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A Study of Students Attending Tennessee Board of Regents Universities
Who Participated in High School Dual Enrollment Programs

A dissertation

presented to

the faculty of the Department of Educational Leadership and Policy Analysis

East Tennessee State University

In partial fulfillment

of the requirements for the degree

Doctor of Education

by

Rubianna M. Porter

May 2003

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Dr. Louise MacKay

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Keywords: College Credits, Early Entrance, Dual Enrollment, Joint Enrollment

ABSTRACT

A Study of Students Attending Tennessee Board of Regents Universities Who Participated in High School Dual Enrollment Programs

by

Rubianna M. Porter

The purpose of this study was to determine if there is a relationship between college retention and completion and the number of college credit hours students earn before graduating from high school. The number of credit hours a student earned was analyzed along with selected demographic characteristics and academic performance indicators to determine if any one of the variables was more of a predictor of retention and completion of college than the others. The data for the study (12,834 records) were obtained from the Student Information System from five Tennessee Board of Regents Universities.

An initial analysis of the data incorporated simple descriptive statistics in the form of frequency tables. Cross tabulation and chi-square were used to compare the gender and ethnicity population of dual/joint-enrolled students and nondual/joint-enrolled students. To determine if dual/joint-enrolled students had greater academic success than nondual/joint-enrolled students, a *t*-test for independent samples was used to compare high school grade point average, the standardized test score average, and first semester and last semester attended grade point average of the two groups. Chi-square was used to analyze if there was a difference in the retention rate and the time it took to obtain a four-year degree between dual/joint-enrolled students and nondual/joint-enrolled students. A one-way ANOVA was used to determine if the number of college credits earned while in high school had any influence on the time it took to finish a four-year college degree. Multiple Linear Regression was used to see if any of the variables could predict academic performance for a student's first and last semester grading period. Discriminant Analysis was used to determine if any of the variables in the study were predictors of completing a four-year degree.

The researcher found that students who participated in dual/joint-enrollment programs had more academic success and a higher retention and graduation rate than those students who did not participate in such programs. The study also revealed that dual credit hours had a significant influence on time to completing a degree.

DEDICATION

This work is dedicated to my husband

Don

I deeply appreciate his love, support, and motivation.

This work is also in honor of my mother,

Dorthella Williams

and

in memory of

Robert A. Williams

and

Griffin and Sara Porter

ACKNOWLEDGMENTS

I would like to express my appreciation to the chairperson of my graduate committee, Dr. Nancy Dishner and to my committee members--Dr. Louise MacKay, Dr. Elizabeth Ralston, and Dr. Russell West.

I am especially appreciative to Dr. Carl Hite, President of Cleveland State Community College, for his help and support and Curtis McNeely for his help in gathering data. A very special thanks goes to Debby Bryan and Dr. Susan Twaddle for their professional expertise and moral support.

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CHAPTER 1

INTRODUCTION

In almost every state in the United States high schools and colleges have agreements that allow junior and senior high school students to take college courses. This researcher has coordinated such a program for a community college since 1994. Even though the terms used to identify such arrangements vary, there is little or no difference in the intent of these agreements (Crooks, 1998; Robertson, Chapman, & Gaskin, 2001). These general agreements allow students who meet the qualifications to begin taking college courses as early as their freshman year of high school. Some agreements consider that college credits and high school credits can be earned simultaneously and in others students earn college credits only. Although not universal, the term “dual enrollment” is most often used when high school and college credits are earned simultaneously and “joint enrollment” when only college credits are earned (Community College Policy Center, 2000).

Purpose of the Study

Dual/joint-enrollment programs are growing in popularity. In the 1994 through 1995 school year, dual/joint enrollment was Florida’s largest accelerated program with 23,343 students (Windham, 1996). It was estimated that within the United States in the 1995 through 1996 school year, 204,790 high school students participated in some kind of program in which they earned college credits (Andrews, 2000a). By 2002, the number had grown to 560,000 (Levinson, 2002). In response to the popularity of high school students taking college classes, several states have implemented state-level policies that make provisions for such programs (Robertson et al., 2001).

Supporters of dual enrollment contend that the program decreases the number of years it takes to earn a degree; thus, financing a college education becomes less costly. They also suggest that it improves high school graduation and college continuation rates as well as making the transition from high school to college easier. In addition, these programs help to strengthen relationships between kindergarten through 12th grade and postsecondary schools (Burns & Lewis, 2000). Bogert (as stated in Burns & Lewis) declared that the benefits of the dual enrollment system are potentially endless. He explained that dual enrollment systems can be used to enhance academic performance and to bridge gaps in race relations. Even with the broad support for and growing number of dual enrollment programs, a number of concerns are cited:

1. College classes taught on a high school campus do not provide an environment equivalent to that of a classroom on a college campus.
2. Under age students attending college could cause legal complications.
3. High school students are not mature enough to handle some college materials.
4. Articulation of credits could be a problem that might result in students having to retake some courses.
5. There are philosophical concerns about combining if not actually replacing junior and senior level courses with college level courses (Andrews, 2000a; Burns & Lewis; Catron, 1998; Johnston, 1999).

In addition, there are those who question the assessment or the lack of assessment of dual/joint programs. In a study of Virginia's dual enrollment program, Catron (1998) stated, "Even more challenging than the issue of assessment has been the issue of tuition and fees. This issue has come under more scrutiny and attack than any other single component of the Virginia Plan for Dual Enrollment" (p. 5).

The cry for accountability for all educational programs is increasing; hence, program scrutiny is at a high level. Any program that does not have data to support progress and

academic gain is in jeopardy of being phased out and dual enrollment programs are not exempt from this scrutiny (Burns & Lewis, 2000).

The purpose of this study was to determine if there was a relationship between college retention and completion and the number of college credit hours students earned before graduating from high school. Other variables such as demographic characteristics and academic performance indicators were included in the study in an attempt to determine if any variable studied was more of a predictor of completing college than the others.

Research Questions

Burns and Lewis (2000) admitted, "There is a general lack of research involving dual enrollment" (p. 4). The research that has been conducted addressed high school students' taking college classes. These studies compared grades earned by high school dual/joint enrolled-students to the grades of regular full-time college students. Studies have also been conducted to determine if students performed academically better by taking classes on their own high school campus versus the college campus and how well high school students progressed socially within a college setting.

Windham (1998) wrote, "The next step in the dual enrollment program review process is to look at the effect that taking dual enrollment courses has on time-to-degree" (p. 12). This researcher has been unable to find recorded research regarding how dual/joint students performed once they became regular full-time college students, or research comparing other variables with dual/joint credit to see how dual/joint credit compares with the other variables as a predictor of retention and completion of a degree. In addition, there was no research found that profiled dual/joint-enrolled students. Many areas of inquiry could be developed addressing dual/joint enrollment; however, because of the lack of studies concerning dual/joint students after they graduate from high school and enter college, the following eight research questions were selected as the focal point of this study:

1. Is there a difference in the type of enrollment by gender and ethnic background?
2. Do dual/joint-enrolled students have greater academic success than nondual/joint-enrolled students?
3. Is there a difference in the retention of dual/joint-enrolled students and nondual /joint-enrolled students?
4. Is there a difference between dual/joint- and nondual/joint-enrolled students and the time it takes to obtain a four-year college degree?
5. Does the number of college credits earned while in high school have any influence on the time it takes to finish a four-year college degree?
6. Which of the following variables, if any, are important in predicting academic performance at the end of the first grading period: (a) dual status, (b) high school grade point average, or (c) standardized test score.
7. Which of the following variables, if any, are important in predicting academic performance for the last semester attended: (a) dual status, (b) high school grade point average, (c) standardized test score, or (d) grade point average after the first grading period.
8. Which variables, if any, are predictors of college graduation: (a) dual status, (b) high school grade point average, (c) standardized test score, or (d) grade point average after the first grading period.

Significance of the Study

In the study, I attempted to determine if dual/joint enrollment was or was not related to retention of four-year college students and the time it took to earn a degree. The findings might provide useful information concerning the outcome of dual/joint-enrollment programs.

Individuals might use the information to help them decide if they will or will not participate in a dual/joint program and to what extent. Secondary and postsecondary schools might find the

information useful when deciding if the programs should be increased or decreased. At the state level, the information might aid in making legislative and funding decisions about the program.

Limitations

This study was limited to college freshmen who graduated from high school in May or June of 1996 and 1998, and who enrolled in a Tennessee Board of Regents University for the 1996 and 1998 fall semesters.

Definition of Terms

Dual Enrollment refers to a high school student enrolled and taking courses in a postsecondary institution while still in high school--with the college courses earning college and high school credit simultaneously. These courses are offered at either the high school or the college campus. At the high school, a full-time college instructor or a high school teacher hired as an adjunct by the college might teach the course (Catron, 1998; Community College Policy Center, 2000; Puyear, 1998; Tennessee Board of Regents, 2002).

Joint Enrollment refers to a high school student enrolled and taking courses in a postsecondary institution while still in high school for college level credit only. In general, the students go to the college campus for these courses (Community College Policy Center, 2000; Tennessee Board of Regents, 2002).

Overview of the Study

Chapter 1 contains an introduction, purpose of the study, research questions, significance of the study, limitations, definition of terms, and the organization of the study. Chapter 2 is the literature review and Chapter 3 describes the methodology. Analysis of data and the presentation of tables are included in Chapter 4. Chapter 5 presents the summary, conclusion, implications, and recommendations.

CHAPTER 2

LITERATURE REVIEW

The Popularity of Dual/Joint-Enrollment Programs

The popularity of students beginning college before graduating high school is sweeping the country. Crooks (1998) referred to it as “the dual credit phenomenon” (p. 2). Some contend that dual/joint-enrollment programs address some of the difficulties experienced today by the American education system. According to Andrews (2000a), “The recent dual-credit explosion around the country gets to the heart of many concerns about high school students' motivation and reducing time to baccalaureate degree” (p. 36).

Today, dual/joint-enrollment programs are offered in colleges and universities in all 50 states (Dixon, 1999). The popularity and growth of these programs have prompted states to pass legislation that governs the following aspects of the programs:

1. age and grades of participants,
2. academic qualifications of participants,
3. courses that may be offered,
4. quality of the programs,
5. tuition and fees,
6. articulation between the high schools and postsecondary schools, and
7. selection of faculty

The states that have no legislation have made provisions for the programs either through their state department of education or their local school boards.

Terms Used to Identify Early Entrance Programs

There are many terms used to identify programs that allow high school students to enroll in college courses. The most often used terms are dual or joint enrollment (Community College Policy Center, 2000). Early Admission, concurrent enrollment, credit validation, college credit by choice, college high, postsecondary options, and running start are also terms used to identify dual/joint-enrollment programs (Andrews, 2000a; Dixon, 1999; Sayler, 1990).

Descriptions of Programs

Just as the terms used to identify dual/joint-enrollment programs vary, the requirements, organization, and structure of the programs also vary. In most programs, dual credit and dual enrollment refer to taking a college course and receiving the college credit as well as credit to fulfill a course requirement for high school graduation. Concurrent enrollment can refer to receiving high school and college credit or just college credit. The terms joint enrollment and early admission usually refer to high school students' going to a college campus to take a course and receiving college credit. Credit validation refers to specified advanced high school courses that have been approved by a sponsoring college as being equal to a college level class. High school faculty members receive special training to teach the classes. Upon successful completion of the class, students earn credit from the sponsoring college. To participate in most programs, a student must have a recommendation from his or her principal or counselor along with the approval of a parent or guardian and achieve a specified score on a standardized test. The grade point average required varies from program to program.

Structure and Organization of State Programs

College by Choice the Anchorage, Alaska, district's program allows students in grades 9 through 12 to register for three college credits per semester. They receive one half credit for high school and credit for the three semester hours of college work. They may register at the

University of Alaska or other universities through distance learning. Prince William Sound Community College sponsors credit validation courses for the Valdez City School District, where students earn college credit toward a degree or certificate (Crooks, 1998).

