant level of high school computer use was the strongest factor in developing computer efficacy.

Using Pearson correlational analysis, both computer skills and computer efficacy showed a significant relationship with course grades and course completion. Students with reportedly higher levels of skills and efficacy had higher grades and were more likely to finish their course. Although the relationships were weak, they were significant considering the extent that other variables, such as study habits and extracurricular responsibilities, also impact grades (Table 8/Appendix) and course completion (Table 9/Appendix)

The mean age that traditional students were initially exposed to computers was 10.72 years (SD = 11.44) and 20.45 years for nontraditional students (SD = 14.50). Also, traditional and nontraditional students reported significantly different ways of obtaining their computer experience. While most traditionally-aged students learned how to use computers on their own, older students relied on external assistance (Table 10/Appendix). This may indicate decreased levels of computer efficacy among the older students. Individuals who possess low levels of efficacy may not be comfortable enough with computers to attempt to learn on their own; rather, they prefer instruction from external sources. Not surprising, the source of computer experience that generated the largest difference between the two groups was on-the-job experience. Since most traditional students have limited work experience, it should be expected that they would report fewer skills gained from employment. On-the-job computer experience appeared to be the most significant compensating factor for those who did not have access to technology in high school. Although high school experience created higher levels of efficacy, those who used computers for employment had positive characteristics that were diminished in students who did not use computers for work. These results included:

- greater participation in online courses (Table 11/Appendix)
- successful course completion (Table 12/Appendix)

- higher course grades (Table 12/Appendix).

When comparing experience gained in high school to experience gained on the job, students with high school computer experience demonstrated significantly higher levels of skills, efficacy, and comfort in using computers (Table 13/Appendix). However, nontraditional students who used computers on the job were more likely than the younger students to prefer using computers for assignments and other college-related activities, even when given the choice of using traditional. non-technical methods (r^{2} =.126, p=.01). Younger students actually indicated a greater preference for getting and submitting assignments on paper and registering for classes in person rather than using tools and resources available online.

In addition to a preference for using computer technology over traditional means, another surprising result among older students was that they spent more time using computers than traditional students (Table 14/Appendix). A positive benefit of increased time spent on computers was linked to course grades. Students who spent more time on a computer had significantly higher grades than those who spent less time using technology (Table 15/Appendix). In spite of reduced skills and less comfort in using computers, older students used them more often and were less likely to rely on traditional methods.

Compared to students in the classroom, students who were enrolled in online courses reported significantly greater efficacy levels and a preference for using computers over traditional methods. They also spent significantly more hours working with computers while on the job. Results from an independent-samples t-test are revealed in Table 16 (Appendix). As expected, students with higher levels of computer efficacy enrolled in more online courses. However, there were no significant differences between online students and traditional classroom students regarding their reported levels of computer skills. This indicates that computer efficacy is more critical to students who select online courses than computer skills. Similarly, a correlational analysis compared three class formats: online, day, and evening, to the computer efficacy variable. Correlational analysis determined that students who enrolled in online courses had greater confidence in their computer abilities (r^2=.125, p=.011).

Nontraditional students in the survey enrolled in more evening and online courses and considerably fewer day courses (Table 17/Appendix). This was expected because of their family and work responsibilities. Additionally, they were twice as likely as traditional students to withdraw from the course they were enrolled in during the survey (Table 18/Appendix). The withdrawal rate was particularly high among nontraditional freshmen students. Over 21% of adult students with fewer than 30 college credits earned withdrew from their surveyed class by the end of the semester compared to 11% of the remainder of the student sample.

