

FACTORS ASSOCIATED WITH RETENTION RATES IN CAREER AND TECHNICAL
EDUCATION TEACHER PREPARATION WEB-BASED COURSES

By

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ABSTRACT

There is a recognized state and national shortage of Career and Technical (CTE) teachers; in certain school districts or by subject area, it is defined as a “Critical Shortage”. At the same time, both statewide and nationally, the number of teacher preparation programs for Career and Technical Education (CTE) teachers has decreased. To alleviate the shortage and increase access many Career and Technical Education (CTE) teacher preparation programs use the web.

This study examined retention rates in courses from Fall 1997 through Fall 2003 within web-based courses in a CTE teacher preparation program at the University of Central Florida to identify factors associated with student retention.

Three research questions emerged from the primary question: Are there factors associated with retention rates in web-based Career and Technical Education (CTE) teacher preparation courses? (a) Is gender associated with retention rates in web-based Career and Technical Education (CTE) teacher preparation courses? (b) Is ethnicity associated with retention rates in web-based Career and Technical Education (CTE) teacher preparation courses? and (c) Is age associated with retention rates in web-based Career and Technical Education (CTE) teacher preparation courses?

Enrollees were non-admitted students seeking initial Career and Technical Education (CTE) school district certification as well as admitted students seeking state certification and/or a Bachelors degree. Of the 2371 enrollees in eleven (11) web-based courses during 74 course

offerings from Fall 1997 through Fall 2003 in a Career and Technical Education (CTE) teacher preparation program at the University of Central Florida, a large metropolitan public university, 92.1% were retained.

Three demographic variables, gender, ethnicity and age were compared, to evaluate retention. The categorical data were analyzed using Chi Square Test of Independence.

My Dad, Joseph A. Fazio, Sr.

“The only limitation in life is the lack of education.”

“I want you to be a teacher”, said my Daddy. As you watch from heaven, I want to say thank you for sending angels here on earth to help me fulfill this dream. You shared how your teachers were upset and tried to convince you to stay in school; however, your family came first. Although you left school in the 9th grade to support your family, you took the time to educate yourself; reading, learning and applying this knowledge to your daily life. You constantly reminded me of the importance of education. Thank you for this gift.

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CHAPTER I: INTRODUCTION

According to a study by Lynch (2001), student dropout rates from Internet courses were as high as 35-50%, compared to 14% for traditional classes (Carr, 2000; Diaz, 2002; M. M. Lynch, 2001). As post secondary institutions have developed distance education programs research in the area of retention has included this form of education delivery (Gilbert, 2000).

Delivery methods of education are affected by technology (Galusha, 1998; Zirkle, 2002a, 2002b). “Increased competition for students and calls for improved ‘ease of access’ have driven institutions to create innovative approaches to course delivery” (Lewis, Snow, Farris, & Levin, 1999). According to Zirkle (2003), these issues have begun to affect Career and Technical Education (CTE) programs (Zirkle, 2003). A study by Bruening, Hodes, Dhital, Xiaorong, & Shih-Tsen (2001) proposed that all types of distance education course delivery systems in CTE Teacher Preparation Programs are projected to increase within the next three years.

If the projections are accurate, nearly 68% of the CTE teacher preparation programs will use the World Wide Web to deliver courses in the near future. The number of satellite, e-mail and traditional print correspondence courses will also increase, but not as much. A few programs reported plans to put all their CTE teacher preparation courses online within the next few years. One respondent reported that their four core teacher certification courses were all on line and that

both their off-campus students and traditional resident students must take these courses via the World Wide Web (Bruening, Scanlon et al., 2001).

Several studies on CTE teacher preparation examined various demographic attributes of learners in web-based type of education delivery. Thompson, Orr, Brooks & Thompson (2000) described the students in distance Bachelor's degree program in Vocational Education as predominately female. Wright and Thompson (2002) described these students as older, adult learners with family and work commitments. Oehlkers (1999) found master's degree programs in vocational education were predominately female students with an average age of 38. Zirkle (2002b) found that 60% of the students for inservice and preservice trade and industrial teachers training were between the ages of 32-45 and pursuing a bachelor's degree. In Tucker (2000) it was noted that there was a significant age difference between students on campus (average age 23 years) and web based students (average age 37 years) (Oehlkers, 1999; Thompson, Orr, Brooks, & Thompson, 2000; Tucker, 2000; Wright & Thompson, 2002; Zirkle, 2002a, 2002b).

Career and Technical Education teacher preparation students may desire to pursue degrees or enroll in courses to retain their current teaching position without relocating due to family responsibilities. Many students who are time-bound due to job or travel difficulties, or place-bound due to geographic location, want to access courses and degree programs at their convenience (Zirkle, 2002a, 2002b).

Purpose of the Study

The purpose of this study is to identify factors associated with retention rates in web-based courses within a Career and Technical (CTE) teacher preparation program.

Research Questions

The broad question for this study: Are there factors associated with retention rates in web-based Career and Technical Education (CTE) teacher preparation courses?

Sub-questions

Is gender associated with retention rates in web-based Career and Technical Education teacher preparation courses?

Is ethnicity associated with retention rates in web-based Career and Technical Education teacher preparation courses?

Is age associated with retention rates in web-based Career and Technical Education teacher preparation courses?

Importance of the Study

A call for increased access to higher education has driven the growth of web-based learning opportunities. This has occurred concomitantly with a decline in Career and Technical Education (CTE) teacher preparation programs while the need for vocational teachers continues (Bruening, Scanlon et al., 2001; R. Lynch & Hartley, 1996; Zirkle & Shoemaker, 1999) . As Career and Technical Education (CTE) teachers use computers and the Internet to further their education distance education is projected to grow (Bruening, Scanlon et al., 2001). Because of this growth, there is a value to both educators and students in determining the factors associated with retention of these future teachers in web-based delivered courses. A potential teacher is lost

when retention rates are low in teacher preparation courses. Not only is this student lost as a teacher; combined with a teacher shortage compounds the problem of a lack of teachers.

Further, due to the nature of this type of delivery there are no borders thereby increasing the competition for recruitment and retention of students (Lewis et al., 1999). At the same time a specific program performance responsibility is to promote retention-driven marketing that encourages students to enroll in courses to complete their educational goals and contribute to the success of colleges and universities in achieving their missions regarding degree completion; and satisfaction (Burnett, 2001; Howard & Rogers, 1991; Koppich, 2001).

This research is important as a benchmark for web-based Career and Technical Education (CTE) teacher preparations courses. The identification of the factors associated with retention rates could be useful to the Career and Technical Education community to evaluate and promote web-based courses as a viable way to prepare Career and Technical Education teachers.

Secondly, Career and Technical Education teacher preparation programs could use this study as a starting point to discover ways in retaining these predominately non-traditional, adult students in web-based courses while providing the quality training they need.

Delimitations

The data were delimited to that which was obtained from one program at one university, albeit a large public university in the United States; namely, the University of Central Florida.

Definitions

For the purposes of this study, the following definitions are used.

Career and Technical Education (CTE) – In this study, Career and Technical Education refers to a curriculum that is experientially based to demonstrate how education relates to the workplace and life (ACTE, 2004).

Community college – A public 2-year institution that awards associate degrees or less than 4 year, sub-baccalaureate certificates as its highest award type.

Comprehensive high school – The typical U.S. high school, offering at minimum, academic studies and usually some vocational education (NCES, 2000).

Distance Education – A formal education process where the majority of the instruction occurs when the learner and the instructor are not in the same place at the same time, often mediated by technology.

Non-traditional student - Specifically, in this study, a nontraditional student is one who has any of the following characteristics:

1. Attends part time for at least part of the academic year;
2. Works full time (35 hours or more per week) while enrolled;
3. Considered financially independent for purposes of determining eligibility for financial aid;
4. Has dependents other than a spouse (usually children, but sometimes others);
5. A single parent (either not married or married but separated and has dependents).

Public universities – State supported institutions that offer both undergraduate and graduate educational programs in a variety of disciplines.

Retention rate – Defined as enrollees that have finished the web-based course and obtained a grade of A, B, C or D.