The Arizona Council Academic Association defines dual enrollment as a course that can be taken for high school and college credit and it can be taken on the high school or college campus. Concurrent enrollment is considered as taking a class for college credit only and the class can be taken on either the high school or college campus (Puyear, 1998). The following are various ways courses are delivered:

1. The course may be an accelerated high school course taught at the high school with students who are not seeking college credit also enrolled. Students seeking college credit (concurrent enrolled) do extra work to receive the college credit.
2. A college course is taught by a high school instructor during the regular school day with students receiving only college credit.
3. A college faculty member teaches a college course at the high school for students who are concurrently enrolled only.
4. Students attend classes away from the high school campus and they are mixed in with the general population of a college (Puyear).

Arkansas's Dual Enrollment Option is open to students in grade 9 through 12. When college and high school credit is earned, it is referred to as concurrent enrollment and when only college credit is earned, it is referred to as dual enrollment (Arkansas Department of Education, 2001).

Florida refers to its programs as dual enrollment when students receive college and high school credit for a college class (Windham, 1996). Illinois specifies that students taking dual-credit courses must have the appropriate qualifications, a high level of motivation, and adequate time to devote to college-level work. Only instructors who are employed as full-time or adjunct faculty at the sponsoring community college may teach dual-credit classes (Andrews, 2001).

Kansas City's Kansas Community College delivers classes to high school students on a high school campus so that students can earn high school and college credit. Qualified high school teachers are hired as adjuncts to teach the classes. The program is concurrent enrollment under the Partnership Program (Brown, 1993).

Students in Kentucky earn high school and college credit in dual credit programs designed mainly for seniors. In order to participate, students must score above average on a specified test and have a grade point average of 3.2 on a 4.0 point scale or higher (Kentucky Council on Higher Education, 2002).

Massachusetts' original dual-enrollment program is only open to students having a 3.0 grade point average or better. In 1999, the program enrolled students up to 22 years of age who were attending alternate educational programs including GED and dropout prevention programs. All dual classes are through universities and colleges (Massachusetts Department of Education, 1999).

In order to participate in postsecondary enrollment option programs in Michigan, junior and senior high school students must take the high school proficiency test to qualify. Juniors must meet requirements for an endorsed diploma in all subject areas of the proficiency test and seniors must do so in one or more areas. Credits earned can apply to either high school or postsecondary credit or both (Crooks, 1998).

Mississippi's dual-enrollment program requires that students have a composite score of 21 or better on the ACT or equivalent SAT, score at least a 3.0 grade point average on a 4.0 scale, and obtain a written recommendation from a principal or counselor. Classes are offered on high school and college campuses (Mississippi Legislature, 1998).

The University of Missouri's dual-enrollment program requires participants to have a 2.5 grade point average on a 4.0 scale. The program is referred to as the Advanced Credit Program. Most of the classes are held on high school campuses and are taught by high school faculty

members who meet the qualifications to teach on the community college level (Issue Brief, 1998).

The Tennessee Board of Regents (TBR) defines dual enrollment as taking a college course and receiving college and high school credit simultaneously, whereas with joint enrollment only college credit is received (Tennessee Board of Regents, 2002). Programs vary around the state, but to participate in the general education dual-enrollment programs most colleges require a 3.0 or better grade point average and an ACT composite score and subject area score of 19 or higher. Equivalent SAT scores are accepted. Dual-enrolled classes are offered on both high school and college campuses. Joint-enrolled classes are offered only on college campuses. Only college faculty or high school teachers who have been hired as adjunct faculty teach dual/joint-enrolled classes. Some Tennessee community colleges offer dual enrolled programs in the business or technical area as well as the general education program. For the business and technical programs, the qualifications are less stringent. Students may participate with a 2.5 grade point average and credits are earned toward a certificate program rather than a degree program (Newman, 1999; Tennessee Board of Regents).

The Virginia Plan for Dual Enrollment requires participants to be 16 years of age or older, classified as juniors or seniors in high school, and be recommended by high school personnel. Students do not receive any special consideration for admission; therefore, they must meet the same standards set for all students. Only those instructors meeting the requirements to teach at the community college level teach dual classes (Catron, 1998). Students earn credit toward a degree or certificate (Crooks, 1998).

In the state of Utah, the programs are referred to as concurrent enrollment using the credit validation style. Classes are sponsored by colleges and universities and taught on the high school campuses. Some students go to the college campus for classes and this is referred to as dual enrollment (Crooks, 1998).

The state of Washington uses a program called Running Start. Students go to community or technical colleges to take classes and earn dual credit (high school and college). To qualify for the program, students must pass a standardized test with the required grade point average varying from school to school (Jordan, McKinney, & Trimble, 2000).

In accordance with Minnesota's legislation, the University of Minnesota at Moorhead offers a program called Postsecondary Enrollment Options for high school students. To earn college and high school credit simultaneously, a student must be a junior in the top 35% of his or her class or a senior in the top 50% of the class in order to take one class or be in the top 25% of the class to take more than one class. The Early Enrollment Option is for students living outside the state of Minnesota. To participate, students must meet the same criteria as the postsecondary enrollment students (Minnesota State University, 2001).

Regardless of the title, each program refers to high school students' being given the opportunity to accelerate their education by earning college credits before they graduate high school (Andrews 2000b; Andrews & Marshall, 1991; Catron, 1998; Crooks 1998; Johnson & Kiger, 1997; Jordan et al., 2000; Mullin, 1997; Puyear, 1998; Windham, 1996).

History of Early Entrance Programs

The practice of accelerating students can be traced as far back as the 19th century. In 1862, the St. Louis, Missouri, school system broke the tradition of age-graded classes by providing accelerated instruction to students who excelled (Kulik & Kulik, 1984). Andrews (2001) reported that individual colleges allowed students to enter before graduating from high school as early as the late 1950s. Even so, the programs were only for the most highly motivated and gifted students or the top 5% of the class. In 1977, the University of Washington formally created an early entrance program that allowed qualified students to pass high school and matriculate directly into the University of Washington. Before entering the program, students were required to spend one year in an academic preparatory program (Mabry, 1988). In 1983,

California State University at Los Angeles approved an early entrance program for extraordinary gifted students from age 11 and up (Mabry)..

Parnell (1985) reported that educational excellence and opportunity were not happening for a majority of students. Students were leaving high school with no job skills and unprepared for college. He proposed that there needed to be more collaboration and cooperation among community colleges, technical schools, and the high schools. Parnell added that the following factors needed to be taken into consideration in reforming education:

1. Three out of four students would not earn baccalaureate degrees.
2. More attention was needed to make winners out of ordinary students.
3. Continuity of learning
4. The individuality of students
5. The high school dropout rate

According to Haycock, Barth, Mitchell, and Wilkins (1999), the National Association of System Heads comprised of a group of chief state school officers and higher education leaders in a 1999 meeting concluded:

Our nation is no longer well served by an education system that prepares a few to attend college to develop their minds for learned pursuits while the rest are expected only to build their muscles for useful labor. In the twenty-first century, all students must meet higher achievement standards in elementary, secondary, and postsecondary schools and thus be better prepared for the challenges of work and citizenship. (p. 3)

Rationale for the Development of Dual/Joint-Enrollment Programs

As early as 1973, public school curriculum was being labeled as “archaic” and more suited for 1953. The observation was made that by their senior year, students were bored. It was also noted that a higher percentage of seniors were abstaining from school than attending (Babbott, 1973). The 1992 candidates for president, George Bush, Ross Perot, and Bill Clinton, agreed that there was a need for a radical reform of education ("Drop-out Society," 1992). Hinds

(1997) polled high school graduates who were attending college and found a consensus that too much of their time had been wasted in high school classes. In 1997, Public Agenda, a nonprofit group, conducted a poll and found that “Half of teens in public schools today stated that their schools fail to challenge them to do their best” (Public Agenda Online, 1997, p. 1). An article in *Newsweek* (“Curing Senioritis,” 2000) reported, “The senior year of high school was nothing more than a time to hang out with friends” (p. 60). The report of The National Commission on the High School Senior (2001) in addressing the topic of what graduates make of their high school experience quoted one graduate as saying,

By the senior year, I was done with math. I was done with history. I was done with all the other classes. I was just taking a bunch of other classes that I didn’t need . . . I’d rather be going to work and doing something else than this. (p. 1)

The National Commission on the High School Senior (2001) claimed that all 21st century high school graduates must plan to develop college-level skills in order to strengthen their communities, participate in national life, and support their families. Despite the Commission’s goals, the high school dropout rate is higher than desirable. The Educational Statistics Quarterly reported that nationally 5 out of every 100 students dropped out of high school during the 1998-1999 school year (as stated in McCormick, 2002). An article in the Sunday, April 29, 2001, edition of the *Atlanta Journal-Constitution* declared that Georgia had the worst dropout rate in the country (as stated in Slazer, 2001). The article listed for each state the percentage of public high school seniors graduating with regular diplomas in 1999. To arrive at the percentages, the number of ninth graders who enrolled in the fall semester four years earlier was used. Only 50.4% of Georgia students who began their freshman year four years prior to 1999 graduated, thus having a dropout rate of 46.6%, the highest in the country. Nebraska had the lowest dropout rate of 13.7%. Twenty-one states had rates between 48% and 30%, 15 states had rates between 25% and 29%, 10 states had rates between 20% and 24%, and 5 states had rates between 13.8% and 19%.

It is estimated that 27% to 28% of 4-year college freshmen and as high as 48% of 2-year college freshmen drop out (Comarow, 2000; Patrick, 2001; Tinto, 1993). Patrick (2001) and Wayman (2001) reported that it is taking an average of six-years to complete a bachelors degree program. A longer time to degree completion increases the cost of education for the individual and because of public education subsidies, for the taxpayers (Condition of Education 1996; Descriptive Summary, 1990; Dunwoody & Frank, 1995). Some researchers advocated that the state of education is beyond reform. Fullen (1993) said, “Clumsy or superficial attempts at reform, actually decrease commitment and make matters worse” (p. 59). Sizer (1995) compared school reform to tuning a Model T Ford. Clifford and Friesen (1995) stated, “Schools have a long history of pouring old wine into new bottles” (p. 5). Wagner (1996) declared, “Our schools are not failing, they are obsolete” (p. 146). With such allegations, reports, and statistics coupled with complaints from businesses and industries that they have a choice of providing new recruits with remedial education or moving their businesses to other countries, there is a public outcry for the education establishment to do something about a failing education system.

K-12 and Postsecondary Collaboration

Collaboration between kindergarten through grade 12 and postsecondary schools is a result of the challenges for change in education. Those supporting the call for educational reform or change see a need for K-12 and postsecondary institutions to work more closely together in an effort to bring about a more seamless approach to public education from kindergarten to the completion of four years of college. The National Conference of State Legislatures and the Education Commission of the States polled state legislators and found that 71% of the respondents placed a very high priority on putting more emphasis on grades K-12 and postsecondary collaboration (Azinger, 2000).

States' Collaborative Efforts

Several states have developed statewide collaborative efforts. In Ohio, colleges and school districts developed curriculum ladders to ensure a seamless curriculum from kindergarten through a two-year college. They also sponsored projects for high school students such as workshops on college survival (Bordner, 1985). Professional development for K-16, teacher training, early intervention, fieldwork within and outside of schools, and distance learning are collaborative efforts at work in Maryland's schools (Mabry, 1988). The Dallas, Texas, Community College District and the area school districts have developed articulation plans in 14 occupational programs and prepared manuals for each area listing required competencies and criteria for determining mastery. Florida's State Board of Community Colleges has required the community colleges and secondary schools to work together to develop articulation agreements to avoid a duplication of courses (Schuetz, 2000). Georgia's efforts are to improve grade K-16 students' achievements and to provide teacher preparation and professional development programs aimed at meeting high standards for every student (Schuetz). To better prepare high school graduates for college, Oklahoma and Tennessee brought their course requirements for high school graduation in line with college admissions (Boswell, 2000). Some grade K-16 collaborative efforts involve sharing facilities, instructors, equipment, and campuses. High schools are being reestablished on college campuses. A high-technology high school has been established on the San Antonio College campus in Texas for 7th- through 12th-grade students to attend. Taught by college faculty, students have classes in math, science, and computer science (Van Patten & Dennison, 1987).