While overall course withdrawal rates were high among older students, an interesting statistic emerged: Nontraditional students did NOT withdraw from computer-related or online courses at significantly higher rates than traditional students. Independent-samples t-tests were calculated to compare the mean withdrawal rates of traditional students and the mean withdrawal rates of nontraditional students in classes that involved a significant amount of computer instruction. No significant difference was found when means were compared (23.72) = -.154, p>.05]. Likewise, no significant difference was found between means of traditional and nontraditional student withdrawal rates in online courses [t(68) = 67.93, p>.05]. Although overall withdrawal rates in online courses were significantly higher than other types of courses, nontraditional students did not withdraw from them in higher numbers than traditional students. Nontraditional students did, however, reveal higher tendencies to withdraw from other types of college classes when compared to traditional students. A Pearson correlation coefficient was calculated to obtain the relationship between the level of nontraditional characteristics and eventual withdrawal from the course that the student was enrolled in during the survey. A positive correlation was found. Generally, students with more nontraditional characteristics withdrew in greater numbers than traditional students [r(337) =.131, p=.008]. However, when the same analysis was conducted specifically with online classes, no significant relationship was revealed [r(68) =.236, p>.05]. Similarly, when the analysis was conducted with the computer literacy courses, results indicated that nontraditional students did not withdrew from more of those classes than traditional students [r(79) =.299, p= >.05]. While nontraditional students generally withdrew from more college classes than traditional students, they did not have higher withdrawal rates from courses that required an extensive use of computers, including online courses. Independent-samples t-tests also revealed that adult students did not fail more classes than younger students. No significant differences existed between traditional and nontraditional students when comparing course failure rates in the classes surveyed: [t(328) = -.062, p>.05].

CONCLUSIONS

The purpose of this study was to examine academic outcomes of nontraditional students who have limited computer skills. In addition to some results that were expected, other outcomes were surprising.

As expected, nontraditional students have fewer technical skills and reduced computer efficacy. This is predominantly the result of limited or no access to computers during childhood or in school. When individuals are exposed to new experiences at an early age, they are more comfortable with those experiences throughout life. The older a person is when learning a new skill, the more difficult it will be for that skill to become second-nature to him or her. For adults who graduated from high school before the computer era, the best opportunity to gain technical skills is when computer use is required for employment. Computer use for work is the most powerful equalizer for low skills; nontraditional students who use them on-the-job have higher levels of computer skills and efficacy than those who don't. In addition to improving skills and efficacy, on-the-job computer experience correlates to additional benefits that are favorable for higher education, such as higher grades and greater likelihood of course completion. One possible reason for course retention is that working students with greater efficacy are more comfortable taking online courses. The benefits of online courses are numerous, but most importantly, they don't compete with the time that students must spend at work and with family. Nontraditional students with no high school or employment-related computer experience are at a significant technological disadvantage. They are less likely to feel comfortable in online courses, yet online courses may provide their best opportunity for completing college degrees.

In spite of limited skills and efficacy, older students have greater preferences for using computer technologies than younger students and they actually spend more time using computers each week. Since many nontraditional students are employed, a significant amount of the time they spend on computers is for work. However, if given the choice of conducting homework and other tasks on a computer or with traditional methods, they are more likely than traditional students to use technology. Typical behavior for individuals with low efficacy is to avoid performing or using that which causes the lack of efficacy. However, in this case, individuals with low efficacy may be compensating for and ultimately overcoming low skills by actually spending more time using the technology that they feel insecure about. Increasing use is a significant step toward improving skills.

Perhaps the most revealing finding regarding nontraditional students was with their level of completion of computer literacy and online courses. In general, nontraditional students in the study withdrew from college classes at twice the rate of traditional students. However, when older students enrolled in computer classes such as introductory computer or applications classes, they finished the courses at the same rate as their younger counterparts. In spite of fewer computers skills and decreased efficacy and all of the other personal obstacles that hinder course completion, adult students are more likely to persist in the technical courses that will ultimately provide them with the skills necessary to improve employment opportunities.

Similarly, their withdrawal from online courses was not significantly different than traditional students. Since online courses eliminate the time and distance issues that force many working adults to withdraw from college, nontraditional students appear to be more likely to successfully complete courses offered in this format. Such courses are the best opportunity that working adults have in completing their education and preparing for better lives. Unfortunately, a significant characteristic that is critical for online enrollment to begin with, is computer efficacy. Before students can enroll in the courses that are more likely to lead them to successful attainment of their degrees, they must feel confident in their abilities.