Subject Matter Expert (SME) – An individual peers would consider as demonstrating the highest level of expertise in performing a specialized job, task or skill; usually limited to industrial or technical specialties.

Success rate – Defined as enrollees that have finished the web-based course and obtained a grade of A, B, or C.

Teacher Preparation Program – A formal program of study that prepares teacher candidates for a state certification or local school district approval; a teacher education program.

Technical education - Includes the following sub groupings:

1. Protective services: includes coursework in criminal justice and fire protection.
2. Computer/data processing: Includes coursework in computer programming, data processing, and computer and information sciences.
3. Engineering/science technologies: Includes coursework in architectural engineering technology; computer engineering technology; heating, air conditioning, and refrigeration technology; industrial/manufacturing technology; biological technology; and nuclear and industrial radiological technologies.
4. Communication technologies: Includes coursework in educational media, photographic technology, and radio and television broadcasting technology.

Trade and industry – Includes coursework in construction; automotive and other mechanics and repairers; drafting and other precision production; transportation and materials moving; and consumer, personal, and miscellaneous services.

Vocational Center/Technical Center – includes full-time vocational high schools and area or regional vocational schools. It may serve postsecondary and adult students in addition to high school students.

Vocational programs – Vocational programs (also called specific labor market preparation or occupationally specific programs) are offered at both the secondary and postsecondary levels, although the classifications differ somewhat at the two levels. According to NCES (2000) the following are definitions of vocational programs.

1. Agriculture and renewable resources - Includes courses in Agricultural Mechanics, Horticulture, Animal Science, and Environmental Management.
2. Business - Offers training in business services and business management, including courses in Bookkeeping, Accounting, Data Entry, Office Procedures, Business and Management and Banking and Finance.
3. Marketing and distribution - Includes courses related to the selling and distribution of goods and services, including Distributive Education, Distribution and Marketing, Fashion Merchandising, and Entrepreneurship.
4. Health care - Includes courses intended to prepare students for careers in the health professions, such as Health Occupations, Dental Assistant, Medical Laboratory Technologies and Practical Nursing.
5. Public and protective services - Includes courses in Criminal Justice, Fire Protection, Public Administration and Social Work.
6. Trade and Industry - Includes coursework in construction trades, mechanics and repair, precision production, and transportation and material moving. The construction trades program area includes course in Electricity, Carpentry,

Plumbing, and General Construction. Mechanics and repair includes courses in Industrial Maintenance; Radio and TV Repair; Air Conditioning, Refrigeration, and Heating; and Auto Mechanics. Precision production includes courses in Drafting, Graphic Arts, Machine Shop, Woodworking, Plastics, Electronics, and Leatherwork and Upholstery. Transportation and material moving includes Aviation Technology, Marine Engine and Boat Repair, and Truck Driving.

7. Technology and communications - Includes coursework in computer technology, communication technology and other technologies. The computer technology field includes courses in Computer Applications, Computer Programming, and Data Processing. The communication technology field includes courses in Broadcast Management, Film Making, and Radio and Television Production. Other technology courses include Electronic Technology, Industrial Production Technology and Chemical Technology.
8. Personal and other services - Includes courses in Cosmetology, Clothing and Textiles, Vocational Home Economics and Institutional Maintenance.
9. Food service and hospitality - Includes courses in Food Service and Nutrition, Hospitality, and Travel and Tourism.
10. Child care and education - Includes courses in Teaching Assisting, Child Care and Elder Care.

Web-based delivery – The delivery of and access to a coordinated collection of learning materials over an electronic medium using an internet web server to deliver the materials, a web browser to access them in an asynchronous learning environment. The teaching and learning

situation engages the instructor and learner in interactive instructional settings when they are separated geographically and by time and place.

CHAPTER II: REVIEW OF LITERATURE

Introduction

Several areas of related literature contributed to the understanding of Career and Technical Education (CTE) teacher preparation programs and associated retention outcomes relevant to the research questions addressed in this dissertation. The first area provided an overview of Career and Technical Education (CTE). This included legislative acts that laid out the funding of vocational education, now called Career and Technical Education (CTE).

The second area provided a description of Career and Technical Education (CTE) teacher preparation programs with their specific subject matter names. This included the status of Career and Technical Education (CTE) programs as well as the uniqueness of Career and Technical Education (CTE) teachers. Another major focus was web-based course delivery and its growing use in education; specifically, in Career and Technical Education (CTE) teacher preparation programs.

The final area addressed retention of students. This included the retention problems in distance education; in particular, web-based delivered courses. Each section explains relevant theories and describes related research.

Career and Technical Education Overview

There is a great and crying need of providing vocational education of this character for every part of the United States—to conserve and develop our resources; to promote a more productive and prosperous agriculture; to prevent the waste of human labor; to supplement apprenticeship; to increase the wage earning power of our productive workers; to meet the increasing demand for trained workmen; to offset the increased cost of living. Vocational education is therefore needed as a wise investment for this nation, because our national prosperity and happiness are at stake and our positioning the markets of the world cannot otherwise be maintained (Holt, 1974 p 4).

This interest aroused the attention of President Woodrow Wilson and the U.S. Congress. Charles Prosser, the first Executive Secretary of the National Society for the Promotion of Industrial Education (NSPIE) and David Snedden, the Education Commissioner of Massachusetts championed to this cause and advocated an essentialist approach toward vocational education. This concern resulted in the Smith-Hughes Act of 1917 that provided funds for vocational education. This was followed by many revisions and new federal legislation including the proposed “*The Carl D. Perkins Secondary and Technical Education Excellence Act of 2004*” (Burkett, 1968; DOE, 2004; Gordon, 2003; Rojewski, 2002). “Many people, including outstanding leaders of the day, were saying that education must expand to include vocational training; that vocational education was ‘socially efficient’; that the end of all schools must be life; that everybody in the nation must be taught to work” (Burkett, 1968).

In 1981, Secretary of Education T. H. Bell created the National Commission on Excellence in Education, directing it to examine the quality of education in the United States and to make a report to the Nation. In accordance with the Secretary's instructions, this report should contain practical recommendations for educational improvement and fulfill the Commission's responsibilities under the terms of its charter. The Commission was created as a result of the Secretary's concern about public perception that something was seriously wrong in our educational system. He then solicited the support of all who care about the future and noted that he was establishing the Commission based on his "responsibility to provide leadership, constructive criticism, and effective assistance to schools and universities." After the publication of *A Nation at Risk: The Imperative for Educational Reform. A Report to the Nation and the Secretary of Education, United States Department of Education* by The National Commission on Excellence in Education (*Nation at Risk*, 1983), dozens of public and private studies, commissions, and task forces convened for the purpose of reforming public education.

The first wave of reform occurred throughout the 1980s then continued into the 1990s with the U.S. Department of Labor Secretary's Commission on Achieving Necessary Skills (SCANS), created for the purpose of examining the demands of the work place and to determine whether the current and future workforce is capable of meeting those demands. The thirty one (31) representatives were from the nation's schools, businesses, unions and government. In 1991 the Commission issued a report entitled: *What work requires of schools: A SCANS Report for America 2000*. This report told educators and employers what students and workers need to know and be able to do in order to succeed in the work place. According to the Commission the information was needed since students were leaving schools without the basic skills required to find and hold a good job (Rojewski, 2002). Other federal laws included the Carl D. Perkins Act

of 1984 and the Carl D. Perkins Vocational and Applied Technology Act of 1990 (Burnett, 2001; Gordon, 2003; Rojewski, 2002). Basically the Federal Carl D. Perkins Vocational and Technical Education Act and revisions thereafter outlined the funding to postsecondary institutions in preparing students to be more competitive in the world economy.

This focused education reform and workforce development agenda continued and in the early 1990s the School-to-Work Opportunities Act (STWOA) of 1994 was the most comprehensive attempt to implement the principles, including the following goals: “improved academic skills; strengthened SCANS skills; a greater emphasis on standards; innovation and work-based learning; participation of many institutions, including employers, in education; making pathways into particular occupations more transparent; and facilitation of the transition of the ‘forgotten half’ to post-secondary education” (Gordon, 2003). As a result, in many localities, education officials changed the term to “school-to-careers” (Gordon, 2003).