Dual/Joint Enrollment: A Leading Collaborative Effort

Dual/joint enrollment especially between high school and community colleges is one of the leading collaborative efforts. The forerunner of dual/joint enrollment as a collaborative effort was Tech Prep. The first Tech Prep programs began as early as the mid 1980s. They promote

secondary and postsecondary schools working together to develop curricula for 9th to 12th grades and on through an associates of applied science degree or a certificate in a career field. Tech Prep gives average students interested in school to work careers an opportunity to get a head start by earning credits toward their degree or certificate while still in high school (Parnell, 1985). The United States Congress funded Tech Prep Programs through the Carl Perkins Vocational and Applied Technology Act of 1990 (Corning Community College, 2001). In 1998, Congress passed legislation that continues Tech Prep as a separately funded federal program until 2003. Tech Prep had some influence on dual/joint-enrollment programs for students other than those labeled highly motivated and gifted. In 1993, there were 96,913 part-time students under the age of 18 enrolled in 2-year public colleges. There were 123,039 by 1995 (Corning Community College). Andrews (2001) proclaimed, “The dual credit phenomenon is providing one of the greatest thrusts ever in American coordination between secondary schools and colleges” (p. 16).

Arguments for Dual/Joint Enrollment

The growing number of students participating in dual/joint enrollment is causing much debate over the value and merit of the programs. Considering what some view as the problems of public education, such as high schools not being challenging enough, repetition of course material in the last two years of high school and first two years of college, and a lack of continuity within K-16, supporters propose that programs such as dual/joint enrollment might provide solutions to many of the secondary problems. Dual/joint-enrollment programs expand the high school curriculum but not the budget. High school students who complete their graduation requirements before the end of their senior year have an opportunity to take higher-level courses and the school does not have to hire extra faculty to teach these courses. This opportunity eliminates the problem of students' being bored and unchallenged in their last years of high school and gives them a running start on their postsecondary plans (Catron, 1998).

Getting started early shortens the time it takes them to earn a degree or certificate, which ultimately reduces the cost of a higher education. States that have legislation for dual/joint-enrollment programs have a number of students who complete their certificate program or two-year degree at the same time they graduate from high school (Reisberg, 1998). Even in states that have not legislated for the program, there are students who are completing postsecondary programs at the same time they graduate from high school.

Schools in South Dakota, Arizona, and New York use dual/joint enrollment as a means of motivating students who might have considered ending their schooling after completing high school and students who are labeled under-prepared or moderate achievers. School districts in Florida with very high minority enrollments use dual/joint enrollment to better prepare students for college and the workforce (Burns & Lewis 2000; Gurule, 1996).

For small high schools or those in rural areas, dual/joint programs are a way to enhance offerings by sharing resources and facilities with colleges. High schools and colleges working together allows faculty from both institutions to become better acquainted with the other's expectations of students and helps to bridge the differences found in policies and practices.

This collaboration makes for better-prepared college students thereby ensuring higher academic success (Boswell, 2000; Brown, 1993; "Curing Senioritis," 2000; Johnson & Kiger, 1997). By summarizing the merits of dual/joint-enrollment programs it can be said that because they seem to be more challenged in dual/joint classes, students especially during their senior year are less likely to become bored. It is estimated that 27% to 28% of 4-year college freshmen and 48% of 2-year college freshmen drop out. These programs acquaint students with what is expected in college. This produces better-prepared college students, thus ensuring higher academic success. For small high schools, or those in rural areas, dual/joint-enrollment programs are a way to expand and enrich their curricula by sharing resources and facilities with colleges. It shortens the time to earn a degree, thereby saving taxpayers' money.

Arguments Against Dual/Joint Enrollment

As with any idea or movement that varies from tradition, people have different perceptions and viewpoints of its worth. The idea of high school students' taking college classes before graduating is no exception. Just as those who support the idea and can list and cite the many advantages and the worth of the programs, those who are not supporters can list and cite many disadvantages to the programs.

Those who question the integrity of dual/joint-enrollment programs ponder whether students who participate in the program are academically prepared for college-level work. For example, a message posted on the Forum On Charter Schools' Internet site sponsored by Tom Butler, expounded on the reasons dual/joint enrollment are not good for high school students (Forum on Charter Schools, 2000). Butler claimed, "High school students are developmentally under prepared for college-level work." His argument was that it does not matter how capable a student is academically, he or she is not developmentally able to handle topics and concepts in college course work. He also claimed that their being unprepared academically was a reason dual/joint enrollment is not good for high school students. The maturity of high school students and their ability to grasp college level course content is an issue raised by faculty from some Virginia colleges. Crook (1998) found that some parents had negative feelings about dual-enrollment programs and cited the following reasons: (a) dual students are separated from their peer support groups, (b) there is inadequate academic advisement, and (c) there is not enough time to participate in high school activities.

Some secondary and postsecondary educators suggested that dual/joint programs lack quality control. There are also some four-year college instructors who consider that dual credit work completed at community colleges is not a match for the four-year general education courses. Some express a concern that as programs expand and grow the quality will decrease. The absence of external validation will make it difficult for college faculty and staff to evaluate the college credit earned from these programs. Johnston (1999) pointed out that assessing the

quality of classes of regular full-time faculty on campus is difficult and that monitoring off campus dual classes will prove to be even more difficult. Therefore, dual programs need to answer to a much higher standard. Some college professors are proposing ways to make it more difficult for students to fulfill college requirements based on credit earned through dual enrollment. Foreign language departments in some colleges are designing their own placement tests that students must pass before their dual earned credit is accepted. The University of Virginia does not accept dual credit courses for transfer credit in most programs (Reisberg, 1998).

Critics are not happy with either of the delivery options for dual programs. They contend that classes held on high school campuses are subjected to too many interruptions such as announcements, solving discipline problems, extra curricular activities, and ringing bells. Going to the college campus leaves high school students without the supervision they have on the high school campus and transportation to the campus is a problem for some students. Johnston (1999) pointed out that administrators at postsecondary institutions should be very aware of the liability they face by having underage students on the college campus. He identified three areas of special concern: (a) negligence and the standards that are applicable to college staff and employees, (b) the contractual relationship between the college and minors, and (c) the potential risk for charges of sexual harassment are greater because younger students are present.

In summary, those who argue against dual/joint-enrollment programs contend that high school classes are transformed into college courses and high school teachers into college professors with little or no means of quality control. High school students regardless of their academic ability lack the maturity to grasp college level course content. Dual credit work completed at community colleges is not a match for the four-year general education courses. The absence of external validation will make it difficult for college faculty and staff to evaluate the college credit earned from these programs. It is simply a means for students to get college

credit free or for a very small fee and for postsecondary schools to boost their headcount and full-time equivalencies.

Studies of Dual/Joint Enrollment

Throughout the United States, dual/joint enrollment has become an essential part of high school programs and a new market for postsecondary schools. As with any educational program, dual/joint enrollment must be able to stand up to scrutiny. Different aspects of dual enrollment have been studied through data collection and research but most researchers conclude that there is a need for more. The number of students participating, grade point averages, standardized test scores, and grades earned in college courses compared to the regular enrollment is the type of data that is being reported.

Roesler (1992) collected data to report to the Virginia State Department of Community Colleges and they served as monitoring tools for the Virginia Plan for Dual Enrollment that was adopted in 1988. Roesler's data included the number of students throughout Virginia participating in the dual/joint program, the required qualifications for students to participate and for instructors to teach in the program, the number of teachers who were regular full-time college faculty, the number of adjunct faculty, and the number of high school teachers who were teaching in the program. In addition, he reported information about evaluation methods, the number of Full-Time Equivalencies, dual credit earned for each postsecondary institution, and the courses dual-enrolled students were taking. Roesler collected the information by sending questionnaires to each college. Knight (1992) conducted a study entitled *The Characteristics, Performance, and Persistence of High School Students Who Enrolled at Kent State Regional Campuses*. He looked at the number of semester hours carried by these students and the grade point average for students enrolled from summer 1990 to fall 1991. He found that the average ACT score for this group was 26. They carried an average of six hours per semester and their

grade points ranged from 3.23 to 4.0 with a mean score of 3.30. They registered for courses in all of the subject areas.

Brown (1993) presented data at an administrators' conference that included the number of high schools and students participating, the history and growth of the program, the number of credit hours generated, and guidelines for faculty and students. A status report given by Puyear (1998) addressed the concurrent and dual enrollment of high school students in Arizona's Community Colleges. Puyear reported on what courses were taken, how many students participated from each high school, and the postsecondary institutions they attended. An explanation and definition of the various ways high school students earn college credit and the history and growth of the program was given.

Crooks (1998) studied state policies on dual enrollment and conducted an indepth study that highlighted three of the states that seemed to be more progressive than other states because of legislation and policies established for dual programs. To conduct the study, she surveyed the state's higher education executive officers. She found that in the 1995 through 1996 school year, 204,790 students were involved in dual enrollment and credit validation classes and that funding of dual classes varied from state to state. The areas legislation dealt with the most were articulation and participant qualifications. Crooks recommended that research be conducted to see if dual/joint enrollment had any influence on time-to-degree; that is, were students graduating in fewer time than students who did not participate in dual/joint-enrollment programs?

Sayler (1990) looked at the academic and social characteristics of early college entrants at Purdue University. He found that students participating in the dual/joint-enrollment program did extremely well academically. They outscored students nationally as well as the traditional freshmen on campus. He also found that these students remained active in leadership roles at their high schools and that this behavior continued once they graduated from high school and became full-time college students.

A 1993 report issued by the University of Florida stated that a majority of those students who had earned dual credit before enrolling at the university had to retake courses (Windham, 1996). This finding prompted a follow-up study in 1994 by the Tallahassee and Pensacola Community Colleges (Windham). The follow-up study noted that the 1993 study was based on students who entered the University but who did not meet the regular admissions requirements and students who had taken chemistry as a dual-enrollment course. The 1994 study included previous dual-enrolled students attending The University of West Florida and Florida State University who transferred dual credit in English or history. The study determined that grades earned by students who had been dual enrolled were higher in the next level of the courses than regular students' grades (Windham). Windham suggested that future researchers of dual/joint programs should consider “the effect that taking dual-enrollment courses has on time-to degree” (p. 12). A 1999 report from Cleveland State Community College, a Tennessee Board of Regents school, indicated that dual/joint-enrolled students did better academically than the regular enrolled college freshmen (Porter, 2000).

Expectations for dual/joint students should be high because many of the programs require above average performance in test scores and grade point averages. A study conducted by Gurule (1996) investigating dual enrollment for underprepared- to moderate-student achievers had what some might find to be surprising results. He compared three concurrent enrollment programs in New York with one in Arizona, looking for factors that help to make the transition from high school to community college easier for underprepared and moderate achievers. He found that students in the three New York programs and the one in Arizona excelled in dual enrolled classes. Regardless of their class rank, ethnicity, or gender, almost all of the students in the Arizona program graduated from high school. Gurule reported that other studies bore out his findings that students who participated in dual type programs were more likely to graduate from high school and earn an undergraduate degree than students who had not. He recommended that programs continue to include moderate students.

To find a possible psycho educational portrait of students who selected dual enrollment as an educational option, McConnaha (1996) conducted a qualitative study. He collected his data by interviewing 20 University of Chicago Lab High School students participating in dual-enrollment programs. His research questions were:

1. What are the characteristics of a student who would select the option of dual enrollment?
2. Why do students choose to participate in dual enrollment?
3. What are the positive and negative aspects of selecting dual enrollment?
4. How does dual enrollment affect the way the student feels about himself or herself?

In order to answer the research questions, participants were asked to answer 17 interview questions. His findings were: (a) students participated in the program because of a self-influenced decision or because of the influence of others, (b) they were highly motivated and had high self-esteem and self-confidence, (c) those that entered the program because others influenced them to do so noted that the program had a negative effect on their behavior and social life, and (d) there was an overwhelmingly positive response when participants were asked what they would tell a friend if he or she was trying to decide about dual enrollment. Even students who did not have exceptionally strong feelings about the program said they would highly recommend it to others.

Johnston (1999), after reviewing and analyzing previous studies, recommended that there was a need for studies that assess and include perceptions of students and educators. In 1997, Mullin conducted a follow-up study on students who took courses through the Minnesota Postsecondary Enrollment Options Program (PSEO). Of the 500 students targeted, 479 students responded. He found that 92% of the PSEO students continued their postsecondary education. It was anticipated that 96% of those would complete a degree (Mullin, 1997). Students and parents rated the following as positive aspects about the program:

1. Educational development
2. Building of self-confidence
3. Preparation for postsecondary articulation
4. Development of study habits

Ninety-seven percent of the survey participants rated the value of PSEO participation as excellent or good. Making the transition from high school to college and being academically challenged were listed as the top benefits of the PSEO program.