Today's forty year old college student had very limited, if any, access to computers in high school and some of them have had limited experience with them during employment. However, these adult students will be needed to fill skilled positions for the next twenty years as the pool of younger workers declines. While reduced computer skills and efficacy may have created significant challenges for nontraditional students, they appear to embrace technology and compensate for limited skills with extra time and effort. If given the right opportunities, these potential employees can meet a growing demand in the labor market while simultaneously creating better lives for themselves and their families.

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APPENDIX

Table 1: Courses Surveyed at College A

Arts and Sciences Courses	Class Format	Number of Students
Business Ethics	Traditional/day	8
Introduction to Computers	Traditional/day	20
Micro Computer Applications	Traditional/day	17
Micro Computer Applications	Evening	10
Micro Computer Applications	Online	18
Technology for Teachers	Hybrid	17
English Composition I	Traditional/day	23
Arithmetic	Traditional/day	19
Elementary Algebra	Evening	16
	Total A&S:	148

Career and Technical Courses	Class Format	Number of Students
Human Resource Management	Traditional/day	11
Human Resource Management	Evening	10
Supervision in Middle Management	Online	15
Keyboarding I	Evening	9
Applied Accounting I	Traditional/day	27
	Total C&T:	72
Total Students from College A:		220

Table 2: Courses Surveyed at College B

Arts and Sciences Courses	Class Format	Number of Students
Basic Writing Skills II	Traditional/day	16
English Composition I	Traditional/day	15
English Composition II	Online	15
U.S. History	Online	15
General Psychology	Online	7
Beginning Algebra	Traditional/day	20
	Total A&S:	88
Career and Technical Courses	Class Format	Number of Students
Voice Technology	Hybrid	15
Micro Computer Software Applications	Traditional/day	16
	Total C&T:	31
Total Students from College B:		119
Total Students, Both Colleges:		339

Table 3: Demographical Data from College A

	Fall 2012 Population		Fall 2012 Sample	
	Number of Students	Percentage of Population	Number of Students	Percentage of Sample
Total Enrollment	3,775		220	
Average credits per student	10.93		12.19	
Average age	25.8		24.9	
Average female age	26.5		25.5	
Average male age	24.6		23.7	
Part-time students	1,452	38%	22	10%
Female students	2,356	62%	141	64%
Nontraditional students	1,248	33%	71	32%
Non-white students	323	9%	9	4%

Note. Obtained from College A, Institutional Research Office (March, 2013)

Table 4: Demographical Data from College B

	Fall 2012 Population		Fall 2012 Sample	
	Number of Students	Percentage of Population	Number of Students	Percentage of Sample
Total Enrollment	5,523		119	
Average credits per student	10.26		11.26	
Average age	26.2		25.7	
Average female age	27.3		27.0	
Average male age	24.8		23.2	
Part-time students	2,579	47%	15	13%
Female students	3,226	58%	78	66%
Nontraditional students	2,028	37%	43	36%
Non-white students	454	8%	9	8%

Note. Retrieved from College B Office of Research and Planning (2012)

Table 5: The Survey

The survey was comprised of a combination of open-ended, dichotomous, and Likert-scale questions. It was divided into sections with multiple questions per section. The first page contained a brief explanation of the study and provided instructions on how to complete the survey. The initial section "Background/Demographic Information" included questions regarding gender, age, ethnicity, academic level (first-semester freshman, second-semester freshman, sophomore, over 65 hours earned), academic intention (associate degree seeking, bachelor degree seeking, graduate degree seeking, non-degree seeking), full- or part-time status, and an open ended question regarding major. Finally, questions regarding employment, marital status, parental status, and financial independence were presented to determine the students' level of traditional or nontraditional standing.