From 1988 to 1999 the National Center for Research in Vocational Education (NCRVE) was the largest center for research, development, dissemination, and outreach in work-related education. “Funded by the Office of Vocational and Adult Education of the U.S. Department of Education, NCRVE played a key role in developing a new concept of workforce development. The Center's mission was *to strengthen school-based and work-based learning to prepare all individuals for lasting and rewarding employment, further education, and lifelong learning.* NCRVE was shut down on December 31, 1999. Furthering this effort into the year 2000 and beyond is the National Research and Dissemination Centers for Career and Technical Education” (*National Center for Research in Vocational Education Website, 1999*).

About seventy five (75%) percent of all comprehensive high schools offer several courses in one or more specialized labor market preparation programs, historically identified as

agriculture, business and office, marketing, health, family and consumer sciences (occupational or wage earning), and trade and industrial (Boesel, Hudson, Deich, & Masten, 1994). More recently the federal government added public and protective services, childcare and education, food service, hospitality, technology and communications, and personal and other services to its classification of vocational education program areas (Levesque, Louen, Teitelbaum, Alt, & Librera, 2000). In addition to comprehensive high schools, vocational education is offered at secondary vocational centers, community colleges and technical centers at the post secondary level.

The 2000-2001 edition of the U.S. Department of Labor (2000) Occupational Outlook Handbook states that overall, the number of career and technical teaching positions will grow approximately 10-20% through 2008. Although the need for vocational education teachers continues, budget restraints have caused colleges and universities to close their CTE programs (Bruening, Scanlon et al., 2001; R. Lynch & Hartley, 1996). Anticipated and continued growth in web-delivered instruction is expected as traditional programs close (Twomey, 2002).

Career and Technical Educator (CTE) Teacher Preparation Programs

It is not easy to determine exactly how many U.S. colleges and universities actually offer baccalaureate degrees (or programs) to prepare teachers for CTE. A primary reason for this difficulty is that the words, “career and technical education” or “vocational teacher education”, are not always the descriptors used to identify such programs. Rather, programs are more apt to be called by their subject-specific names (e.g., technology education, business education, home economics education, agricultural education). The problem is exacerbated in that there is no

nationally-published directory identifying career and technical education or vocational and technical teacher education programs (R. Lynch & Hartley, 1996). There are at least seven different CTE teacher preparation program constituencies historically defined as: (a) business education, (b) trade and industrial education, (c) health occupations, (d) family and consumer sciences, (e) technology education, (f) agriculture and (g) marketing/distributive education (Bruening, Scanlon et al., 2001; Gray & Walter, 2001).

Status of Career and Technical Education Teacher Preparation Programs

Lynch (1990), in a study of CTE teacher preparation programs identified 432 institutions reported to have vocational teacher education programs (R. Lynch & Hartley, 1996; R. L. Lynch, 1990). Ten years later, Bruening, et al (2001) approximated 385 CTE teacher preparation programs were found. This represents an 11% decrease in a 10-year period in the number of CTE teacher preparation programs. The researcher pointed out that although the number of vocational teacher education programs has been steadily declining in recent years federal policies have begun to place greater emphasis on career and technical education as a critical component of the public educational system (Bruening, Scanlon et al., 2001). In Florida during the last five years, the number of undergraduate CTE teacher preparation programs in public universities has decreased from 4 traditional and online programs to 2 online programs. In addition to the reduction of CTE teacher preparation programs and the growing demand of CTE teachers there is an expectancy of teacher candidates meeting rising academic criteria (Bruening, Scanlon et al., 2001).

Uniqueness of Career and Technical Education Teachers

In Senter & Senter (1998), non-traditional students are defined as 25 years of age or older. In Villella & Hu (1991) non-traditional students are described as those students 25 years of age or older, or attend college on a part-time basis, or commute to school, or a combination of these characteristics (Villella & Hu, 1991). In Bruening, et al (2001) a profile of a career and technical educators had the following characteristics:

Almost half (46%) of the respondents were female. This finding represented a large increase over the Lynch study (1990), which reported that only 29% of CTE teacher educators were female. The mean age of the respondents was 50, ranging from a low of 23 to a high of 75 years of age, which is a slight increase in mean age over the 1990 study where Lynch reported a mean age of 49. More than 40% (42.8%) of the respondents were between 51 and 60 years of age. Older teacher educators (>70 years) were few in number (0.6%).

About 90% of the respondents identified themselves as white, 4% as African American, and 3% as Hispanic. Of the remaining 3%, 1.1% were Pacific Islander, 6% were Asian American, 1% were Native American, and .3% chose not to provide this information. These figures are reasonably stable over the 10 years since Lynch (1990) reported that CTE teacher educators were 90.6% white and about 5% African American (Bruening, Hodes, Dhital, Xiaorong, & Shih-Tsen, 2001).

Career and technical education teachers are generally older than academic teachers as they enter the teaching profession after obtaining industry experience (Levesque et al., 2000).

Career and technical education teachers are subject-matter-experts (SMEs) without degrees since they are required to have practical experience in their subject-area field before their teacher education training (Bartlett, 2002). Although they enter teaching with content experience, some with degrees; they require teacher preparation courses (Bruening, Scanlon et al., 2001). At the same time state and district requirements require career and technical educators (CTE) to enroll in certification and continuing education courses. Several years of work experience plus certification courses and/or a bachelor's degree in a subject-area and then teacher training can translate into a six figure overall training cost (Lucas, 1999).

New CTE teachers are sometimes discouraged by the protracted period of teacher training as well as the inconvenience of attending face-to-face preparation classes. According to Phelps (1998) teachers must be required to understand the role of academics in business, industry and community organizations as they align their programs with the needs of the workplace (Phelps, 1998).

Web-based Course Delivery

In 1999–2000, 8 percent of all undergraduates participated in distance education at the institution in which they were enrolled or at both the institution at which they were enrolled and somewhere else. Among those who participated, 29 percent were enrolled in programs available entirely through distance education. Moderately or highly nontraditional students were more likely than either traditional students or minimally nontraditional students both to participate in distance education and to be in programs available entirely through distance education.

Among all students who participated in distance education, 60 percent participated via the Internet, 39 percent through prerecorded television or audio, and 37 percent through live television or audio. There were no statistically significant differences between traditional and nontraditional students in the mode they used to participate (NCES, 2002).

Due to technological innovations, distance education can provide the same instructional contact and interaction for the student as traditional settings (Galusha, 1998). The growth of distance learning opportunities allows students to access courses and degree programs at their convenience. The career and technical education teacher is typically drawn to this form of delivery as they are students who are “time bound” due to job or travel difficulties, or “place-bound” due to geographic location (Zirkle, 2002b).

Reported in Bruening (2001) the instructional approach most frequently used in career and technical teacher preparation programs was the traditional lecture or lab complemented by a student teaching semester or quarter; however, distance education course delivery systems were also used and projected to increase within the next three years (Bruening, Scanlon et al., 2001). The use of web-based learning using the World Wide Web was projected to double over that period of time. Twenty-eight programs (30.4%) offered three or more courses on the World Wide Web (Bruening, Scanlon et al., 2001).

Web-based learning refers to the teaching and learning situation in which the instructor and learner are engaging in interactive instructional settings when they are separated geographically and by time and place (Keegan, 1988; Mizell, Heppler, & Kontos, 1995). Web-based learning utilizes the World Wide Web combined with current technologies to achieve two

main objectives: (a) provide equitable access to quality education and (b) meet the unique learning needs and styles of individuals (Barron, 1994). In CTE online courses for teachers, the course instructor is not the sole source of knowledge as much as a facilitator to support the student's learning process while the student participates in the imparted knowledge (Galusha, 1998). This learning process fits the CTE program participants because the facilitator recognizes and respects the content expertise of the student.

Retention of Students

Retention can be defined in a variety of ways. Martinez (2003) describes it as “the number of learners or students who progress from one part of an educational program to the next” (Martinez, 2003 p 3). It can be defined by some academic institutions to be relevant to program completion (Kerka, 1988). Poor retention rates produce financial implications, accreditation concerns, and the negative impact on reputation. Institutions spend significant resources in attracting and admitting students; incompleteness is considered a loss in an investment by a college or university. Successfully reducing the dropout rate and stabilizing enrollments allows for better allocation of delivery of resources as well as providing improved return on investment (Martinez, 2003).