Burns and Lewis (2000) investigated the dual-enrolled students' perceptions of the effect of the classroom environment on their educational experience. To conduct their study, the researchers interviewed six students, asking them questions regarding their experience in the dual enrollment program. Three of the participants were taking dual enrollment classes that met on the high school campus and three were taking classes that met on a college campus. All of the respondents stated that their experience was good. Students attending classes on a college campus were more positive than those whose classes met on a high school campus. The students attending classes on the college campus enjoyed more academic independence than those who had classes on the high school campus. All participants expressed a desire to continue in the program. The researchers concluded that more studies should be conducted on climate in dual-enrollment classes.

A survey conducted by Jordan et al. (2000) addressed the sociological impact on students at Western Washington University that focused on students' advising and registration experience, preparedness for academic work, fitting in at Western, and response to the Running Start program generally. The researchers found that all areas received positive responses except in advising. The opinions of the participants were that the advisors were not well acquainted with the needs of Running Start students. Students spoke positively about their program:

1. "Running Start made me feel like I'd gotten ahead and really done something positive."
2. "I've grown a lot through it. It's made me realize who I really am."

3. "Anyone who can do it should." (np)

Myers (1993), a student who participated in the Purdue University dual-enrollment program stated, "Dual enrollment is a challenging path that is not without its difficulties. However, the outstanding benefits far outweigh and outnumber the disadvantages. Because of such reasons, dual-enrollment had earned an A+ in my grade book" (p. 30).

The studies and literature reviewed indicated that dual/joint programs were beneficial. Students did as well or better academically than the general population of college students did including those students who had been classified as under-prepared or moderately prepared. Dual/joint classes helped to make the senior year of high school more challenging thus relieving the boredom "senioritis" that many students experienced and these students were better prepared for college. Even though the studies reported positive results, for the integrity of the program it is important that quality control and means of validation are in place and carried-out and studies and research on the effects and outcomes of dual/joint enrollment continue.

Applying Regional Accreditation Guidelines to Dual/Joint-Enrollment Programs

Concerns have been voiced about the quality control of dual/joint-enrollment programs. Because of these concerns, postsecondary schools need to be mindful of the required accreditation standards that affect dual/joint-enrollment programs (Johnston, 1999; Reisburg, 1998). Postsecondary schools that hire high school faculty as adjunct instructors need to keep careful watch to ensure that the guidelines for faculty qualifications are met and that they are also included in the campus evaluation process. Accreditation guidelines stipulate that provisions must be made for student support and auxiliary services. High school students might have different service needs from other college students and these needs must be met. All college courses are required to meet comprehensive standards; therefore, college courses offered on high school campuses need to be monitored and evaluated to make sure that the curriculum is being followed. Because admission policies need to be constant with institutions' missions and to

ensure that course work and learning outcomes are collegiate level, admission policies for dual/joint programs need to be set and monitored by postsecondary institutions rather than secondary institutions. It is important that dual/joint-enrolled students who are taking college classes on their high school campuses be informed of the colleges' academic policies. Accrediting agencies require postsecondary schools to provide effective academic advising; many dual/joint students earn 12 or more college credit hours while still attending high school. These students have a need for advising by postsecondary personnel to ensure that the classes they are taking will transfer and meet the requirements of the college they plan to attend. The Family Educational Rights and Privacy Act of 1974 protects the confidentiality of students' records. When students earn high school and college credit for a course, postsecondary institutions need to be aware of how and to whom grades are released (Catron, 1998; Johnston, 1999; Reisberg, 1998).

Summary

An important result of the call for change in education was allowing high school students to take college courses. This practice is most often referred to as dual/joint enrollment. The popularity of dual/joint-enrollment programs has prompted state board of education officials to create laws and policies to govern them.

Although the terms used to identify the structure and organization of such programs vary, the purpose is the same and that is to allow high school students to take college courses, which is not a new concept. As early as 1950, colleges were admitting high school students but only those students who had been declared "highly gifted." As students began to complain that the senior year of high school was a boring waste of time, educators, parents, and legislators began to look for programs that would alleviate the problem. Dual/Joint enrollment, or allowing high school students to take college classes, has been one solution in alleviating the problem. With the growing number of students participating in dual/joint-enrollment programs, it seems that

these programs are successful. In addition to relieving the boredom of the senior year, these programs also strengthen collaborative efforts between secondary and postsecondary institutions, allowing smaller high schools to expand their curriculum and giving students a head start on college. Even though there are several positive aspects of dual/joint-enrollment programs, there are areas that need to be closely monitored to ensure the integrity and quality of the programs.

The popularity of dual/joint-enrollment programs has brought about several studies and many reviews of these programs. Previous studies indicated that most high school students did well in college courses, even those who had not been successful in their high school classes. There seems to be a lack of studies showing how these students perform once they become full-time college students. This study is being conducted to find out how dual/joint-enrolled students perform as full-time college students.

CHAPTER 3

RESEARCH METHODS

This chapter includes a description of the study design, rationale, selection of the population, a description of the data collection procedures and analysis, and the hypotheses.

Description of the Study

Throughout the United States, there are programs that allow high school students to enroll in college classes. For several years, I have coordinated a dual/joint-enrollment program and I am familiar with the research and studies that have been conducted. These studies pertained to students who were still attending high school. However, I, as well as others who were familiar with dual/joint-enrollment programs, realized there was a need for information about dual/joint-enrolled students after they graduated high school and became traditional college students. This research project addressed college students who were previously dual/joint-enrolled students. Secondary analysis, using data retrieved from the Tennessee Board of Regents (TBR) (2002) Universities' Student Information System (SIS Instructions, 2002) was used to conduct the study. A copy of the preliminary and formal letters of request for retrieval of data is shown in appendices A and B.

The academic performance indicators for this study were grade point averages (high school and college), standardized test scores (ACT), and the number of college credits earned before completing high school.

Rationale for Using Secondary Analysis

The researcher should determine the data to be used and the decision should be based on his or her perception of the quality and relevancy of the data to the problem addressed (Gall,

Borg, & Gall, 1996). The purpose of this study was to determine if there is a relationship between college retention and completion and the number of college credit hours students earn before graduating from high school. Other variables such as demographic characteristics and academic performance indicators were also included in the study in an attempt to determine if any variable studied was more of a predictor of retention and the completion of college than any other. It seemed that the study would have more validity if the data were extracted from college records rather than from a survey form (Lang & Hiess, 1997). Analysis of existing data, such as students' records, is referred to as secondary analysis (Kiecolt & Nathan, 1985). The advantages of using this collection procedure included the reliability of the information obtained and the researcher's benefit of not having to depend on the return of survey forms. The disadvantages noted securing permission from each of the six TBR university presidents to obtain access to the Student Information System (out of the six universities targeted, one president refused the request), and to create a program that would extract the data needed for the study.

Selection of Population

The data for this study were extracted from the Student Information Systems of the TBR universities. The presidents of the universities were contacted by letter (see Appendices A and B) asking permission to study the student records of a specific population of incoming 1996 and 1998 freshmen. The population for the study was 1996 and 1998 freshmen who graduated from high school in May or June of 1996 and 1998 and who enrolled in a TBR University for the 1996 and 1998 fall semesters. The data for the study consisted of records for 12,834 students.

TBR Student Information System

SCT Connected Learning Alliance supplies the software that stores and maintains information needed for administrative and academic functions (SCT Corporation, 2002). TBR is one of 1,300 institutional systems around the world that uses SCT software for storing and

maintaining student information. Information Builder's Incorporated (IBI) is a company that designs software that retrieves information easily and quickly. The TBR schools use IBI's *Focus* program for entering, maintaining, retrieving, and analyzing student data. *Focus* is designed to serve the needs of both end users and application developers programmers (Focus for VAX/VMS, 1991). Programmers are able to take information found in various places and organize it to be accessible for a variety of uses. The items of information are called fields. The fields are given names. Related fields are grouped together into segments. Segments are named and can be linked to related segments. The collected data for one or more related segments become a file. Personal data that have been collected and gathered into a single segment *Focus* (Focus for VAX/VMS, 1991) file comprise the SIS (SIS Instructions, 2002).

Data Collection

The data in this study were obtained from five of the TBR Universities' Student Information Systems. All TBR schools use the *Focus* program (Focus for VAX/VMS, 1991) to enter, maintain, analyze, and retrieve student data; therefore, anyone employed by the system whose job requires using SIS (SIS Instructions, 2002), such as the programmers, would be familiar with the system. A programmer (a colleague of the researcher) developed the program to extract the data needed for the study. The following information was extracted:

1. All 1996 and 1998 university freshmen who graduated high school in May or June of 1996 and 1998.
2. Gender
3. Race
4. High school grade point average
5. Standardized test score (ACT)
6. The number of college credit hours accumulated upon entry to the university
7. Grade point average at the end of the first grading period

8. Last semester of attendance or graduation semester
9. Grade point average at the end of the last semester of attendance

Even though there are policies and regulations that govern all TBR schools, there were individual differences among the schools. Codes identifying semesters varied from university to university. For this study, semesters were identified as 1 = spring, 2 =summer, and 3 = fall. Although SAT scores are accepted at TBR schools, the required entry test is the ACT. There is a concordance between SAT and ACT and the universities apply the concordance to convert SAT to ACT scores but the converted scores are not recorded in the Student Information System. SAT scores are stored. The program that was written to obtain the data for this study was written to extract ACT scores; any record with an SAT score had a 0 indicating that there was no ACT score. From the 12,834 records, 716 or 5.6% had missing ACT scores. It was not possible to determine for certain how the missing scores affected the study; however, a comparison of the means of these two groups (missing ACT scores and ACT scores) on high school GPA, first semester grade, and the ending GPA showed the groups to be very similar, indicating that there was little or no difference between the groups.

Some foreign students and students who fulfilled high school requirements by completing the General Educational Development (GED) test did not have high school GPAs. There were 134 records (or fewer than 1.1%) without high school GPAs. It is not possible to determine how these missing high school grades affected the study; however, a comparison of the means of this groups' ACT scores, first semester grades, and ending GPAs showed the group to be similar to the others in the study, indicating that those with no high school GPA were much the same as those with high school GPAs.

Special codes denoted college credit hours earned before graduating from high school. Dual/Joint-enrolled students, regardless of the number of college credit hours they earned before high school graduation, were coded and received as first time freshmen at all of the TBR Universities (SIS Instructions, 2002). This coding helped to identify students who had

participated in dual/joint-enrollment programs.

When I received a copy of this program, I emailed it to the designated person at each university. The information was emailed back to me and the data were burned onto a compact disk and then merged when it was put into the SPSS program. The data collected were in accordance with the Family Education Rights and Privacy Act of 1974. The names and social security numbers of all students were omitted from the data collected.

To make the process of obtaining data as consistent and reliable as possible, a copy of a precoded *Focus* (Focus for VAX/VMS, 1991) program was used to extract the data needed for the study from the Student Information System database. A copy of the *Focus* program was sent to each TBR University to run.

Measurement of Variables

High School Grade Point Average was an average of grades earned throughout the high school years at the time of graduation from high school.

College Grade Point Average. One set was the average grade earned at the end of the students' first semester of college and one set was an average of all the grades earned through graduation from college or the last semester attended.

Standardized Test Score was the composite (average) of the four subtests given on the ACT.

Dual/Joint Enrolled College Credit was college credit hours accredited to first-time freshmen.

Retention/Graduation was the semester of graduation or the last semester of attendance.

Hypotheses

From the eight research questions the following hypotheses were developed and analyzed:

Ho1₁: There is no difference in the type of enrollment by gender.

Ho1₂: There is no difference in the type of enrollment by ethnic background.

Ho2₁: There is no difference in the high school GPA of dual/joint-enrolled students and those who were not dual/joint enrolled.

Ho2₂: There is no difference in the standardized test score of dual/joint-enrolled-students and those who were not dual/joint enrolled.

Ho2₃: There is no difference in the first semester grades of dual/joint-enrolled students and those who were not dual/joint enrolled.

Ho2₄: For students no longer attending (dropped out) there is no difference in the ending mean grade point average of dual/joint-enrolled students and those who were not dual/joint enrolled.

