DISSERTATION

ANALYSES OF DUAL CREDIT IN RURAL EASTERN COLORADO

Submitted by

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WE HEREBY RECOMMEND THAT THE DISSERTATION PREPARED UNDER OUR SUPERVISION BY PHYLLIS A. GERTGE ENTITLED "ANALYSES OF DUAL CREDIT IN RURAL EASTERN COLORADO" BE ACCEPTED AS FULFILLING IN PART REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY.

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ABSTRACT OF DISSERTATION

ANALYSES OF DUAL CREDIT IN RURAL EASTERN COLORADO

Dual credit programs (also called concurrent enrollment) are designed for high school students who enroll and earn credits towards their high school diploma while simultaneously earning college credits in the same course. It is a strategy used by educational institutions to attempt to eliminate barriers between educational levels and provide a seamless education.

The purpose of this study was to analyze the available data on dual credit programs at 29 mostly rural high schools served through five college centers of one community college over a time span of nine years. This is the first study completed in Colorado examining the PSEO (Post Secondary Enrollment Options) Act that allows dual credit programs funded by the state. It investigates the variables associated with student access, selection and participation in dual credit courses.

The results of the study suggest that the purpose of the legislation is being met. Dual credit enrollment increased from 17% of eligible students in 1995 to about 30% since 2000. Nearly all of the selected high schools provide some dual credit courses to eligible high school students. The data also indicated that there is a strong relationship between schools linked by interactive learning networks and the rate of participation. However, school size, distance from campus, percentage of minorities, and percentage of students on free and reduced lunch were not significantly related to the percentage of

students enrolled in dual credit. Since 2001 students were required to have minimum scores on the "Accuplacer" college placement exam in order to enroll in dual credit class; however, there has been little change in enrollment rates.

The low scores demonstrated in entry level assessments by students who applied to take dual credit should be noted. The results also demonstrated the impact of the legislation which has allowed 25% of all eligible students to participate in dual credit opportunities over the nine years.

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DEDICATION

I wish to dedicate this body of work to my staunchest supporter, Dave. You made it all possible; you provided the motivation...what a team we are!! Thank you.

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Introduction

National interest in shortening the time required to earn a baccalaureate degree increased during the early 1970s following the publication of a Carnegie Commission report: *Less Time, More Options, Education Beyond the High School* (1971). The report's authors urged educators at all levels to reexamine the length of time traditionally required to complete the baccalaureate degree and to develop options for achieving educational objectives more quickly. Since then numerous researchers have looked at this issue in terms of accelerated educational experiences including the granting of college credit to high school students (Baker, 1988; Batchelder, 1997; Wrightson, 1998; Zhang, 1997; Marquez, 1999; Ungricht, 1997; Sagers, 2000).

The use of the term "educational acceleration" was first documented in the St. Louis, Missouri schools in 1892. Educational acceleration is defined as any program adaptation that shortens the time students must remain in a grade-progressive educational setting, or advances the level of curriculum attained in a given time (Rodgers, 1991; Rodgers & Kimpston, 1992).

Today, many community colleges have dual enrolled high school students in college level coursework (McCarthy, 1999). Dual credit also referred to as concurrent enrollment programs are a form of "educational acceleration" that permits high school students to enroll in college-level courses and apply the credit earned towards both their high school diploma and their college degree simultaneously (Greenberg, 1988). Many

states began piloting the dual credit program in the 1970s; however, the first state to pass concurrent enrollment legislation was Minnesota in 1985. Since that time the majority of states have passed concurrent enrollment or post-secondary options legislation (McCarthy, 1999).