Reason (2003) reported ever rapidly changing demographics of undergraduate students in higher education has impacted the study of retention. “As an increasing number of students from formerly underrepresented groups come to campus, the effects of race, gender, ethnicity, age and other demographic variables will change” (Reason,

2003 p 187). Further, Hoyt & Winn (2004) found that disaggregate non-returning students were not separated into distinctive subpopulations which included drop-outs, stop-outs and transfer-outs. They had different overall profiles and reasons for leaving college. However, “The most frequent reason reported across all groups is financial concerns” (Hoyt & Winn, 2004 p 407). In addition to financial concerns, the same study results indicated that family responsibilities, conflict with job, marriage, health concerns, and dissatisfied instruction ranked fifth or above for drop-outs, stop-outs and transfer-outs (Hoyt & Winn, 2004).

Finding inclusive and representative samples of highly diverse student populations is and will continue to be very difficult, but essential to thorough retention research studies. Researchers must include such variables as student status (full or part-time) commuter status, and work/family responsibility, along with the traditional age, gender, race, and ethnicity variables, for samples to be truly representative of the current student population (Pascarella & Terenzini, 1998; Reason, 2003)

Among beginning postsecondary students seeking bachelor and associate’s degrees, nontraditional students were more likely than traditional students to leave without earning a degree. Nontraditional beginning students who left their first institution were more likely to leave postsecondary education altogether (Allen, 1993; NCES, 2002; Reason, 2003). “Two-thirds of nontraditional students perceived their primary role to be that of an employee, suggesting that school did not have first claim on their time and energy. Nontraditional students who considered themselves primarily students found that work limited their class and scheduling options” (NCES, 2002). In addition to non-traditional students Fry (2004) indicated that there is a

disparity between Hispanic and White completion rates; 81% of Whites complete compared to 57% for Hispanics (Fry, 2004).

In conjunction with retention, attrition is mentioned in the same articles. The attrition rate for nontraditional students was approximately 32% (M. M. Lynch, 2001; Villella & Hu, 1991).

Factors that affect the retention or attrition decisions of nontraditional students are difficult to determine. The underlying problem is the difficulty in defining the typical nontraditional student. The characteristics of this population are constantly changing. Some of the characteristics of the nontraditional student that impact persistence in college include sex, marital and parental status, ethnicity, and age. Women and men experience different needs. Students with children have very different problems from students without children. Single parents have different needs from couples with children. Many ethnic groups have needs that differ from other ethnic groups (Marlow, 1989; Villella & Hu, 1991).

Distance Education Retention

A World Bank report on distance learning covering the world's mega universities; large open universities with more than 100,000 distance education students (e.g., China TV University system with 530,000 students in 1996) reported dropout rates ranging from 19 to 90 percent and an overall average rate of 40% (Potashnik & Capper, 1998). Further, student dropout rates are on average 15 percent higher in distance learning courses than in traditional course offerings (Carr, 2000).

Many distance education learners are older, have jobs and families (Simonson, Smaldino, Albright, & Zvacek, 2003). They must be able to coordinate the various aspects of their lives in order to have dedicated time for studying (Moore & Kearsley, 1996). Role conflict, time management, family problems, and economic concerns can all present barriers to online learning. An adult nontraditional student could easily feel overwhelmed when trying to juggle job demands, caring for children or elderly parents, and completing coursework (Moore & Kearsley, 1996).

Retention of nontraditional students in online programs is a persistent and perplexing problem for providers of adult education. With online learning, there is a greater likelihood that a student will not complete courses and stay enrolled in an online program than in an on-campus course (Palloff & Pratt, 2001).

Summary

In the early 1900s, vocational education was identified as the resource for preparing tomorrow's employees. One hundred years later; although the name has changed to Career and Technical Education, it continues to serve the 'forgotten half' to post-secondary education as they prepare the workforce; known today as "school-to-careers".

This chapter includes the historical frame of reference for Career and Technical Education (CTE) as well as the need for Career and Technical Education (CTE) teachers; for without the teachers there are no programs. The literature indicates that there is a shortage of Career and Technical Education (CTE) teachers; thereby jeopardizing the

very existence of some of these programs. At the same time, the numbers of Career and Technical Education (CTE) teacher preparation programs are decreasing.

Researchers recommend that Career and Technical Education (CTE) teacher preparation programs turn to web-based delivery of courses to allow “ease of access” to second career subject-matter-experts (SMEs) affording them the opportunity to enter teaching positions in Career and Technical Education (CTE). It is therefore imperative to study the factors associated with retention in web-based course delivery, which is the focus of this study.

CHAPTER III: METHODOLOGY

Introduction

This study targeted retention rates for undergraduate web based courses in a Career and Technical Education (CTE) teacher preparation program. The researcher examined retention rates in web-based courses from Fall 1997 through Fall 2003 at the University of Central Florida and determined retention and success rates in these courses. The research design was descriptive using categorical variables to discover factors associated with retention rates.

This chapter describes the methods and procedures used to answer the following research questions:

The broad question for this study is whether there are factors associated with retention rates in web-based Career and Technical Education (CTE) teacher preparation courses?

1. Is gender associated with retention rates in web-based Career and Technical Education teacher preparation courses?
2. Is ethnicity associated with retention rates in web-based Career and Technical Education teacher preparation courses?
3. Is age associated with retention rates in web-based Career and Technical Education teacher preparation courses?

Research Design

After evaluating the data for enrollees in Career and Technical Education (CTE) teacher preparation web-based courses, the researcher removed graduate level courses, independent study courses and internship courses. The data would then correspond to earlier institutional research including only courses. This researcher proceeded to evaluate the institution demographics and compared them to the study population to determine if any major differences and/or similarities existed. To appropriately compare the target group to that of the institution a variable was created entitled “Success rate”; only enrollees receiving Grades A, B and C were included; this duplicated how the institution defined success rate in an earlier study on web-based courses (Dziuban, Hartman, Moskal, Sorg, & Truman, 2004). In addition, a second variable was created for those finishing web-based courses with a passing grade (A – D) and were defined as “completers” to be used in the retention rate analysis. This study was interested in retention rates and on a 4.0 scale, Grades A, B, C & D are passing grades; therefore, this researcher wanted to include all enrollees that finished and passed the CTE teacher preparation web-based courses.

Data Collection

For the purpose of this research data by enrollees in undergraduate web-based courses was obtained from the Office of Institutional Research.

This office has the responsibility of assisting in the organization and maintaining institutional data for decision-making, analyzing and interpreting data to provide information that is appropriate and useful in planning and decision-making, and serves as

a catalyst for institutional self-analysis and improvement. The information was obtained in a coordinated effort with the Research Initiative for Teaching Effectiveness (RITE), which supports the institution's faculty in formulating and implementing research on effective teaching practices in higher education (OIR website).

Further information was obtained through the Center for Distributed Learning, which serves as the Virtual Campus for the University. As the Virtual Campus, the Center brings focus to University efforts in Distributed Learning by providing administrative support for all distributed learning credit courses, degree programs and activities offered by the University of Central Florida. The University of Central Florida is one of eleven public universities within the Florida Board of Education's Division of Colleges and Universities. Additional data was obtained from Course Development & Web Services (CDWS), which is a learning organization within the division of Information Technologies and Resources at the University of Central Florida (UCF). CDWS was originally formed out of a need to develop and deliver online strategies and guidelines for UCF faculty venturing into the world of online teaching and learning. Since its inception, CDWS' responsibilities have expanded to encompass a broad spectrum of Web-based initiatives.

Permission to use institutional data was approved through the Institutional Review Board (I.R.B.); this committee oversees the human subject guidelines and grants permission to conduct the research. Data for the study was analyzed from Fall 1997 through Fall 2003. The university began using Web-CT in Fall 1997 as the official and supported system to offer web-based courses; therefore, Fall 1997 was chosen as the starting point in data collection. The last data collected for this study included Fall 2003. The data included 2371 enrollees in 11 different web-based courses across 74 course offerings.