Ho2₅: For students still attending (not graduated) there is no difference in the ending mean grade point average of dual/joint-enrolled students and those who were not dual/joint enrolled.

Ho2₆: For students who graduated, there is no difference in the mean GPA at graduation between dual/joint and nondual/joint enrolled students.

Ho3₁: There is no difference in the retention of dual/joint- and nondual/joint-enrolled students who graduated from high school in 1996.

Ho3₂: There is no difference in the retention of dual/joint- and nondual/joint-enrolled students who graduated from high school in 1998.

Ho4₁: Among 1996 high school graduates, there is no difference between dual/joint- and nondual/joint-enrolled students and the time it takes to obtain a four-year degree.

Ho4₂: Among 1998 high school graduates, there is no difference between dual/joint enrolled and nondual/joint-enrolled students and the time it takes to obtain a four-year degree.

Ho5: The number of college credits earned while in high school has no influence on the time it takes to finish a four-year college degree.

Ho6₁: Dual status, high school grade point average and ACT scores taken together can not predict academic performance at the end of the first grading period.

Ho6₂: There is no relationship between high school grade point average and first semester grade point average.

Ho6₃: There is no relationship between dual status and first semester grade point average.

Ho6₄: There is no relationship between ACT scores and first semester grade point average.

Ho7₁: For students no longer attending (dropped-out) there is no relationship between any of the variables (high school grade point average, ACT score, dual status, and/or grade point average after the first grading period) and academic performance for the last semester attended (ending grade point average).

Ho7₂: For students currently enrolled there is no relationship between any of the variables (high school GPA, ACT score, dual status, and/or GPA at the end of the first semester (fall term grade) and academic performance for the last semester attended (ending grade point average).

Ho7₃: For students who graduated there is no relationship between any of the variables (high school GPA, ACT score, dual status, and/or GPA at the end of the first semester (fall term grade) and academic performance for the last semester attended (ending grade point average).

Ho8₁: Dual status, high school grade point average, standardized test score, or grade point average after the first semester grading period are not predictors of college graduation.

Ho8₂: There is no relationship between dual status and college graduation.

Ho8₃: There is no relationship between high school GPA and college graduation.

Ho8₄: There is no relationship between standardized test score and college graduation.

Ho8₅: There is no relationship between GPA after the first semester grading period and college graduation.

Data Analysis Procedure

For question 1, Cross Tabulation was used to see how the gender and ethnicity population between the nondual/joint and dual/joint population compared. Chi-square was used to test Ho1₁ and Ho1₂. A *t*-test for independent samples was used to test Ho2₁, Ho2₂, Ho2₃, Ho2₄, Ho2₅, and Ho2₆. Chi-square was used to analyze Ho3₁, Ho3₂, Ho4₁, and Ho4₂. A one-way ANOVA was used to test Ho5. Multiple Linear Regression was used to analyze Ho6₁, Ho6₂, Ho6₃, Ho6₄., Ho7₁, Ho7₂, and Ho7₃. Ho8₁, Ho8₂, Ho8₃, Ho8₄, and Ho8₅ were analyzed by using Discriminant Analysis.

CHAPTER 4
ANALYSIS OF DATA

The cry for accountability for all educational programs is increasing; hence, program scrutiny is at a high level. Any program that does not have data to support progress and academic gain is in jeopardy of being phased out, and dual-enrollment programs are not exempt from this scrutiny (Burns & Lewis, 2000). The purpose of this study was to determine if there was a relationship between college retention and completion and the number of college credit hours students earned before graduating high school.

The study's population consisted of college freshmen who graduated from high school in May or June of 1996 and 1998 and who enrolled in a Tennessee Board of Regents University for the 1996 and 1998 fall semesters. A program was written using *Focus* (Focus for VAX/VMS, 1991) to extract the following information from each of the five universities' Student Information System: (a) gender, (b) high school GPA, (c) ACT score, (d) GPA at the end of the fall semester [the students' first semester of school], and (e) last semester attended and/or graduation date. From the five universities, data were obtained from 12,834 student records. The schools are identified as A, B, C, D, and E. The number of participants by school is shown in Table 1.

Table 1

Number of Participants by School

<u>University</u>	<i>N</i>	<i>%</i>
A	1,952	15.2
B	2,660	20.7
C	4,242	33.1
D	2,562	20.0
E	<u>1,418</u>	<u>11.0</u>
Total	12,834	100.0

There were 12,834 students' records studied. The largest number of records came from University C with 4,242 records making up 33.1% of the population followed by University B with 2,660 (20.7%), University D with 2562 (20.0%), University A with 1,952 records (15.2%), and University E with 1,418 records (11.0%).

The records from the 1996 freshman class included 6,248 or 48.7% of the participants in the study. The 1998 freshmen students numbered 6,586 or 51.3% of the total.

The data revealed that 1,069 (8.3%) of the students were dual/joint enrolled and 11,765 (91.7%) were nondual/joint enrolled. The 1996 class had 509 or 8.1% dual/joint-enrolled students and 5,739 (91.9%) nondual-enrolled students. The 1998 class had 560 or 8.5% dual/joint students and 6,026 (91.5%) nondual students.

Because some students took the SAT, 719 or 5% of the participants' standardized test scores were recorded as zero indicating the ACT score was missing. Because of the missing data, the researcher thought it necessary to compare those subjects having missing ACT scores to those with ACT scores. A *t*-test was used to compare the means on high school GPA, number of hours transferred, first semester GPA, and ending GPA between those subjects with ACT scores and those without. Table 2 shows the results.

Table 2

A Comparison of HS GPA, Transfer Hours, First Semester GPA, and Ending GPA Between Students Who Took the ACT and SAT

		<i>N</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>
High School GPA	SAT	660	2.9	.5496	3.775	.000*
	ACT	12,040	3.08	.5623		

Table 2 (continued)

		<i>N</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>
Transferred Hours						
	SAT	719	1.23	3.67	4.900	.000*
	ACT	12,115	.5515	2.34		
First Semester GPA						
	SAT	719	2.40	1.10	1.766	.077
	ACT	12,115	2.48	1.12		
Ending GPA						
	SAT	719	2.25	1.06	2.356	.018
	ACT	12,115	2.35	1.02		

Table 2 shows that the mean of the two groups' high school GPAs, transferred hours, first semester GPAs, and ending GPAs are very similar with the most variance being in the number of transferred hours (dual credit hours). Although three of these revealed statistically significant differences ($p < .05$), this was largely because of the sample size. The differences were not considered to be practically significant.

It was not possible to determine how the missing ACT scores influenced the study; however, with the finding that there was miniscule difference between those subjects with ACT scores and those without, the assumption would be that the missing ACT scores would have little or no influence on the study.

There were also 134 or fewer than 1.1% of the subjects missing high school grade point averages. Although this population represented a very miniscule part of the study, the researcher thought it best to do a simple comparison of this group with the others. Using a *t*-test, the mean ACT scores, transferred hours, first semester GPA, and ending GPA of the two groups were compared. Table 3 shows the results

Table 3

Comparing Students Without High School Grade Point Averages With Students Who Have Them

	<i>N</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>
<u>ACT Score</u>					
No HS GPA	75	20.73	4.09	2.117	.034
HS GPA	12,040	21.68	3.86		
<u>Transferred Hours</u>					
No HS GPA	134	.3060	1.96	1.676	.096
HS GPA	12,700	.5925	2.45		
<u>GPA 1st Semester</u>					
No HS GPA	134	1.70	1.50	5.969	.000*
HS GPA	12,700	2.48	1.11		
<u>Ending GPA</u>					
No HS GPA	134	1.5	1.2	7.687	.000*
HS GPA	12,700	2.3	1.02		

Table 3 shows that the mean ACT score for students who had no high school grade point average was 20.73 and for those with a high school grade point average, 21.68. The transferred hours of those students who had no high school GPA was .3060 and those with, .5925. The mean first semester grade point average of those with no high school GPA was 1.70 and 2.48 for those with a high school grade point average. The ending GPA mean score for students without a high school grade point average was 1.5 and 2.3 for those with a high school grade point average.

Although the mean college GPA, ACT score, and number of transferred hours were lower for those who had missing high school grades, it was not possible to determine how this influenced the study. Because these subjects are a very small part of the study's population and because the focus of the study is retention and graduation of former dual/joint-enrolled students,

the conclusion of the researcher is that the missing high school grades would not have influenced the study one way or another.

Research Question 1

Is there a difference in the type of enrollment by gender and ethnic background?

Ho1: There is no difference in the type of enrollment by gender.

Ho1₂: There is no difference in the type of enrollment by ethnic background.

Research question 1 addressed the demographics of the students who participated in the dual/joint-enrollment programs. Using the chi-square statistic and cross tabulation of gender, Table 4 shows that in the dual/joint-enrollment population there were 423 males (39.6%) and 646 females (60.4 %). In the nondual/joint-enrollment population, there were 5239 males (44.5%) and 6526 females (55.5%). The results were statistically significant. The null hypothesis was rejected. A higher percentage of the dual enrolled were female.

Table 4

Number of Male and Female Students by Type of Enrollment

<u>Participants</u>	<u>Gender Cross tabulation</u>			
	<u>Dual</u>		<u>Nondual</u>	
	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>
Male	423	39.6	5,239	44.5
Female	<u>646</u>	<u>60.4</u>	<u>6,526</u>	<u>55.5</u>
Total	1,069	100.0	11,765	100.0

$X^2 = 9.78$

df = 1

$p < .001$

Table 5 shows the ethnicity cross tabulation between type of enrollment and ethnic background.

Table 5

Number of Nonwhite and White Students by Type of Enrollment

<u>Participants</u>	<u>Ethnicity Cross tabulation</u>			
	<u>Dual</u>		<u>Nondual</u>	
	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>
Nonwhite	90	8.4	2,066	17.6
White	<u>997</u>	<u>91.6</u>	<u>9,699</u>	<u>82.4</u>
Total	1,069	100.0	11,765	100.0

$X^2 = 58.590$

df = 1

$p < .001$

Table 5 shows that 90 or 8.4% of the dual-enrolled students were Nonwhite (any student not classified as being White) compared to 2,066 or 17.6% among the nondual group. The result was statistically significant. A higher percentage of the dual students were White. The results indicated that the majority of participants in dual/joint enrolled programs were White and female.

Females in the nondual/joint-enrollment group outnumbered males by 10% whereas in the dual/joint-enrollment population, females outnumbered males by 20.8 %. Nonwhites made up 17.6 % of the nondual-enrollment group and only 8.4% of the dual/joint-enrollment population. For this study, the majority of participants in dual/joint-enrolled programs were White females.

Research Question 2

Do dual/joint-enrolled students have greater academic success than nondual/joint-enrolled students?

From question 2 the following hypotheses were developed and tested:

Ho2₁: There is no difference in the high school GPA of dual/joint-enrolled students and those who were not dual/joint enrolled.

Ho2₂: There is no difference in the standardized test score of dual/joint-enrolled-students and those who were not dual/joint enrolled.

Ho2₃: There is no difference in the first semester grades of dual/joint-enrolled students and those who were not dual/joint enrolled.

Ho2₄: For students no longer attending (dropped out) there is no difference in the ending mean grade point average of dual/joint-enrolled students and those who were not dual/joint enrolled.

Ho2₅: For students still attending (not graduated) there is no difference in the ending mean grade point average of dual/joint-enrolled students and those who were not dual/joint enrolled.

Ho2₆: For students who graduated, there is no difference in the mean GPA at graduation between dual/joint and nondual/joint enrolled students.

A *t*-test for independent samples was used to test Ho2₁, Ho2₂, and Ho2₃. Table 6 shows the results.

The table shows dual/joint-enrolled students have a significantly higher HS GPA, ACT, and 1st semester mean score than nondual/joint-enrolled students. Hypotheses 2₁, 2₂, and 2₃ were rejected.

Table 6

A Comparison of High School Grade Point Average, ACT Score, and 1st Semester Grade Point Average Between Dual and Nondual Students

	<i>N</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>
<u>HS GPA</u>					
Nondual	11,636	3.03	.5540	28.75	.000*
Dual	1,064	3.53	3.86		
<u>ACT Score</u>					
Nondual	11,148	21.29	3.64	39.27	.000*
Dual	967	26.09	3.63		

A *t*-test was also used to test Ho₂₄, 2₅, and 2₆. Tables 7, 8, and 9 show hypotheses 2₄, 2₅, and 2₆.