Background/Demographic Information Variables

Variables	Description of Responses
College	College A or College B
Gender	Male or Female
Age	In Years
Ethnicity	African-American, Asian, Caucasian/White, Hispanic, Other
Academic Level	Student selects one from the following: First-semester Freshman (0-15 hours earned) Second-semester Freshman (16-30 hours earned) Sophomore (31-65 hours earned) Over 65 hours earned
Academic Intention	Student selects one from the following: Seeking a certificate (1 year or less) Seeking an associate degree (2 years) Seeking a bachelor degree (4 years) Seeking a graduate degree (Master's or Doctoral)

	Upgrading job skills Personal satisfaction
Credits enrolled	Student enters the number of credits currently enrolled
Employment[c]	Yes indicates that the student is currently employed
Marital Status[d]	Yes indicates that the student is married
Children[e]	Yes indicates that the student has children
Financial independence	Yes indicates that the student does not rely on others for financial support
College after high school	Yes indicates that the student attended college immediately after high school

[a-e] Variables also were combined to create a new variable: "level of nontraditionality"

The next section was titled "Experience with Computer Technology". The first question was dichotomous and asked if computers were used in school (kindergarten through twelfth grade). Various checkbox questions were presented to gather information pertaining to the skills acquired during these formative years. These responses were accumulated to create a single predictor variable regarding the amount of computer-related experience gained in school. A question was then presented regarding the availability of an introductory computer course in either high school or college. If such a course existed, the participant was asked if he or she completed it. Participants were then asked how they received the majority of their computer skills (formal class, on their own, help from a friend or family member, for employment, etc.). The final question in this section asked for the approximate age of the respondent when first introduced to computers. It was predicted that the primary method of computer experience as well as the age of initial use of computers would correlate to criterion variables.

Experience with Computer Technology Variables

Variables	Description
Computer Use in High School	Were computers used in high school? Yes or no response
Experience Obtained in High School[a]	Which experiences were obtained in high school? Students checked all that apply: Word processing, spreadsheets, presentations, database, programming, web page development, networking, email, Internet searching, video/audio editing, other
Introductory Computer Course Taken	Yes or no response
Computer Experience Obtained	How was computer experience obtained? On your own, taught by family/friends, for employment, in a class, other
Age of first computer use	At what age did computer use begin? Students entered age in years

[a]Selections were aggregated to create a new variable "amount of high school use"

The next section, "Access to Computers and Internet Technology", inquired about technological devices (cell phone, smart phone, desktop computer, notebook computer, tablet, eReader) that were owned and used by the participant. The age of computers in use was also collected. The selected devices were summed to create a single predictor variable regarding the number of devices owned. The type of Internet access, if it existed, was requested, as well as any use of public Internet access. It was predicted that the quantity of devices and the quality of Internet access would positively correlate to computer efficacy as well as computer-related behavior and participation in college.

Access to Computers and Internet Technology Variables

Variables	Description
Devices Owned[a]	Which of the following devices are owned? Students checked all that apply: Mobile cell phone, smart phone, desktop computer, laptop computer, tablet/mobile device, eReader
Internet Access at Home	Yes or no response
Type of Internet Connection/Home	Students selected one from the following options: Dial-up, DSL, satellite, cable, wireless, other
Public Internet Use	Yes or no response
Public Internet Locations	If public access is used, which locations are used? Students checked all that apply: public library, restaurants, college campus, work, other

[a] Selections were aggregated to create a new variable: "total devices owned"

In the section labeled "Level of Computer and Internet Use", participants were asked various questions regarding the number of hours that they used computers each week for any purpose, specifically for academic purposes, and/or specifically for employment purposes. Additionally, participants selected which computer- and online-related activities they utilized, such as banking, email, research, social networking, blogs, etc. These activities were aggregated to create predictor variables regarding the extent of both online and off-line computer usage. Students also were asked to estimate the percentage of their classes that required the use of computers for communication (email), obtaining and submitting homework (course management systems), and using word processors for writing papers, etc.