Data Analysis

Data analysis in this study was conducted using the statistical analysis software Statistical Package for the Social Sciences (SPSS) Version 11.5 for Windows. Chi-Square Test of Independence, a nonparametric test, was used since the data was categorical.

Enrollees in Career and Technical Education (CTE) teacher preparation web-based courses were classified by gender, ethnicity and age group. The data was then analyzed using Chi-Square Test of Independence, cross-referencing the individual classified variables with completers, resulting in retention rates. A second analysis was done using success in the place of retention. Differences based on gender, ethnicity and age were used and compared to completers of web-based courses in a CTE teacher preparation program. The Chi-Square Test for Independence was used to analyze the data for differences in retention and success in web-based courses. The output included the number of occurrences, the count of each combination of levels of each variable as well as the percentages for the variables. Retention was placed in the row while the other variables; gender, ethnicity and age were placed in columns. On the second run success was placed in the row. The output contains a row and column for each value of a variable. Gender included male and female. Ethnicity included Caucasian, Black, Hispanic, Asian and American Indian. Age included age groups; namely, “age 24 or younger”, “age 25-39” and “age 40 or older”. The output in SPSS consisted of two parts. The first part gave the counts and percentages within the independent variable. The second part of the output gave the results of the chi-square test. This was done twice; once for Retention rate and again for Success rate using the same comparison variables located in the columns. The Pearson chi-square was used

for this study to test significance. A significant chi-square test result indicates that the two variables are not independent. A value that is not significant indicates that the variables do not vary significantly from independence. Each independent variable; gender, age, and ethnicity were used to determine statistical significance with a dependent variable; retention rate and then on success rate.

CHAPTER IV: RESULTS

Introduction

This research study sought to determine the factors associated with retention rate in web-based courses within a CTE teacher preparation program at a large public university; UCF data by enrollees in courses from Fall 1997 through Fall 2003 were obtained from the Office of Institutional Research in a coordinated effort with the Research Initiative for Teaching Effectiveness (RITE). Chi Square Test of Independence using the statistical analysis software Statistical Package for the Social Sciences (SPSS) Version 11.5 for Windows was calculated. Three sub research questions were developed from the original research question. The analyses included the following areas of interest: (a) the setting and demographics of the institution where the study population was drawn, (b) demographics of the study population, (c) similarities and differences of the institution and study population, (d) Tables 1, 2, and 3 provide descriptive details for the institution, (e) Tables 4, 5 and 6 the study population, (f) all remaining Tables 7, 7.1, 7.2, 7.3, 8, 8.1, 8.2, 8.3, 9, 9.1, 9.2 and 9.3 are in this Chapter including the Chi-Square Test of Independence and (g) the analysis of the data related to the research questions.

Setting – Overall Demographics for Institution

The setting for this study was a public educational institution classified by the Carnegie Commission as a doctoral institution. The following institutional information was obtained from the Office of Institutional Research.

The total enrollment within the institution for 2003 was 41,685. Less than half of the population (18,632) was males (44.7%) and over half of the population (23,053) were females (55.3%). Table 1 provides the gender breakdown for the institution.

Table 1

Institution - 2003 Enrollment by Gender

Gender	# Enrolled	% of Total Enrollment
Male	18,632	44.7
Female	23,053	55.3
Total	41,685	100.0

In 2003, the ranking order of the institutions student population by ethnicity was: White, Non-Hispanic (71.2%); Hispanic (11.6%); Black, Non-Hispanic (8.4%); Asian-Pacific Islander (4.9%); Non-Resident Alien (3.4%); and Indian-Alaskan (.5%). Nearly 4% did not report their ethnicity. Table 2 provides the institutions enrollment by ethnicity.

Table 2

Institution - 2003 Enrollment by Ethnicity

Ethnicity	Enrollment	Percent
Indian-Alaskan	218	.5
Black, Non-Hispanic	3,385	8.4
White, Non-Hispanic	28,599	71.2
Asian-Pacific Islander	1,962	4.9
Hispanic	4,643	11.6
Non-Resident Alien	1,358	3.4
Not Reported	1,520	
Total	41,685	

In 2003 the average age for undergraduates was 22 years old. Table 3 provides the average age by grade level for the institution.

Table 3

Institution - 2003 Average Undergraduate Age Distribution by Grade Level

Grade Level	Average Age
Freshmen	18
Sophomore	21
Junior	23
Senior	26

Population and Demographic Characteristics

The target population was enrollees in CTE teacher preparation web-based courses. Only undergraduate courses were targeted. Enrollees were non-admitted students seeking initial CTE school district certification as well as admitted students seeking initial state certification and/or a Bachelors degree. Enrollees were not identified individually.

University wide enrollment demographics indicate that females (55.3%) exceed that of males (44.7%). These percentages are similar to the study population, which indicated a frequency of 1359 for females (57.3%) and 1012 for males (42.7%). The difference between the institutional demographics for enrollment by gender is approximately 2% or less for either gender.

As to ethnicity the study population was representative of the overall institutional student body, with one exception. The study population frequency of ethnicity ranked Black, Non-Hispanic second and Hispanic third. Whereas, the institutional demographics indicated Hispanic was second and Black, Non-Hispanic was third. The percentage of difference in the Black, Non-Hispanic ethnic classification for the institutional group (8.4%) compared with the study group (9.7%) was less than 2%. However, the Hispanic percentage of difference was twice as much in the institutional population (11.6%) when compared to the study group (5.4%).

The age group is the predominate area of difference. The average age for undergraduates in the institution was 22 years old; however, the majority of enrollees in the target group are over 25 years of age (86.4%). The literature confirms that there is a significant age difference between students on campus (average age 23 years old) and web-based students (average age 37).

Participants – Demographics for Study Population

The study population is enrollees in a Career and Technical (CTE) teacher preparation web-based courses. The total study population was $N = 2371$.

Less than half of the study population (1012) was males (42.7%) and over half of the population (1359) was females (57.3%). The literature indicated an increase in female Career and Technical Education (CTE) teachers over a 10-year period (from 29% in 1990 to 46% in 2000). One study indicated that a CTE teacher preparation program had predominately female students. Table 4 provides the total frequency and percentage of CTE enrollees by gender.

Table 4

Study Population: For the period Fall 1997 – Fall 2003 - Enrollees by Gender in Career and Technical Education Teacher Preparation Web-based courses

Gender	Frequency	Percent
Female	1359	57.3
Male	1012	42.7
Total	2371	100.0

The majority of enrollees are White, Non-Hispanic (79.5%) and nearly one-fifth (17.1%) are from various ethnic backgrounds. Approximately 3.5% did not report their ethnicity. The study population differs from the review of literature; White, Non-Hispanic is higher (90%) with 10% from various ethnic backgrounds. The literature indicated that these figures have been stable over a 10-year period, from 1990 through 2000. Table 5 provides the frequency and percentage of enrollees by ethnicity.

Table 5

Study Population: For the period Fall 1997 – Fall 2003 - Enrollees by Ethnicity in Career and Technical Education Teacher Preparation Web-based courses

Classification	Frequency	Percent
White, Non-Hispanic	1885	79.5
Black, Non-Hispanic	229	9.7
Hispanic	127	5.4
Asian	30	1.3
American Indian	17	.7
Not reported	83	3.5
Total	2371	100

The majority of enrollees are 25 years of age or older (86.4%). In 2001 the literature indicated that 42.8% of Career and Technical Education (CTE) teachers were between the ages of 51 – 60 years with a mean age of 50, ranging from a low of 23 to a high of 75 years of age. The literature reported that the typical CTE teacher is generally older than academic teachers. Table 6 provides the frequency and percentage of enrollees by age groups.

Table 6

Study Population: For the period Fall 1997 –Fall 2003 - Enrollees by Age Groups in Career and Technical Education Teacher Preparation Web-based courses

Age	Frequency	Percent	Frequency Over 25	Percent Over 25
24 years or below	75	3.2		
25-39 years	637	26.9	637	
40 years or above	1566	66.0	1566	
Not reported	93	3.9		
Totals	2371		2203	86.4

Overall, the enrollees in the study group are predominately female (57.3%). Out of those in the study group reporting their age over three quarters are “25 years of age or older” (86.4%). Based on the enrollees reporting their ethnicity, most are White, Non-Hispanic (79.5%).