Legislation

Following Minnesota's lead, the vast majority of states have passed laws referred to as either Post-Secondary Options (PSO) or Dual Enrollment (DE) legislation that allow qualified students to enroll simultaneously in high school and college courses. For the most part, students take college-level courses on college campuses, but many states allow programs to be taught within the high school. Most states now allow programs that include the option to enroll under various distance learning technologies (McCarthy, 1999). According to a recent report from The Education Commission of the States (Hale, 2001), 47 states support concurrent enrollment, and the number of states that have established comprehensive programs has increased from 12 in 1998 to 21 in 2001. The states that have comprehensive programs are: California, Colorado, Delaware, Florida, Georgia, Idaho, Iowa, Maine, Massachusetts, Michigan, Minnesota, Mississippi, New Jersey, New Mexico, North Carolina, Ohio, Oregon, Utah, Washington, West Virginia, and Wisconsin. While there is no strict definition for "comprehensive concurrent/dual enrollment programs", they generally meet two criteria: (a) students pay minimal or no tuition and fees; (b) and both secondary and postsecondary credits are earned for the postsecondary course.

There are 26 states with limited concurrent enrollment plans, an increase of 15 states since 1998: Alaska, Arizona, Arkansas, Connecticut, Illinois, Indiana, Kansas,

Kentucky, Louisiana, Maryland, Montana, Missouri, Nebraska, Nevada, New Hampshire, New York, North Dakota, Oklahoma, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Vermont, and Wyoming. The criteria for these programs are: (a) students pay tuition for their postsecondary courses; and (b) they must adhere to more strict academic credit restrictions in terms of eligible courses.

In addition to helping some students get a taste of what college is all about, the concurrent/dual credit laws have also served as vehicles to prod educational reforms. These reforms include raising academic standards, improving student achievement at all levels, facilitating student transitions, extending college access for minority and low-income students, making efficient use of existing educational institutions, and allowing talented students progress faster through their college education. For the most part, the dual credit programs have not required additional state government funding, as the funding either comes from the tax dollars set aside for K-12 education or the individual student. According to (Kulik & Kulik 1984) and (McCarthy 1999), these efforts appear to reflect national goals for educational reforms.

However, there are some issues that have been raised. The characteristics of many dual credit programs have made some college faculty and administrators increasingly concerned about expanding them. One fear is that the concurrent enrollment courses may not meet the same standards as traditional college classes; others fear that standards are lowered by the use of under prepared faculty, "watered down" curriculum and is simply a way for students to gain easy credit instead of an education. Another aspect is the program allows colleges to collect tuition. A number of prestigious universities do not accept credits earned prior to high school graduation, including Brigham Young University, Notre Dame,

Rice, Lafayette University, Colorado College, and the University of Southern California (Koelling, 1997; Brody, 1999; Kummerer, 2000).

In Colorado the sponsor of the original concurrent/dual credit bill was Richard R. Bond, with support of legislators Faatz and Meikeljohn. Bond has had a long career in education, including faculty positions at various colleges and as college president at University of Northern Colorado prior to being a legislator. Since leaving the state legislature, he has occupied the president's office at Front Range Community College and Morgan Community College (Bzdek, 1995). In 1944-45, he took dual credit courses at Salem High School and Salem College in his home state of West Virginia, and was able to complete all of his college freshman requirements while still a high school senior. He felt that his experience should be available for all high school students.

According to Dr. Bond, the intent of the concurrent/dual credit legislation called Post-Secondary Enrollment Options (PSEO) in Colorado was to provide:

1. an option for high school students to earn college credit while completing their high school requirements;
2. financial support to cover the costs of college coursework (to be paid by local school districts);
3. challenging options for motivated students; and
4. opportunities for students to make positive changes in their environment and to proceed toward earning post secondary degrees (R. Bond, personal communication, July 19, 2001).

House Bill 1244, Section 1. 22-35-101...110, the PSEO bill, was signed into law in 1986. With the support of the Colorado Department of Education, Colorado students

became eligible to earn college credits and high school credits simultaneously during their junior and senior years in high school. The following excerpt from a directive published by the Colorado Commission on Higher Education (CCHE) describes the statute's intent:

> Provide access to advanced courses not available at a high school and to give qualified high school students a jump-start on their college degree. The program is open to high school juniors and seniors. Students can receive high school and/or college credit for the courses enrolled under postsecondary options. The type of credit earned determines whether the school or college may claim state support (Samson, 1998).