Level of Computer and Internet Use Variables

Variables	Description
Number of hours computers are used each week	Total number of hours spent on the computer each week
Number of hours computers are used for academia each week	Total number of hours spent on the computer for college-related work each week
Number of hours computers are used for employment each week	Total number of hours spent on the computer for work-related purposes each week
Regular online activities[a] (Continued on next page)	Online activities are presented. Students checked all that apply: email, research, banking, shopping, social networking, selling, college portal, YouTube, reading books/news, forums, phone calls, downloading music, chatting, blogging, wikis, sharing photos/videos, conferencing, gaming
Regular offline activities[b]	Offline activities are presented. Students

	checked all that apply: creating documents, homework, listening to music, editing photos/audio/video/graphics, playing games, web design
Amount of computer use in classes[c]	Enter percentage of classes that use the following: email, course management system, Internet research, word processing, specialized software

[a] Selections were aggregated to create a new variable: "total online activities"
[b] Selections were aggregated to create a new variable: "total offline activities"
[c] Selections were averaged to create a new variable: "average computer use in classes"

The final section, "Perceived Level of Computer Skills (Computer Efficacy)", asked an assortment of Likert-scale questions in which the participant rated his or her level of computer skills, computer preferences, and confidence in working with computers. The first question asked the participant to rate his or her general computer skills (1 = poor to 5 = excellent). For internal consistency, results from this question were compared to a new variable that averaged responses from several questions related to various computer skills. The next question asked students to rate their level of comfort with technology (1 = not comfortable to 4 = very comfortable). Then, students were asked if they had enough technical and computer skills to complete their assignments (1 = no, 2 = sometimes, 3 = yes).

Perceived Level of General Computer Skills and Comfort Variables

Variables	Description
Describe computer skills	1 = poor, 2 = below average, 3 = average, 4 = above average, 5 = excellent
Comfort with using technology	1 = not comfortable, 2 = somewhat comfortable, 3 = comfortable, 4 = very comfortable
Enough skills for assignments	1 = no, 2 = sometimes, 3 = yes

A series of questions allowed students to rate their level of skill using a variety of applications such as spreadsheets, word processors, video/audio software, graphics software, presentation software, course management systems, etc. These Likert options were 1 = don't use, 2 = poor, 3 = average, 4 = good, and 5 = excellent. Responses were averaged to create a single predictor variable related to total computer skills.

Perceived Level of Computer Skills with Various Technologies Variables

Variables	Description
Word processing	Word, etc.
Presentations	PowerPoint, etc.
Spreadsheets	Excel, etc.
Editing graphic/photo files	
Online library resources	
Computer maintenance tasks	Installing updates, extra memory, etc.
Organizing files and folders	

Working with files and folders	Creating, saving, deleting, moving, copying
Course management systems	Such as Blackboard, Moodle, etc.
Social networking	Such as Facebook, MySpace, etc.
Email	Sending/receiving, attaching files, organizing
Searching for information online	

Note. Variables also were aggregated to create a new variable: "total computer skills"

A single question allowed students to share their general preference for using computers for coursework or using traditional methods such as pen and paper or printed paper copies.

Preference for using Computers Variable

Questions	Response Options
Preference for using computers or traditional methods	1 = use the computer 2 = do not use the computer

Note. Question was reverse scored so all responses that were favorable to computers received higher rankings.

To measure internal consistency, this particular question was compared to a single new variable that averaged a series of existing variables regarding specific computer versus traditional methods. Possible responses to these questions were 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree. Responses were averaged to create a new variable: "total computer preferences".

Level of Computer Preference Variables

Questions
Web based instruction intimidates me.[a]
I am comfortable when communicating online.
I prefer talking to people in person rather than communicating on the web.[b]
I would rather answer questions in class than with an online discussion board.[c]
I would rather get class notes and materials as handouts than have to retrieve them on the web.[d]
I would rather not have to use computers in any of my classes.[e]
I would rather get my grades from the instructor and register for classes in person than have to use the Internet.[f]

[a-f] Questions were reverse scored so all responses that were favorable to computers received higher rankings.