Research Questions

The broad question for this study is whether there are factors associated with retention rates in web-based Career and Technical Education teacher preparation courses.

Related sub-questions were used to clearly describe the results. Descriptive statistics were used to analyze all of the questions; the data being categorical in nature.

Research Sub Question 1

Is gender associated with retention rates in web-based Career and Technical Education teacher preparation courses?

Table 7 contains information related to retention rates in CTE teacher preparation web-based courses by gender. Out of the total number of enrollee course completers (2184) the retention rate for females (93.3%) was slightly higher than males (90.5%).

Table 7

Retention Rate of Enrollees in CTE Teacher Preparation Web-based courses by Gender

			Gender		Total
			Male	Female	
Retention	Completers (Grades A-D)	Count	916	1268	2184
		% within Gender	90.5%	93.3%	92.1%
	Incomplete	Count	72	66	138
% within Gender		7.1%	4.9%	5.8%	
Withdraw	Count	24	25	49	
	% within Gender	2.4%	1.8%	2.1%	
Total	Count	1012	1359	2371	
	% within Gender	100.0%	100.0%	100.0%	

A chi-square test of independence was calculated comparing the frequency of CTE course completers by gender (see Table 7.1). A statistical significance was found [chi-square (2) = 6.366, $p \leq .05$, N = 2371]. Based on the analysis test women were more likely to complete the CTE teacher preparation web-based course (93.3%) than men (90.5%).

Table 7.1

Results: Chi-Square Test of Independence Comparing the Frequency of CTE Course Completion by Gender

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.366 ^a	2	.041
Likelihood Ratio	6.295	2	.043
Linear-by-Linear Association	2.230	1	.135
N of Valid Cases	2371		

Note. ^a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 20.91.

Table 7.2 contains information related to success rates in CTE teacher preparation web-based courses by gender. Out of the total number of enrollee CTE teacher preparation web-based course completers (2171) the success rate for females (92.8%) was slightly higher than males (89.9%). The overall incomplete rate was slightly higher (6.4%) than the withdrawal rate (2.1%). The overall success rate (91.6%) of enrollees in CTE teacher preparation web-based courses by gender was lower than the retention rate (92.1%).

Table 7.2

Success Rate of Enrollees in CTE Teacher Preparation Web-based Course by Gender

			Gender		Total
			Male	Female	
Success	Completers (Grades A-C)	Count % within Gender	910 89.9%	1261 92.8%	2171 91.6%
	Incomplete	Count % within Gender	78 7.7%	73 5.4%	151 6.4%
	Withdrew	Count % within Gender	24 2.4%	25 1.8%	49 2.1%
Total		Count	1012	1359	2371
		% within Gender	100.0%	100.0%	100.0%

A chi-square test of independence was calculated comparing the frequency of completers by gender (see Table 7.3). A statistical significance was found [chi-square (2) = 6.285, $p \leq .05$, $N = 2371$]. Based on the analysis test females were more likely to succeed in CTE teacher preparation web-based courses (92.8%) than males (89.9%).

Table 7.3

Results: Chi-Square Test of Independence Comparing the Frequency of Completers by Gender

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.285 ^a	2	.043
Likelihood Ratio	6.217	2	.045
Linear-by-Linear Association	4.953	1	.026
N of Valid Cases	2371		

Note. ^a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 20.91.

The difference between the retention rate and success rate by gender was less than 1%. The overall retention rate by gender (92.1%) was slightly higher than the success rate (91.6%). Both showed statistical significance.

Research Sub Question 2

Is ethnicity associated with retention rates in web-based Career and Technical Education teacher preparation courses?

Table 8 contains information related to retention rate of CTE teacher preparation web-based courses by ethnicity. The retention rate for all groups reporting ethnicity was 92%. The incomplete rate was slightly higher (5.9%) than the withdrawal rate (2.1%). Out of the total number of enrollees reporting ethnicity (2288) Asian had the highest course retention rate (96.7%), followed by those identified as White, Non-Hispanic (92.4%), Hispanic (91.3%), Black, Non-Hispanic (89.5%), and American Indian (82.4%). The literature corresponded with higher retention rates for White, Non-Hispanic; however, the Hispanic retention rate in this study was higher than reported in the literature.

Table 8

Retention Rates of Enrollees in CTE Teacher Preparation Web-based Courses by Ethnicity

			Ethnicity					Total
			White Non-Hispanic	Black Non-Hispanic	Hispanic	Asian	American Indian	
Retention	Completers (Grades A-D)	Count	1741	205	116	29	14	2105
		% within Ethnicity	92.4%	89.5%	91.3%	96.7%	82.4%	92.0%
	Incomplete	Count	102	19	11	0	3	135
		% within Ethnicity	5.4%	8.3%	8.7%	.0%	17.6%	5.9%
	Withdrew	Count	42	5	0	1	0	48
		% within Ethnicity	2.2%	2.2%	.0%	3.3%	.0%	2.1%
Total	Count	1885	229	127	30	17	2288	
	% within Ethnicity	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	

A chi-square test of independence was calculated comparing the frequency of course completers for ethnic groups (see Table 8.1). No statistical significance was found [chi-square (8) = 14.209, $p \geq .05$, N = 2288]. There appears to be no difference in retention rates by ethnicity.

Table 8.1

Results: Chi-Square Test of Independence Comparing the Frequency of Course Completers by Ethnic Groups

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	14.209 ^a	8	.076
Likelihood Ratio	17.134	8	.029
Linear-by-Linear Association	4.925	1	.026
N of Valid Cases	2288		

Note. ^a. 6 cells (40.0%) have expected count less than 5. The minimum expected count is .36.

Table 8.2 contains information related to success rate of CTE teacher preparation web-based courses by ethnicity. The success rate for all groups reporting ethnicity was 91.4%. The incomplete rate was slightly higher (6.5%) than the withdrawal rate (2.1%). Out of the total number of enrollees reporting ethnicity (2288) Asian had the highest course retention rate (96.7%), followed by those identified as White, Non-Hispanic (91.8%), Hispanic (91.3%), Black, Non-Hispanic (88.2%), and American Indian (82.4%). The overall success rate (91.4%) of enrollees in CTE web-based courses by ethnicity was lower than the retention rate (92%).

Table 8.2

Success Rate of Enrollees in CTE Teacher Preparation Web-based Courses by Ethnicity

			Ethnicity					Total
			White Non-Hispanic	Black Non-Hispanic	Hispanic	Asian	American Indian	
Success	Completers (Grades A-C)	Count	1731	202	116	29	14	2092
		% within Ethnicity	91.8%	88.2%	91.3%	96.7%	82.4%	91.4%
	Incomplete	Count	112	22	11	0	3	148
		% within Ethnicity	5.9%	9.6%	8.7%	.0%	17.6%	6.5%
	Withdrew	Count	42	5	0	1	0	48
		% within Ethnicity	2.2%	2.2%	.0%	3.3%	.0%	2.1%
Total		Count	1885	229	127	30	17	2288
		% within Ethnicity	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

A chi-square test of independence was calculated comparing the frequency of course completers for ethnic groups (see Table 8.3). No statistical significance was found [chi-square (8) = 14.209, $p \geq .05$, N = 2288]. There appears to be no difference in success rates by ethnicity.

Table 8.3

Results: Chi-Square Test of Independence Comparing the Frequency of Course Completers for Ethnic Groups

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	14.400 ^a	8	.072
Likelihood Ratio	17.743	8	.023
Linear-by-Linear Association	.088	1	.767
N of Valid Cases	2288		

Note. ^a. 6 cells (40.0%) have expected count less than 5. The minimum expected count is .36.

The difference between the retention rate and success rate by ethnicity was nominal. The overall retention rate by ethnicity (92%) was slightly higher than the success rate (91.4%). Neither the retention or success rate showed statistical significance.

Research Sub Question 3

Is age associated with retention rates in web-based Career and Technical Education teacher preparation courses?