Table 7

Ending College GPA: Students No Longer Attending (Dropouts)

	<i>N</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>
<u>Nondual</u>	6,819	1.80	1.03	11.16	.000*
<u>Dual</u>	380	2.41	1.00		

Table 8

Current GPA of Last Grading Period for Students Currently Enrolled (Not Graduated)

	<i>N</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>
<u>Nondual</u>	2,360	2.71	.5405	9.16	.000*
<u>Dual</u>	191	3.09	.5651		

Table 9

GPA at Graduation: Students Who Have Completed the Four-Year Degree

	<i>N</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>
<u>Nondual</u>	2,586	3.15	.4438	13.32	.000*
<u>Dual</u>	498	3.43	.4060		

Tables, 7, 8, and 9 show that in each of the three groups of students (dropout, currently enrolled, and graduated) the dual/joint-enrolled subjects' mean ending GPAs were significantly higher than nondual/joint-enrolled subjects. Null hypotheses 2₄, 2₅, and 2₆ were rejected.

Research Question 3

Is there a difference in the retention of dual/joint-enrolled students and nondual/joint-enrolled students?

The following hypotheses were developed from this question:

Ho3₁: There is no difference in the retention of dual/joint- and nondual/joint-enrolled students who graduated from high school in 1996.

Ho3₂: There is no difference in the retention of dual/joint- and nondual/joint-enrolled students who graduated from high school in 1998.

Retention status was determined by three categories, those students who no longer attend (dropped-out), those students currently enrolled, and those students who have graduated. Chi-square was used to analyze if there was a difference in the retention status of dual- and nondual-enrolled students. Table 10 shows the results of the 1996 freshman class and Table 11 the 1998 class.

Table 10 shows that more nondual/joint-enrolled students (56.8%) dropped out of school compared to 32.8% of dual/joint enrolled. A higher percentage (7.5%) of the 1996 nondual/joint-enrolled students are currently enrolled compared to 3.3% of dual/joint students. A greater percentage (63.9%) of dual/joint students graduated than did the nondual/joint (35.7%). The null hypothesis was rejected.

Table 10

Retention Status of 1996 Class

	<u>Dual</u>		<u>Nondual</u>	
	<i>N</i>	%	<i>N</i>	%
Dropped Out-- Not Currently Attending	167	32.8	3,259	56.8
Currently Enrolled-- Not Graduated	17	3.3	430	7.5
Graduated	<u>325</u>	<u>63.9</u>	<u>2,050</u>	<u>35.7</u>
Total	509	100.0	5,739	100.0

$\chi^2 = 157.17$
 $\phi = .159$
 $p < .001$

The results of Table 11 are similar to the results shown in Table 10. The 1998 percentage of dropouts for nondual/joint-enrolled students was 59.1% compared to 38% for dual/joint-enrolled students. The percentage of nondual/joint-enrolled students currently attending was 32.0% and for nondual/joint it was 31.1%. The graduation rate for nondual/joint-enrolled students was 8.9% and for dual/joint it was 30.9%. The retention of dual/joint-enrolled students was significantly higher than the retention of nondual/joint-enrolled students. The null hypothesis was rejected.

Table 11

Retention Status of 1998 Class

	<u>Dual</u>		<u>Nondual</u>	
	<i>N</i>	%	<i>N</i>	%
Dropped Out-- Not Currently Attending	213	38.0	3,560	59.1
Currently Enrolled--Not Graduated	174	31.1	1,930	32.0
Graduated	<u>173</u>	<u>30.9</u>	<u>536</u>	<u>8.9</u>
Total	560	100.0	6,026	100.0

$$X^2 = 270.07$$

$$\text{phi} = .203$$

$$p < .001$$

Research Question 4

Is there a difference between dual/joint- and nondual/joint-enrolled students and the time it takes to obtain a four-year college degree?

The following hypotheses were developed from question 4:

Ho4₁: Among 1996 high school graduates, there is no difference between dual/joint- and nondual/joint-enrolled students and the time it takes to obtain a four-year degree.

Ho4₂: Among 1998 high school graduates, there is no difference between dual/joint enrolled and nondual/joint-enrolled students and the time it takes to obtain a four-year degree. Chi-square was used to test both hypotheses. Tables 12 and 13 show the results.

Table 12 shows that a higher percentage of 1996 nondual students were currently enrolled than dual-enrolled students. A higher percentage of nondual/joint-enrolled students (63.1%) graduated late compared to 39% of the dual/joint enrolled. The percentage of dual/joint-enrolled students (45.9%) graduating early was much higher than the percentage of nondual/joint-enrolled students (19.6%). The null hypothesis was rejected.

Table 12

Cross Tabulation: Time to Obtain a Four-Year Degree: 1996 Freshmen

	<u>Dual</u>		<u>Nondual</u>	
	<i>N</i>	%	<i>N</i>	%
Currently Enrolled—				
Not Graduated	17	5.0	430	17.3
Graduated Late	168	49.1	1,564	63.1
Graduated Early or On Time	<u>157</u>	<u>45.9</u>	<u>486</u>	<u>19.6</u>
Total	342	100.0	2,480	100.0

$X^2 = 129.84$

phi = .215

$p < .001$

Table 13 shows that 78.3 % of the 1998 nondual/joint-enrolled students were currently enrolled compared to 50.1% of the dual/joint enrolled. Of the dual/joint-enrolled students, 49.3% had graduated compared to 21.2% of the nondual/joint. The graduated late percentages are small because spring 2002 was the semester that designated if a student graduated on time. A student identified as graduating late would have graduated at the end of the summer 2002 semester; thus, this accounts for the small percentages of late graduates. The null hypothesis was rejected.

Table 13

Cross Tabulation: Time to Obtain a Four-Year Degree: 1998 Freshmen

	<u>Dual</u>		<u>Nondual</u>	
	<i>N</i>	%	<i>N</i>	%
Currently Enrolled— Not Graduated	174	50.1	1,930	78.3
Graduated Late	2	0.6	13	0.5
Graduated Early/ on Schedule	<u>171</u>	<u>49.3</u>	<u>523</u>	<u>21.2</u>
Total	347	100.0	2,466	100.0

$\chi^2 = 129.33$
 $\phi = .214$
 $p < .001$

Research Question 5

Does the number of college credits earned while in high school have any influence on the time it takes to finish a four-year college degree?

The hypothesis for question 5 was:

Ho5: The number of college credits earned while in high school has no influence on the time it takes to finish a four-year college degree.

Table 14 shows 1996 and Table 15 shows 1998 descriptive statistics for the number of college credit hours earned while in high school for each of the three categories of time to obtain a degree: (1) currently enrolled, (2) graduated late, and (3) graduated early or on schedule. One-way ANOVA was used to test the hypotheses. Table 14 shows the results for 1996 and Table 15 for 1998.

Table 14

Mean Number of College Credit Hours Earned in High School by the Class of 1996

	<i>N</i>	<i>M</i>	<i>SD</i>
Currently Enrolled	447	.3199	1.9816
Graduated Late	1,732	.6046	2.3070
Graduated Early/on Time	643	1.9985	4.5688

Table 15

Mean Number of College Credit Hours Earned in High School by the Class of 1998

	<i>N</i>	<i>M</i>	<i>SD</i>
Currently Enrolled	2,104	.5452	2.3139
Graduated Late	15	1.0667	3.1952
Graduated Early/on Time	694	2.0749	4.7257

Table 14 shows that 1996 students' mean number of hours earned while in high school was .3199 for currently enrolled students, .6046 for those students who graduated late, and 1.9985 for those who graduated early or on time. Table 15 shows that 1998 students' mean number of hours earned while in high school was .5452 for currently enrolled students, 1.0667 for those students who graduated late, and 2.0749 for those who graduated early or on time.

Table 16

1996--Comparing Mean Number of Transferred Hours

	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Between Groups	1075.909	2	537.955	62.240	.000*
Within Groups	24365.134	2819	8.643		

* $p < .05$

Table 17

1998--Comparing Mean Number of Transferred Hours

	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Between Groups	122.575	2	610.788	63.854	.000*
Within Groups	26878.748	2810	9.565		

* $p < .05$

Table 16 (1996) and Table 17 (1998) show that p is lower than alpha indicating that there are at least one pair of means that are different; therefore, the null hypothesis was rejected. A multiple comparison post hoc test was used to find out which pair or pairs of means were different. Tables 18 and 19 show the results.

Table 18

1996 Multiple Comparison of Means

	<i>Mean Difference</i>	<i>SE</i>	<i>p</i>
<u>Currently Enrolled</u>			
Graduated late/not graduated	-.2847	.1560	.068
Graduated early or on schedule	-1.6785	.1810	.000*
<u>Graduated Late</u>			
Currently enrolled/not graduated	.2847	.1560	.068
Graduated early or on schedule	-1.3938	.1358	.000*

* $p < .05$

Table 19

1998 Multiple Comparison of Means

	<i>Mean Difference</i>	<i>SE</i>	<i>p</i>
<u>Currently Enrolled</u>			
Graduated late/not graduated	-.5215	.8014	.515
Graduated early or on schedule	-1.5298	.8071	.000*
<u>Graduated Late</u>			
Currently enrolled/not graduated	.5215	.8014	.515
Graduated early or on schedule	-1.0083	.8071	.212

* $p < .05$

The post hoc test revealed in Tables 18 (1996) and 19 (1998) that dual credit hours have a significant influence on time to graduation. Among the 1996 group, those who graduated early had earned significantly more hours than those who graduated later or those who were currently enrolled. Among the 1998 group, those who graduated early earned more hours than those who graduated later or those who were still enrolled.

Research Question 6

Which of the following variables, if any, are important in predicting academic performance at the end of the first grading period: (a) dual status, (b) high school grade point average, or (c) standardized test score.

Ho6₁: Dual status, high school grade point average, and ACT scores taken together can not predict academic performance at the end of the first grading period.

Ho6₂: There is no relationship between high school grade point average and first semester grade point average.

Ho6₃: There is no relationship between dual status and first semester grade point average.

Ho6₄: There is no relationship between ACT scores and first semester grade point average.

Multiple Linear Regression was used to test these hypotheses. Tables 20, 21, and 22 show the results.

Table 20

Dual Status, High School Grade Point Average, and ACT Scores as Predictors of Grade Performance at the End of the First Semester

<i>R</i>	<i>R²</i>	<i>Adjusted R²</i>	<i>Std Error of the Estimate</i>
.434	.188	.188	1.0053

$R^2 = .188$ or 19%

Table 21

Predictors of First Semester Grade Point Average

	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Regression	1514.585	3	504.862	921.121	.000*
Residual	5997.249	10942	.548		

* $p < .05$

Table 22

Ranking of the Predictors for 1st Semester Grade Point Average

	β	<i>t</i>	<i>p</i>
High School GPA	.378	41.051	.000*
ACT	.076	7.994	.000*
Dual Status	.049	5.544	.000*

Table 20 shows that R^2 was .188 or 19% indicating that 19% of the variation in GPA could be explained by the predictors. Table 21 reveals that the three independent variables, dual status, high school grade point average, and standardized test score predicted GPA at the end of the first grading period. The null hypothesis was rejected. Table 22 shows that of the three independent variables, high school grade point average had the strongest relationship in predicting grade point average at the end of the first semester with a beta of .378. The relationship between ACT score and first semester grade was weaker with a beta of .076. The weakest relationship was dual status and 1st semester grade with a beta of .049. All three

independent variables were significantly related to first semester grade point averages. Null hypotheses β_2 , β_3 , and β_4 were rejected.

Research Question 7

Which of the following variables, if any, are important in predicting academic performance for the last semester attended: (a) dual status, (b) high school grade point average (c) standardized test score, or (d) grade point average after the first grading period.

Three hypotheses were developed from this question:

Ho7₁: For students no longer attending (dropped-out) there is no relationship between any of the variables (high school grade point average, ACT score, dual status, and/or grade point average after the first grading period) and academic performance for the last semester attended (ending grade point average).