Completing this section was a series of Likert questions regarding the students' confidence in performing common computer maintenance tasks. Rankings were from 1 = strongly disagree to 5 = strongly agree. These responses were averaged to create a single variable: "total computer confidence".

Level of Computer Confidence Variables

Questions
I feel confident when creating word processing files such as letters or reports.
I feel confident when locating, copying, moving, and deleting files.
I feel confident when learning about new software and applications.
I feel confident when troubleshooting minor computer problems.
I feel confident in organizing, managing, and moving files in folders.
I feel confident in understanding most words and terms about computers and technology.
It scares me to think that I could destroy large amounts of important information by pressing the wrong key.[a]
I am reluctant to use a computer because I am afraid that I will make a mistake that I cannot correct.[b]

[a-b] Questions were reverse scored so all responses that were favorable to computers received higher rankings.

Table 6: Nontraditional Students' Report Fewer Computer-related Abilities

	Traditional		Nontraditional	
	M	*SD*	*M*	*SD*
Perceived computer skills	3.71	.735	3.42	.784
Comfort using computers	3.20	.710	2.93	.842
Word processing skills	4.25	.794	3.80	.927
Presentations skills	3.97	.963	3.03	1.18
Graphics skills	3.04	1.29	2.63	1.30
Organizing folders/files	3.70	1.157	3.34	1.190
Creating folders/files	4.04	1.058	3.61	1.051
Searching on Internet	4.43	.731	4.15	.759

$p<.01$.

Table 7: Comparison of Computer Device Ownership

	Traditional		Nontraditional	
	M	*SD*	*M*	*SD*
Own a smartphone*	76%	.431	64%	.483
Own a laptop computer*	91%	.292	83%	.376

*$p<.05$. **$p<.01$.

Table 8: Computer-Related Factors Linked to Course Grades

	r^2
Computer efficacy	.093
Computer skills	.095

$p<.05$.

Table 9: Factors that Relate to Successful Course Completion

	r^2
Computer efficacy	.105
Computer skills	.124

p<.05.

Table 10: How Students Obtain Computer Experience

	Traditional	Nontraditional
On their own	61.9%	45.1%
Family or friend	4.9%	7.1%
On the job	1.8%	20.4%
Formal computer class	31.0%	26.5%

Table 11: Students Who Use Computers on the Job Enroll in More Online Courses

	Percentage enrolled online
Employed students who use computers on the job	30.8%
Employed students who do not use computers on the job	19.4%

Table 12: Academics Improve when using Computers for Work

	Hours on Computer for Work
Course grade	.101
Successful course completion	.137

ns = not significant.
p<.05.

Table 13: High School Experience Creates Greater Efficacy than Work Experience

Variables	*Experience gained on the job* r^2	*Experience gained in high school* r^2
Computer efficacy	.169**	.376**
Computer skills	.109*	.442**
Believe they have adequate skills for college	.120*	.221**
Comfort with using computers	ns	.356**
Are not intimidated by online classes	ns	.172**

ns = not significant.
*p<.05. **p<.01.

Table 14: Comparison of Time Spent on Computers

	Traditional		Nontraditional	
	M	*SD*	*M*	*SD*
Hours on a computer each week	17.65	24.34	23.63	19.88

**p<.01.

Table 15: Computer-Related Factors Linked to Course Grades

	r^2
Hours spent on a computer	.106

p<.05.

Table 16: Students in Online Courses Report Increased Computer Efficacy

	Online Students		Students in Classroom	
	M	*SD*	*M*	*SD*
Computer Efficacy	3.55	.651	3.28	.679
Preference for Using Computers	3.30	.717	2.98	.763

p<.01.

Table 17: Differences in Enrollment by Class Format

	Traditional	Nontraditional
Day classes	79.2%	20.8%
Evening classes	45.2%	54.8%
Online classes	48.6%	51.4%

p<.05.

Table 18: Comparison of Course Withdrawal Rates

	Traditional		Nontraditional	
	M	*SD*	*M*	*SD*
Course withdrawal rates	9.8%	.298	17.7%	.383

p<.01.