Table 9 contains information related to retention rate of CTE teacher preparation web-based courses by Age Group. The incomplete rate was slightly higher (5.9%) than the withdrawal rate (1.9%). Out of the total number of enrollees reporting age (2278) age group “40 years or older” had the highest course retention rate (93%), followed by “24 years or younger” (92%) and “25 – 39 years” (90.4%).

Table 9

Retention of Enrollees in CTE Web-based courses by Age Group

			Age Group			Total
			24 years or younger	25-39 years	40 years or older	
Retention	Completers (Grades A-D)	Count % within Age	69 92.0%	576 90.4%	1456 93.0%	2101 92.2%
	Incomplete	Count % within Age	2 2.7%	41 6.4%	91 5.8%	134 5.9%
	Withdrew	Count % within Age	4 5.3%	20 3.1%	19 1.2%	43 1.9%
Total		Count % within Age	75 100.0%	637 100.0%	1566 100.0%	2278 100.0%

A chi-square test of independence was calculated comparing the frequency of course completers for all age groups (see Table 9.1). A statistical significance was found [chi-square (4) = 15.765, $p \leq .05$, $N = 2278$]. Enrollees “40 years or older” were statistically more likely to complete CTE teacher preparation web-based courses (93%) than 24 years or younger (92%) or 25 – 39 years (90.4%).

Table 9.1

Results: Chi-Square Test of Independence Comparing the Frequency of Course Completers for All Age Groups

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	15.765 ^a	4	.003
Likelihood Ratio	14.183	4	.007
Linear-by-Linear Association	4.117	1	.042
N of Valid Cases	2278		

Note. ^a. 2 cells (22.2%) have expected count less than 5. The minimum expected count is 1.42.

Table 9.2 contains information related to success rate of CTE teacher preparation web-based courses by Age Group. The incomplete rate was slightly higher (6.4%) than the withdrawal rate (1.9%). Out of the total number of enrollees reporting age (2278) age group “40 years or older” had the highest course success rate (92.5%), followed by “24 years or younger” (90.7%) and “25 – 39 years” (90.0%).

Table 9.2

Success Rate of Enrollees in CTE Teacher Preparation Web-based courses by Age Group

			Age Group			Total
			24 years or younger	25-39 years	40 years or older	
Success	Completers (Grades A-C)	Count % within Age	68 90.7%	573 90.0%	1449 92.5%	2090 91.7%
	Incomplete	Count % within Age	3 4.0%	44 6.9%	98 6.3%	145 6.4%
	Withdrew	Count % within Age	4 5.3%	20 3.1%	19 1.2%	43 1.9%
Total	Count		75	637	1566	2278
	% within Age		100.0%	100.0%	100.0%	100.0%

A chi-square test of independence was calculated comparing the frequency of course completers for all age groups (see Table 9.3). A statistical significance was found [chi-square (4) = 15.099, $p \leq .05$, N = 2278]. Enrollees “40 years or older” were more likely to succeed in CTE teacher preparation web-based courses (92.5%) than 24 years or younger (90.7%) or 25 – 39 years (90.0%).

Table 9.3

Results: Chi-Square Test of Independence Comparing the Frequency of Course Completers for All Age Groups

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	15.099 ^a	4	.004
Likelihood Ratio	13.280	4	.010
Linear-by-Linear Association	8.001	1	.005
N of Valid Cases	2278		

Note. ^a. 2 cells (22.2%) have expected count less than 5. The minimum expected count is 1.42.

The overall retention rate by age group (92.2%) was slightly higher than the success rate (91.7%). Both showed statistical significance; age group “40 years and older” were more likely to complete and succeed in CTE teacher preparation web-based courses.

Summary

This chapter has presented an analysis of data. Comparisons were conducted based on gender, ethnicity and age group of the enrollees in CTE teacher preparation web-based courses. Age group as well as gender was statistically significant when compared with the either of the dependent variables, retention or success.

The retention rate for all independent variables; gender, ethnicity and age (92.1%, 92%, 92.2%, respectively), was slightly higher (.6% or less) than the success rate (91.6%, 91.4%, 91.7%, respectively). The overall success rate for web-based courses for the institution is substantially higher (91%) than what was provided by the literature review. The study group had a higher success rate than the institution or what was provided by the literature review (91.6%).

CHAPTER V: SUMMARY, CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

Introduction

Career and Technical Education is a long-standing program in the education system that continues to evolve. Its goals continue to broaden and there is ongoing service to a large and diverse population with varied expectations. At the same time schools seeking CTE teachers find it very difficult or impossible to fill vacancies. By 2000, one out of 15 schools did not fill their vocational teacher (now CTE) vacancies (Silverberg, Warner, Fong, & Goodwin, 2004). In the review of literature, some programs, such as Technology Education, the shortage of CTE teachers is so severe that it threatens the program of study's very existence (Weston, 2002).

Every state has an emergency teacher licensure provision that allows administrators to hire individuals who have not met the formal teacher preparation requirements. At the same time CTE teacher preparation programs are closing. One effective avenue to reach prospective CTE teachers is web-based learning.

There is a shortage of CTE teachers; in Florida this is even defined as a "Critical Shortage" by certain areas. In Florida there are few CTE Teacher Preparation programs left. To alleviate the shortage many CTE teacher preparation programs are now using the web. It is therefore important to understand factors associated with retaining enrollees in these courses.

This study sought to identify factors associated with retention rates in web-based courses within a CTE teacher preparation program. The study group was enrollees in a Career and Technical Education (CTE) teacher preparation web-based courses. Only undergraduate courses were targeted. The researcher examined enrollees in web-based courses from Fall 1997 through Fall 2003 at the University of Central Florida and determined retention and success rates in these courses. The importance of this study was no formal study had been conducted to examine retention rates in web-based Career and Technical Education (CTE) teacher preparations courses.

Summary of Results

Data were analyzed to determine whether gender was associated with retention or success rates. Over half of the completers in web-based CTE teacher preparation courses were female (55.3%) while less than half were males (44.7%). The chi-square test for independence was conducted for retention and success rates based on gender to determine statistical significance. There was statistical significance found for both. The retention and success rates were higher for females (93.3%, 92.8%, respectively) than males (90.5%, 89.9%, respectively). Based on these findings females are more likely to complete or succeed in web-based Career and Technical teacher preparation courses. Gender is associated with retention rates in web-based Career and Technical Education teacher preparation courses.

Data were analyzed to determine if ethnicity was associated with retention rates. Out of the total number of enrollees reporting ethnicity (2288) over three quarters (79.5%) of enrollees were White, Non-Hispanic (1885); 9.7% Black, Non-Hispanic (229); 5.4% Hispanic (127); 1.3%

Asian and less than 1% American Indian. A total of 83 enrollees did not report their ethnicity (3.5%). The chi-square test for independence was conducted for retention and success rates based on ethnicity to determine statistical significance. There no statistical significance found for either. The retention and success rates were higher for Asian (96.7%, 96.7%, respectively) followed by White, Non-Hispanic (92.4%, 91.8%, respectively); Hispanic (91.3%, 91.3%, respectively); Black, Non-Hispanic (89.5%, 88.2%, respectively); American Indian (82.4%, 82.4%). There is a difference of less than 6% from the highest to lowest. There was minimal (less than 1 %) difference between retention and success rates. Ethnicity is not associated with retention or success rates in web-based Career and Technical Education teacher preparation courses.

Data were analyzed to determine if age was associated with retention rates. Out of the total number of enrollees reporting age (2278) over three quarters (86.4%) of enrollees were 25 years of age or older (2203). A total of 93 enrollees did not report their age (3.9%). The chi-square test for independence was conducted for retention and success rates based on age to determine statistical significance. There was statistical significance found for both. The retention and success rates were higher for “40 years of age or older” (93.0%, 92.5%, respectively) followed by “24 years or younger” (92.0%, 90.7%, respectively) and “25 – 39 years” (90.4%, 90.7% respectively). Based on these findings age group “40 years of age or older” are more likely to complete or succeed in web-based Career and Technical teacher preparation courses. Age is associated with retention rates in web-based Career and Technical Education teacher preparation courses.