According to the statute, school districts are required to reimburse participating students for up to two courses (six credit hours) per semester; reimbursement for more than two courses is at the district's discretion. In order to receive reimbursement, a student must successfully complete the course. The law states that colleges may not defer billing dual credits to students or school districts, but must follow normal billing practices; that is, send a bill for tuition to the student, the student's parents, or the student's guardian (Samson, 1998)

In 1998 the Colorado General Assembly amended the financial provisions of PSEO (was signed into law in 1986) so that the student or the student's parents, or guardians became fully responsible for paying the college tuition. The special arrangements for low-income students were not changed. Governor Roy Romer signed this House Bill 98-1162 into law on March 27, 1998 (Samson, 1998).

According to the legislative declaration, 22-25-102,

> (1) The general assembly hereby finds, determines, and declares that high school pupils need to be continually challenged in order to maintain their academic interest; that such challenges must include rigorous academic pursuits; that, for some students, exposure to such academic challenges declines during the last two

> years of high school as pupils complete their graduation requirements; that there is a high rate of dropouts at the eleventh and twelfth grade levels; that, for some students, courses not offered in high school or courses offered in a different setting may stimulate or maintain their interest; that providing a wider variety of option to high school pupils by encouraging and enabling secondary pupils to enroll in courses offered by state institutions of higher education provides new and exciting academic challenges to such pupils; and that such enrollment opportunities provide access to excellence in education.

Although a number of studies on dual credit have been done in other states (Brown, 1993; Crossland, 1996; Curtain, 1996; Donahue, 1994; Gurule, 1996; Knight, 1992; Lambert & Mercurio, 1986), no systematic evaluation has been made of the impact of the Colorado PSEO law. Topics of these studies included, comparisons of test scores of dual credit students with traditional college students, entrance exam scores of those who had earned dual credit compared to non-participants, the transferability of college credit earned before high school graduation, whether dual credit programs encourage students to pursue further education, whether underachievers are successful in dual credit along with other benefit analyses. These studies from other states have suggested a lack of thorough evaluation in terms of the effect of dual credit programs on persistence, transfer, and graduation rates. Other problems that have been noted include inconsistent regulation of curriculum, faculty qualifications, admission standards, and tuition rates. (Hale, 2001).

Statement of the Research Problem

The small amount of research on dual credit has limited the information that educators can use to identify factors that affect the development, implementation, and strengthening of programs jointly managed by community colleges and high schools. Some of the first dual credit programs began at the university level. Thus, even though the state of Colorado has embraced dual credit, it cannot present data on what the

advantages and disadvantages are for participating students. For the most part, current practices in the delivery of dual credit/concurrent enrollment courses are also unknown. Since 1986 (the year the original law was passed), no researcher has looked at issues of access, curriculum expansion or secondary/post-secondary institution partnerships. Nor has anyone tried to answer the question: to what degree are students enrolling in dual credit and does it benefit students?

Support for educational acceleration, dual credit, and concurrent enrollment programs has never been unanimous. Depending on the district, such programs have been established with a variety of goals in mind, often intervention programs. Many are designed to help students earn their baccalaureate degrees more quickly; others are meant to provide more educational options for students at small rural schools. However, dual credit programs have also been created for students in occupational tracks, and for underrepresented high risk students, to make secondary curricula more rigorous and to deter students from dropping out before high school graduation (Adelman, 1983; Baker, Gaines & Silbur, 1985; Marquez, 1999; Black, 1997).

The time-based nature of college degrees uses the credit system as an accounting mechanism, not as an indication of academic value or student learning. This study is designed to measure the pattern of dual credit enrollment that appears to be a result of the PSEO (Post-secondary enrollment options). It will look at the progression of dual credit students in selected high schools served by the designated community college by identifying, tracking, and evaluating their access, participation, and success.

Purpose of the Study

The changing demands being placed on educators and educational institutions mean that research is required to identify and test new methods and procedures for facilitating learning (Gifford, 1986). An examination of the literature supports the idea that dual credit will continue to grow as one approach to helping students reach higher levels of achievement (Legg, 1993). Therefore, there exists a current need to determine the quantity and quality of participation in such programs.