Ho7₂: For students currently enrolled there is no relationship between any of the variables (high school GPA, ACT score, dual status, and/or GPA at the end of the first semester (fall term grade) and academic performance for the last semester attended (ending grade point average).

Ho7₃: For students who graduated there is no relationship between any of the variables (high school GPA, ACT score, dual status, and/or GPA at the end of the first semester (fall term grade) and academic performance for the last semester attended (ending grade point average).

Multiple Linear Regression was used to test hypotheses Ho7₁, Ho7₂, and Ho7₃. The researcher tested each retention group (those students no longer attending, those students currently attending, and those students who have graduated) with the thought that there might be variation from group to group.

Table 23

Multiple Regression Analysis of the Effects of Independent Variables on Ending Grade Point Average

	<u>Students No Longer Attending</u>			<u>Currently Enrolled Students</u>			<u>Students Who Graduated</u>		
	β	t	p	β	t	p	β	t	p
High School GPA	.138	10.138	.000*	.337	.398	.000*	.320	19.474	.000*
ACT	-.041	5.319	.000*	.150	8.193	.000*	.205	12.237	.000*
Dual Enrolled	.010	1.353	.176	.037	1.470	.142	.002	.119	.905
End of Fall Term GPA	.747	98.924	.000*	.297	17.139	.000*	.356	24.149	.000*
	R ² = .665 F = 3300.110 p = .000*			R ² = .358 F = 341.224 p = .000*			R ² = .499 F = 731.681 p = .000*		

* $p < .05$

Table 23 shows the results for students no longer attending, students currently attending, and for students who have graduated. The table shows for students no longer attending that $R^2 = .665$ indicating that 65.5 % of the variation in the ending grade point average can be explained by the predictors ($F = 3300.2110$). There is a strong relationship between the ending GPA and the GPA at the end of the fall semester ($\beta = .747$). There is also a relationship between the ending GPA and high school GPA ($\beta = .138$) and ACT score ($\beta = .041$) but the relationships were weak. There is no relationship between the ending GPA and dual enrollment ($\beta = .010$). For students currently enrolled $R^2 = .358$ indicating that 35.8% of the variation in the ending grade point average can explained by the predictors, $F = 341.224$. The high school GPA had the strongest relationship with ending GPA ($\beta = .337$) followed by the GPA at the end of the fall semester ($\beta = .297$) and ACT scores ($\beta = .150$). There was no relationship between the ending

GPA and dual status ($\beta = .037$). For students who graduated the table shows that $R^2 = .499$ indicating that 49.9 % of the variation in the ending grade point average can be explained by the predictors, $F = 731.681$. The GPA at the end of the first semester had the strongest relationship with the ending GPA ($\beta = .356$) followed by the high school GPA ($\beta = .320$) and ACT score ($\beta = .205$). There was no relationship between dual status and ending GPA ($\beta = .002$).

In all three categories of students, there was a relationship between ending GPA and all of the variables except dual status. In all of the categories each variable except dual status was a statistically significant predictor. Even though dual enrollment was not a statistically significant predictor, given its joint relationship to the other predictor variables, it is an important predictor.

Research Question 8

Which variables, if any, are predictors of college graduation: (a) dual status, (b) high school grade point average, (c) standardized test score, or (d) grade point average after the first grading period.

The following hypotheses were developed from this research question:

Ho8₁: Dual status, high school grade point average, standardized test score or grade point average after the first semester grading period are not predictors of college graduation.

Ho8₂: There is no relationship between dual status and college graduation.

Ho8₃: There is no relationship between high school GPA and college graduation.

Ho8₄: There is no relationship between standardized test score and college graduation.

Ho8₅: There is no relationship between GPA after the first semester grading period and college graduation.

Discriminant Analysis was used to test the hypotheses. Table 24 shows the result.

Table 24

Wilks' Lambda Independent Variables as Predictors and the Strength of the Predictors

	<i>Wilks'</i>	<i>df</i>	<i>p</i>
All Independent Variables	.856	4	.000*

In Table 24 of the independent variables, Wilks' .856 indicated that one or more of the independent variables were predictors of college graduation rejecting hypotheses 8₁, 8₂, 8₃, and 8₄.

In order to see how well the discriminant function classified students into two groups a summary measure was used. Kappa Coefficient was also used to determine how much the discriminant function added beyond “chance” classification. Table 25 shows the results.

Table 25

Classification of Students Into Categories and Kappa Coefficient Symmetric Measures

		<u>Predicted Group Membership</u>		
		0 No	1 Yes	Total
Graduated Count	0 No	8661	431	9,092
	1 Yes	2,314	634	2,948
%	0 No	95.3	4.7	100.0
	1 Yes	78.5	21.5	100.0

a. 77.2% of the original grouped cases correctly classified

Table 25 shows that the discriminant function correctly classified 77.2% of the students and the Kappa Coefficient .214 supports the discriminant function finding.

This chapter included analysis of data. In Chapter 5, the findings are summarized and interpreted and from the analysis conclusions are made. Recommendations for further consideration are also included.

CHAPTER 5

FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

The purpose of the study was to determine if there is a relationship between college retention and completion and the number of college credit hours students earned before graduating from high school. The study's population consisted of college freshmen who completed high school in May or June of 1996 and 1998 and who enrolled in one of the TBR Universities for the 1996 and 1998 fall semesters.

Secondary analysis of student records was used to conduct the study. The data were obtained from the student information system of five TBR Universities. Using a specifically written program the following information was extracted for the study:

1. Gender
2. Race
3. High School GPA
4. ACT Scores
5. Number of college credits earned before graduating high school
6. GPA at the end of the first semester of college
7. Last semester attended and/or graduation semester
8. GPA at the end of the last semester attended

Because the data for the study came from five universities representing students from 1,650 high schools, home schooled students, students completing high school by taking a GED test, and foreign students, there were variances in the data that could or could not have had an effect on the study. Two such variances were the standardized test score and high school GPA. The ACT score was the standardized test score extracted from the SIS; 5.6% of the study's population had no ACT scores and 1% had no high school GPA. To determine how those

students without ACT scores compared to those with, a *t*-test was used to compare the means of high school GPA, number of dual/joint credit hours earned, first semester GPA, and ending GPA. The findings were that these students were similar.

To determine how the 1% of the population missing a high school GPA compared to those with, a *t*-test was used to compare the two groups' mean ACT scores, number of dual/joint credit hours, first semester GPA, and ending GPA. Those having no high school GPA had lower mean scores than those with a high school GPA; however, because they represented such a small proportion of the population and the focus of the study was to determine if college dual/joint enrollment in high school had any influence on retention or completion of college, the researcher concluded that the missing GPAs would have little or no influence on the study.

The findings of the study were analyzed using Statistical Package for the Social Sciences (SPSS) software that is designed to analyze and display data (Gall et al., 1996). Frequency tables were used to identify the number of students from each university and each year (1996 and 1998). The participants' gender, ethnicity, and dual status were also identified.

To compare the mean high school GPA, ACT score, 1st semester GPA, and ending GPA between nondual and dual students, a *t*-test for independent samples was used. To determine if there was a difference between nondual and dual-enrolled students in retention and the time it takes to complete a four-year college degree, chi-square was used. One-Way ANOVA was used to determine if there was a relationship between the number of college credits earned in high school and the time it takes to finish a four-year degree. Multiple Linear Regression was used to determine which variables among high school GPA, first semester GPA, ACT scores, and/or dual status best predicted college academic performance. To determine if any of the variables were predictors of completing a four-year degree, Discriminant Analysis was used.

Findings

Of the 12,834 records studied, the 1996 class comprised 6,248 (48.7%) and the 1998 class contained 6,586 (51.3%) of the study's population. Students attending the TBR Universities came from 1,650 high schools. Home-schooled students were also represented, as were students who completed high school by taking the GED.

Research Question 1

Is there a difference in the type of enrollment by gender and ethnic background?

This study determined that females were the majority in the dual and nondual group but the percentage of females was higher (60.4%) in the dual/joint group than in the nondual/joint group (55.5%). In the nondual/joint group, nonwhites comprised 17.6% of the population but in the dual/joint group, the percentage dropped to 8.4%. In this study, the findings indicate that compared to the nondual/joint students, a higher percentage of White females and fewer Nonwhites participated in dual/joint-enrollment programs.

Research Question 2

Do dual/joint-enrolled students have greater academic success than nondual/joint-enrolled students?

In comparing the mean of high school GPA, ACT scores, 1st semester GPA, and ending GPA of nondual/joint and dual/joint students, the results showed that dual/joint students had higher mean scores in all of the areas compared. The nondual/joint mean high school GPA was 3.03 for nondual/joint students and 3.53 for dual/joint students. The mean ACT score for nondual students was 21.29 and 26.09 for dual. The mean GPA at the end of the first semester for dual/joint students was 3.09 compared to 2.42 for nondual/joint students, suggesting that the adjustment to college might be easier for the dual/joint than for nondual/joint students.

Also compared were the last semester attended grades. The students were placed in one of the following three categories:

1. No longer attending
2. Currently attending
3. Graduated

In each category, dual/joint students' mean GPA was higher. For students no longer attending, the ending GPA for nondual/joint students was 1.80 and 2.41 for the dual/joint. For students currently attending, the last grading period mean score for dual/joint students was 3.09 and for the nondual/joint 2.71. In the graduated category, at the time of graduation, the mean GPA for the nondual/joint students was 3.15 and 3.43 for the dual/joint students. These results indicate that dual/joint-enrolled students had greater academic success than nondual/joint-enrolled students did. The four hypotheses were rejected.

Research Question 3

Is there a difference in the retention of dual/joint-enrolled students and nondual/joint-enrolled students?

Retention status was determined by the following three categories:

1. Students no longer attending
2. Currently enrolled
3. Graduated

Because of the two-year difference between the classes (1996 and 1998), it was expected that a higher number of the 1996 students would be no longer attending. Therefore, the classes were analyzed separately. In addition, the 1998 class did not complete four years of attendance until the end of the 2002 spring term. In the 1996 class, 56.6% of the nondual students dropped out of school compared to 32.8% of the dual/joint students; however, a higher percentage, 7.5%, of the nondual are currently enrolled compared to 3.3% of the dual/joint students. This

difference could be explained by the fact that 63.9% of the dual/joint students graduated compared to 35.7% of the nondual students.

In the 1998 class, 59.1% of the nondual students had dropped out compared to 38.0% of the dual/joint students. The percentage of students currently enrolled was close 32.0% of the nondual/joint and 31.1% of the dual/joint students. A higher percentage of dual students, 30.9% had graduated compared to 8.9% of the nondual/joint students.

The findings for the 1996 and 1998 class indicated that fewer dual/joint students dropped out of college than nondual/joint students and a higher percentage of dual/joint students graduated than nondual/joint, thus rejecting the null hypothesis that there is no difference in the retention of dual/joint and nondual/joint students.

Research Question 4

Is there a difference between dual/joint and nondual/joint-enrolled students and the time it takes to obtain a four-year college degree?

For this question, 1996 and 1998 data were analyzed separately and students were categorized into the following three groups:

1. Currently enrolled
2. Graduated late
3. Graduated early or on time

In the 1996 class, 17.3% of the nondual/joint and 5.6% of the dual/joint students had not graduated. A higher percentage of nondual students (63.1%) graduated late (attending more than four years) compared to 49.1% of the dual/joint students, whereas 45.9% of the dual/joint students compared to 19.6% of the nondual/joint students graduated in four-years or fewer. The statistics showed much the same results for the 1998 class except that the percentage of students graduating late was miniscule (.5% for nondual/joint and .6% for dual/joint students) because students in this category would be considered late graduates if they did not graduate by the end

of the spring 2002 term. Only students who graduated at the end of the summer 2002 semester would be in the count because the data for this study only included information through the 2002 fall registration. Of the 1998 nondual/joint students, 75.3% were currently enrolled and 50.1% of the dual/joint-enrolled students, but 49.3% of the dual/joint students had graduated early or on schedule compared to 21.2% of the nondual/joint students.

The findings indicated that those students who participated in dual/joint programs completed their degrees at a faster pace than those who did not participate in such programs.

Research Question 5

Does the number of college credits earned while in high school have any influence on the time it takes to finish a four-year college degree?