The study sought to determine retention rates in web-based courses within a CTE teacher preparation program and identify factors associated with student retention. The retention rates

based on gender (92.1%), ethnicity (92.0%) and age (92.2%) are relatively high when compared to the literature for online courses. The results of a chi-square test for independence associated gender and age with retention rates.

Conclusions

This study sought to determine the factors associated with retention rates in web-based Career and Technical Education Teacher preparation courses. The following conclusions have been developed based on the findings of the study and a review of related literature. First, age and gender was related to retention rates for web-based CTE teacher preparation courses even though the literature indicated that these non-traditional female students are more likely to drop out of web-based courses. Nearly 64% of all completers were for the age group “40 years of age or older”.

Ethnicity was not statistically significant with relation to retention rates for web-based CTE teacher preparation courses. In this study, Hispanic was ranked third for both retention (91.3%) and success (91.3%) rates; extremely high retention rates for web-based courses. This ethnic group was slightly higher than the study institution’s success rate (91%). The other ethnic groups varied from the lowest, American Indian (82.4%) to the highest, Asian (96.7%). Others were within 7% of the highest retention rate: Black, Non-Hispanic (89.5%) and White, Non-Hispanic (92.4%).

The percentage of female CTE teachers in these web-based courses was more than half (57.3%). This is higher than reported in the literature for CTE teachers. As indicated in the

literature there has been an increase in female CTE teachers and this study falls in line with the Bruening, et al 10-year study.

There is statistical significance by gender for both retention and success rates; females have a slight edge for success (92.8%) and retention (93.3) in web-based Career and Technical Education teacher preparation courses.

It is difficult to find data about retention rates in web-based courses; specifically in teacher preparation courses or programs. There are very few clearly defined constructs of retention with little to no differences made regarding dropouts, stop-outs, opt-outs and transfer outs. Further, many studies include all distance learning delivery when calculating retention rates; web-based should be separated and properly defined in these studies. The one clearly defined study on success and various types of distance learning delivery came from the study institution.

The University of Central Florida is a benchmark institution when it comes to student retention and success in online courses. The success rate in this institution of 91.6% in web-based courses was very high when compared to the literature on retention rates in distance learning.

Implications

Reviewing the literature and analysis of the data for the present study led to the development of implications for web-based Career and Technical Education (CTE) teacher preparation courses. The questions and implied statements developed regarding Career and Technical Education are offered as insightful issues to consider.

1. If current online Career and Technical Education (CTE) teacher preparation programs reverted to face to face what would happen to enrollment?
2. Is face-to-face even a viable choice any longer for CTE teacher preparation programs and serving these non-traditional students?
3. The undergraduate population of non-traditional students should be redefined since this population has changed when compared to a generation ago.
4. Web-based courses are a great equalizer for retention rates by gender, ethnicity and age.

Recommendations for Future Research

Existing data were analyzed for web-based Career and Technical Education (CTE) teacher preparation courses. CTE enrollees in other colleges outside the State of Florida or in proprietary institutions in or out of the state were not tracked. The findings of this study reflect that there may be viable ways to lessen the burden of CTE teacher shortages through the use of web-based course delivery. The following recommendations for future research are posed:

1. It is recommended that the retention rates of this Career and Technical Education (CTE) teacher preparation program be compared to other programs both in and out of the State of Florida.
2. It is recommended that further studies be developed to determine what makes the University of Central Florida and specifically this Career and Technical Education (CTE) teacher preparation program unique in having such a high retention rate.

3. It is recommended to conduct a further study using other variables such as marital status, financial resources, children, childcare, other dependents, first time in college, working, and number of hours working per week.
4. It is recommended to study other gender issues by retention rate in face-to-face courses when compared to online courses.
5. It is recommended to research the retention rate of students in Career and Technical (CTE) graduate courses.
6. Further study needs to be conducted on the factors associated with retention and ethnicity.

APPENDIX A
CHI-SQUARE TEST TABLES

Results: Retention Rate - Chi-Square Test of Independence Comparing the Frequency of CTE Course Completion by Gender

(N=2371)

Gender	Total by Gender	N	X ²	df	Approx. sig.
		2371	6.366	2	.041
Females	1268				
Males	916				

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.366 ^a	2	.041
Likelihood Ratio	6.295	2	.043
Linear-by-Linear Association	2.230	1	.135
N of Valid Cases	2371		

Note. ^a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 20.91.

Results: Success Rate - Chi-Square Test of Independence Comparing the Frequency of Completers by Gender

(N=2371)

Gender	Total by Gender	N	X ²	df	Approx. sig.
		2371	6.285	2	.043
Females	1261				
Males	910				

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.285 ^a	2	.043
Likelihood Ratio	6.217	2	.045
Linear-by-Linear Association	4.953	1	.026
N of Valid Cases	2371		

Note. ^a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 20.91. Table XX

Results: Retention Rate - Chi-Square Test of Independence Comparing the Frequency of Course Completers by Ethnic Groups

(N=2288)

Ethnic Groups	Total in Each Ethnic Group	N	X ²	df	Approx. sig.
		2288	14.209	8	.076
White, Non-Hispanic	1885				
Black, Non-Hispanic	229				
Hispanic	127				
Asian	30				
American Indian	17				

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	14.209 ^a	8	.076
Likelihood Ratio	17.134	8	.029
Linear-by-Linear Association	4.925	1	.026
N of Valid Cases	2288		

Note. ^a. 6 cells (40.0%) have expected count less than 5. The minimum expected count is .36.

Results: Success Rate - Chi-Square Test of Independence Comparing the Frequency of Course Completers for Ethnic Groups

(N=2288)

Ethnic Groups	Total in Each Ethnic Group	N	X ²	df	Approx. sig.
		2288	14.400	8	.072
White, Non-Hispanic	1885				
Black, Non-Hispanic	229				
Hispanic	127				
Asian	30				
American Indian	17				

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	14.400 ^a	8	.072
Likelihood Ratio	17.743	8	.023
Linear-by-Linear Association	.088	1	.767
N of Valid Cases	2288		

Note. ^a. 6 cells (40.0%) have expected count less than 5. The minimum expected count is .36.

Results: Retention Rate - Chi-Square Test of Independence Comparing the Frequency of Course Completers for All Age Groups

(N=2278)

Age Groups	Total in Each Age Group	N	X ²	df	Approx. sig.
		2278	15.765	4	.003
24 years or younger	75				
25-39 years	637				
40 years or older	1566				

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	15.765 ^a	4	.003
Likelihood Ratio	14.183	4	.007
Linear-by-Linear Association	4.117	1	.042
N of Valid Cases	2278		

Note. ^a. 2 cells (22.2%) have expected count less than 5. The minimum expected count is 1.42.

Results: Success Rate - Chi-Square Test of Independence Comparing the Frequency of Course Completers for All Age Groups

(N=2278)

Age Groups	Total in Each Age Group	N	X ²	df	Approx. sig.
		2278	15.099	4	.004
24 years or younger	75				
25-39 years	637				
40 years or older	1566				

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	15.099 ^a	4	.004
Likelihood Ratio	13.280	4	.010
Linear-by-Linear Association	8.001	1	.005
N of Valid Cases	2278		

Note. ^a. 2 cells (22.2%) have expected count less than 5. The minimum expected count is 1.42.

APPENDIX B
IRB APPROVAL LETTER



Office of Research

August 3, 2004

Jo Ann Whiteman
1110 Marcus Court
Winter Springs, FL 32708

Dear Ms. Whiteman:

The University of Central Florida's Institutional Review Board (IRB) received your protocol entitled, "Retention Rates in Career and Technical Education Teacher Preparation Web-Based Courses". The IRB Chair did not have any concerns with the proposed project and has indicated that under federal regulations this project using de-identified data is exempt from review by our IRB, so an approval is not applicable.

Please accept our best wishes for the success of your endeavors. Should you have any questions, please do not hesitate to call me at 823-2901.

Cordially,

Barbara Ward

Barbara Ward
Coordinator, Institutional Review Board

Copies: Dr. Larry Hudson, College of Education, Teaching & Learning Principles, Room 122T
IRB File

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