Accordingly, the purpose of this study is to analyze the available data on dual credit programs. To fulfill this purpose, this study will examine the degree that high schools are participating, and the numbers of juniors and seniors who have access to college courses. Further the study will determine whether dual credit programs provide greater academic opportunities for student by equalizing access to post-secondary education. The study will examine the changes in dual credit enrollment at 29 high schools served through five college centers of one community college over a time span of nine years. In other words, the primary purpose of the study is to determine whether or not the intended goals of PSEO legislation are being met.

Research Questions

Specifically, the study will address the following main research questions:

1. What screening criterion did participating institutions use to determine if a high school student was qualified for participation in a dual credit program?
2. What if any changes in dual credit program enrollments have occurred over time (1995-2003) and especially since 2001, when the Colorado Commission on

Higher Education (CCHE) required that all new students take a placement exam?

3. What percentages of eligible students from each of the high schools selected for this study participated in dual credit programs during the 1995-2003 time period?
4. How did enrollment in academic and vocational dual credit programs change from 1995-2003?
5. What differences exist in dual-credit vocational and academic track program participation in terms of gender and ethnicity?
6. What relationships, if any, exist between percent of dual credit enrollments in the school and school size, network availability, distance from a college center, student characteristics (% minority, % male, % free/reduced lunch) of individual schools?

Essentially, the goal of this research is to discern whether or not educational acceleration is actually occurring, and if so, how it is affecting high schools and their students who have participated in dual credit programs. It is hoped that the results of this study will help in future policy and program design, and will supplement those results reported in studies conducted in other states.

Definition of Terms

The following terms are defined for the purpose of clarification in commonly interchangeable terms used in the study:

Advanced placement – "any arrangement that enables the student (usually at the secondary level) to test out of or receive credit for completion of college-level coursework" (Long, 1985, p 36).

Community college – any institution accredited to award the Associate in Arts or the Associate in Science as its highest degree. The two-year degree granting institution is headed by a president or chancellor; a single community college campus or multi-campus community college district; also refers to junior and technical college (Cohen, Brawer & Assoc, 1994, p. 102; Cohen & Brawer, 1996, p.7). For the purpose of this study, "community college" refers to the identified Colorado community college that has implemented the dual credit program.

Concurrent enrollment – any high school student, who enrolls in a college course prior to high school graduation, is known as a concurrently enrolled student.

Core education credits – a common set of general education credits that will meet the lower-division general education requirement of most baccalaureate degree-grant programs at Colorado's publicly supported four-year institutions. Thirty-three credits are generally included as part of a two-year degree at Colorado community colleges.

Dual credit programs - a program in which high school students are enrolled in college-level classes for simultaneous high school and college credit. (Cox & Daniel, 1983, p. 25).

Early admission – a student enters a college as a full-time student without completing high school (Rodgers & Kimpston, 1992, p.60).

Educational acceleration – any program adaptation that shortens the time gifted students must remain in a grade-progressive educational setting, or advances the level of curriculum attained in a given time (Rodgers, 1991).

Full-time equivalent – refers to an accumulation of 30 college credit hours which represents one full time student for reimbursement in Colorado.

High school – a secondary educational institution that usually includes grades 9 through 12. A school intermediate between elementary school and college and usually offering general, technical, vocational, or college-preparatory courses.

Individualized instruction – the process of custom tailoring instruction so that it fits the learning style of a particular student, individualized instruction is based on the premise that there is no one best way for all students to learn (Long, 1985, p 36).

Participating students – for the purpose of the study, it is defined as students who enrolled in a dual credit course and completed a minimum of three college semester credits concurrent with high school graduation or age 19.

Transfer student – the transition of high school graduates to further education in a post-secondary institution.

Delimitations, Limitations, and Assumptions of the Study

Delimitations of the Study

The following delimitations should be taken into consideration when drawing inferences from this study to other environments.