To analyze question 5, students were again categorized into one of the following three groups:

1. Currently enrolled
2. Graduated late
3. Graduated early or on time

Each year (1996 and 1998) was analyzed separately. Descriptive statistics was used to identify the number of college credits earned while still in high school. Those students in the 1996 class who were in the currently enrolled category had the lowest mean number of credit hours: .3199. The mean number of credit hours earned by students in the graduated late category was .6046 and 1.9985 by those students in the graduated early or on time category. In the 1998 class, the mean number of credit hours earned by the students in the currently enrolled category was .5452, in the graduated late category, 1.0667, and 2.0749 in the graduated early or on time category. The One Way ANOVA showed that the mean number of hours earned in at least one of the categories was different. The number of dual credit hours earned had a significant influence on time to graduation. Those students who graduated early or on time had earned a

higher number of dual/joint credit hours than those students who graduated late or were still currently enrolled. These findings indicated that the number of college credits earned while still in high school had a significant influence on the time it takes to complete a four-year degree.

Research Question 6

Which of the following variables, if any, are important in predicting academic performance at the end of the first grading period: (a) dual status, (b) high school grade point average, or (c) standardized test score.

Multiple Linear Regression showed that 19% of the variation in the first semester GPA could be explained by dual status, high school GPA, and ACT scores. Of the three predictors, high school grade point average was the best predictor, showing the strongest relationship. ACT scores and dual status showed much weaker relationships. ACT score beta equaled .065 and dual status equaled .055. This finding rejected the null hypothesis that there is no good predictor of academic performance at the end of the first grading period.

Research Question 7

Which of the following variables, if any, are important in predicting academic performance for the last semester attended: (a) dual status, (b) high school grade point average, (c) standardized test score, or (d) grade point average after the first grading period.

Using Multiple Linear Regression, students in the following categories were analyzed:

1. Students No Longer Attending
2. Students Currently Attending
3. Students Graduated

The findings revealed that in the category of students no longer attending, there was a strong relationship between these students' ending grade point average and the grade point average at the end of the 1st semester grading period. The test also showed that there was a

relationship between the ending grade point average and the high school grade point average but the relationship was weaker. Even though the test showed that there was no significant relationship between the ending grade point average and dual/joint enrollment, because of the relationship of dual/joint enrollment with the other variables, dual enrollment is an important predictor.

For students currently enrolled and those who had graduated, the findings were similar. The findings indicated that there was a relationship between the dependent variable: ending GPA and the independent variables: first semester GPA, high school GPA, and ACT score. There was no relationship between ending GPA and dual status. There was some variation in the strengths of the relationships. It was revealed that the independent variable having the strongest relationship with the ending GPA was the high school GPA. The relationship with the 1st semester GPA was weaker. The findings were the same for the students who had graduated. The null hypotheses that there were no predictors for academic performance for the last semester attended were rejected.

The *t*-test revealed the following relationships in the category of students who had graduated:

GPA at the end of the first semester	- $\beta = .356$	$p = .000$
High school GPA	- $\beta = .320$	$p = .000$
ACT score	- $\beta = .205$	$p = .000$
Dual status	- $\beta = .002$	$p = .905$

The null hypotheses that there were no predictors for academic performance for the last semester attended were rejected.

Research Question 8

Which variables, if any, are predictors of college graduation: (a) dual status, (b) high school grade point average, (c) standardized test score, or (d) grade point average after the first grading period.

Discriminant Analysis was used to test if dual status, high school GPA, ACT test score, and/or GPA at the end of the 1st semester were predictors of completing a four-year degree. The results indicated that the predictors showing the strongest relationship with completing a degree was GPA at the end of the 1st semester and high school GPA. ACT score and dual status showed weaker relationships with dual status being the weakest

The discriminant function correctly classified 77.2% of the students into categories. Kappa Coefficient was used to determine how much this classification from the discriminant function added beyond “chance” classification. The findings of the Kappa Coefficient supported the findings of the discriminant analyses that all of the independent variables were predictors to completing a four-year degree; thus, the null hypothesis that there were no predictors for completing a four-year degree was rejected.

Conclusions

From the 1995-1996 school year to the year 2000, the number of high school students enrolled in college classes grew from 204,790 to 560,000. The growth in dual/joint-enrollment programs has sparked debates over the value merit of such programs. Two particular debates provided the focus for this study. One was that dual/joint-enrollment programs acquaint students with what is expected in college, thus producing better-prepared college students and ensuring higher academic success. The other was that dual/joint-enrollment programs shorten the time it takes to earn a degree. These suppositions were investigated by analyzing the records of 12,834 1996 and 1998 incoming freshmen from five TBR Universities. The results of the analysis led to the following conclusions:

1. Students who participated in dual/joint-enrollment programs had more academic success than those students who did not participate in such programs. At the end of the first year of college, dual/joint-enrolled students had a mean grade point average of 3.09 compared to 2.42 for the nondual/joint-enrolled students. Students who participated in dual/joint-enrollment programs also had higher retention and graduation rates. In the 1996 freshman class, 56.8% of the nondual/joint-enrolled students dropped out compared to 32.8% of the dual/joint-enrolled students, 35.7% of the nondual/joint-enrolled students graduated compared to 63.9% of the dual/joint-enrolled students and 7.5 % of the nondual/joint students were currently enrolled compared to 3.3% of the dual/joint students. In the 1998 freshmen class, 59.1% of the nondual/joint-enrolled students dropped out compared to 38.0% of the dual/joint enrolled, 30.9 % of the dual/joint students had graduated compared to 8.9% of the nondual/joint students and 32.0% of the nondual/joint students were currently enrolled compared to 31.1 % of the dual/joint students.
2. Dual credit hours have a significant influence on time to graduation. Analyzing the student records revealed that students who had earned dual/joint credit hours earned their four-year degree in four years or fewer. The average time given to complete a four-year degree currently is six years.

These findings support the debate that students who enroll in college while still in high school enter college with some knowledge of what is expected of them, thus making them better students. Dual/joint enrollment also reduces the time it takes to complete a degree, lending support to the debate that decreasing the time it takes to earn a degree ultimately reduces the cost of a higher education.

Recommendations

1. Since 1998, dual/joint programs have grown steadily not only in the number of students participating but also in the number of credit hours earned. More studies are needed to determine if participants of dual/joint-enrollment programs are completing their degrees in fewer than four years.
2. As dual/joint-enrollment programs have grown in popularity, the programs have opened up to students with lower grade point averages and standardized test scores. Studies that track these students need to be conducted. Are they more successful in college than students with similar abilities who have not participated in dual/joint-enrollment programs?
3. What is the composition of high schools that produce dual/joint-enrolled students? Are they in rural or urban areas? Do they have large or small enrollments?
4. Are dual/joint-enrolled students who have been successful in college also successful in careers?
5. The retention and completion of degree of students earning Advanced Placement credit should be compared to those students who earned dual/joint credit.

Practice Recommendations

1. Adopt policies and guidelines for dual/joint enrollment on the state level so that programs are more uniform across the state.
2. At the state level, provide more information to students and parents about the value and benefits of participating in dual/joint-enrollment programs.

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APPENDICES

APPENDIX A

Preliminary Letter to TBR Presidents

March 12, 2002

Dear President,

I am a student at ETSU in the Educational Leadership and Policy Analysis Program working on the prospectus of my dissertation. I have chosen dual/joint enrollment for my dissertation topic because I have coordinated Cleveland State's Dual/Joint Program since its inception in the 1994 fall semester. Several of our Tennessee Board of Regents schools provide variations of a dual/joint-enrollment program for high school students. Throughout the United States, dual/joint enrollment is a popular secondary and post secondary collaborative effort.

To date, dual/joint-enrollment research and studies have to do with how high school students perform in college classes and how they get along socially. The results show that these students do quite well academically and socially. There have been no studies published about these students once they become full-time college students. My plan is to conduct such a study. I believe that this study could be of value to not only the secondary schools and colleges/universities in Tennessee but to all secondary and postsecondary schools participating in a dual/joint-enrollment program.

The method of gathering data will have a great effect on the validity of the study. Gathering information from records would have more validity than gathering by survey or questionnaire. The information that I need to conduct the study and the way it will be reported will not be in violation of the Family Educational Rights and Privacy Act of 1974. I will not be publishing names, grades, test scores, social security numbers or any other personal information.

I would like to request that I be allowed to study the records of the fall 1998 freshmen class from each of the TBR 4 year institutions. From this group, my sample would be made-up of students who graduated from high school spring 1998. Of this group, I will be looking for students who entered as first time freshmen with college credits earned while still in high school and those students who entered with no college credit. I will be looking for information that will answer the following questions:

1. Between students who begin college with earned credit and those who have not, is there a difference in their retention rate and the time it takes to complete their four-year degree?
2. Is there a relationship between the number of college credits earned before entering college and retention and the time it takes to complete a four-year degree?
3. Does high school grade point average have more influence in keeping students in college and completing college in fewer time than the number of college credits earned before graduation from high school?

If I am given permission to have access to the records, I have planned and expect to

conduct all the record searches myself. I will be very grateful for any help and or advice you might have concerning gaining access to records. Thank you.

Sincerely,

Rubi Porter

Rporter@clscc.cc.tn.us

(XXX) xxx-xxxx

APPENDIX B

Formal Letter to TBR Presidents

June 7, 2002

Dr. Jane M. Jones
Executive Assistant to the President
East Tennessee State University
PO Box 70734
Johnson City, TN 37614

Dear Dr. Jones,

Please consider this correspondence my formal letter of request to obtain data for my dissertation. These data are available on your institution's Student Information System (SIS). Because the success of my study depended on being able to collect data from SIS, my Chair, Dr. Nancy Dishner, suggested that I seek permission informally before proceeding on with my proposed study.

As an employee of Cleveland State Community College on my behalf, at the March 2002 TBR meeting Dr. Carl Hite, President of CLSCC, was kind enough to distribute an informal letter of request from me asking for permission to obtain data from your SIS. Your willingness to give me that permission is a major factor in being able to continue with my proposed study. My committee, Drs. Nancy Dishner, Louise MacKay, Elizabeth Ralston and Russell West, approved my prospectus on May 2, 2002.

To comply with the Family Educational Rights and Privacy Act of 1974, no identifying information such as names or social security numbers will be included in the data extracted from the SIS. I will need the following data:

- High school attended
- High school and college grade point average
- Age
- Gender
- Test score ACT/SAT
- Number of college credits earned before graduating from high school
- Financial Aid status
- Living on or off campus

I am requesting that I be allowed to study a certain population of the 1996 and 1998 freshman class – those freshmen that graduated from high school spring 1996 and 1998 and entered college fall 1996 and 1998.

The title of the study is “A Study Of Students Attending Tennessee Board Of Regents Universities Who Participated In High School Dual Enrollment Programs.” I believe the information I gather will be of use to your enrollment management office. I will be pleased to share the results of my study. Please be assured that institutional anonymity is guaranteed in my study.

As not to cause any undue hardship on any employee at your university, a program is being developed to extract the data I’m requesting. I am hopeful that I will be able to distribute the program no later than June 17, 2002.

I appreciate your permission to extract data from the SIS. I will be in contact with the person I was given as a contact at your university. If you have any questions and or suggestions, you may contact me at (XXX)-xxx-xxxx or rporter@clscc.cc.tn.us.

Sincerely,

Rubianna M. Porter
Student
Department of Educational Leadership and Policy Analysis
East Tennessee State University

pc: Paul Hayes
Bob Baxley

VITA

RUBIANNA M. PORTER

Personal Data: Date of Birth: June 23, 1943
 Place of Birth: Galesburg, Illinois
 Marital Status: Married

Education: Southern Illinois University, Edwardsville, Illinois;
 B.S., Elementary Education
 1966

 Webster University, St. Louis, Missouri;
 MAT – Reading
 1983

 Lincoln Memorial University, Harrogate, Tennessee;
 ED. S., Curriculum and Instruction
 1998

 East Tennessee State University, Johnson City, Tennessee;
 Educational Leadership and Policy Analysis, Ed. D.,
 2003

Professional
Experience: Classroom Teacher, St. Louis City Schools; 1976 - 1989
 Hazelwood, Missouri School District

 Reading Specialist, Hazelwood, Missouri School District; 1989 - 1991
 Niagara Falls, New York School District

 Director of Community Services and Precollege Programs; 1992 - Present
 Cleveland State Community College
 Cleveland, Tenn.