1. The study was limited to a selected community college and the 29 high schools it serves within the state of Colorado. The College was selected from

a total of 14 system community colleges, two local district community colleges, and the high schools from 175 school districts.

2. The study was limited in time to the 1995-2003 academic years. This was the time frame used for sampling. It is a longitudinal descriptive study.
3. The study size is also limited to data available.
4. The subject groupings were taken from the final two to four semesters of high school.

Limitations of the Study

The study was limited by the threats to internal validity. This would include instrumentation error, plus any variable surrounding courses available, program quality and support of administration.

Assumptions

The scope of the study is limited to those students who participated in a dual credit program, as defined under the PSEO legislation. It is, however, representative of dual credit within the state of Colorado and will generalize the findings.

It is assumed that:

1. high school administrators or counselors could identify concurrent enrollment students;
2. the common course database, SIS (students information system) maintained by CCCS (Colorado Community Colleges System) was complete and accurate.
3. the learning is comparable.

Significance of the Study

Dual credit programs have existed for many years and are widely implemented in 47 states (Hale, 2001). They have become a joint secondary and post secondary venture to assure that there are additional opportunities for high school students to develop, maintain, and advance their academic capabilities. There is a vast amount of literature available on most of these programs. However, the tremendous growth of these programs has caused concern among researchers, administrators, faculty and funding agencies. Although dual credit programs have been promoted as helping high school students graduate, little is known on the impact of concurrent/dual credit programs on participants beyond their high school years (Marquez, 1999; Black, 1997; Greenberg, 1988).

The study will assess the student access, percentage of the high school involved, and evaluate student participation in dual credit.

The study will include a longitudinal follow-up of students and their participation level in their final four semesters of high school. The study will look at the concurrent enrollment at selected community colleges in Colorado from 1995-2003.

CHAPTER 2

Review of Literature

This chapter presents a review of the literature relating to educational acceleration and is focused specifically on dual credit programs. It will discuss the history and philosophy of educational acceleration (specifically grades 10-14), types of educational acceleration, the development of dual credit programs, the legislative status concerning dual credit programs, Colorado concurrent enrollment and relevant research studies.

History and Philosophy of Educational Acceleration

Educational acceleration is a program adaptation that shortens the time it takes to obtain education, while advancing the level of curriculum. This acceleration of curriculum gives individual educational flexibility based on abilities without regard for age. Specific acceleration methods include early entrance to school, grade skipping (omission of a grade level), fast-paced classes ("telescoping of curriculum"), college courses for high school students, and advanced placement. While it is universally agreed that individuals learn at different rates, education has historically been so structured that it blocks those differences. Placement according to the individual's level of competence is a principle widely accepted in many domains, such as music or athletics. With regard to academic endeavors, however, there exist strong prejudices against education acceleration (Batchelder, 1997; Clark, 1968; Durdan, 1985; Gilbert, 1997; Legg, 1993; Swiatek, 1992).

There has always been a pattern to education, which becomes part of the social norm. Education has boundaries that have evolved over time through processes and habit. At Oxford University in England in the late 17th century, there was no "correct" chronological age to begin studies. In 1784 New York State's Board of Regents had instituted a policy that students did not have to begin as freshmen, but at the level for which they qualified. In 1892 the University of Chicago was restructured into a Junior and Senior College. Superior students could complete the junior level while in high school and enter the senior level after the eleventh grade (Serrano, 1992; Stoel, 1988). Soon the educational system became time bound; by 1918 the United States educational system required that a student stay in school until the age of 16; by 1930 it had become a grade progressive system (Hutchins, 1936; Kleiner, 1999; Knight, 1992; Stanley & Benbow, 1983; Whitlock, 1978).

In the early 1900s many of the early community colleges began as extensions of the local high schools providing two additional years past high school. The two years addressed the void for the typical 18 year-old who needed to be educated to produce benefits to the individual and the economy. There was a tremendous growth in higher education programs and services to meet the needs of increased numbers of students who were completing high school. The University of Chicago first began its emphasis on compacted education in 1892. Hutchins (1936), president of the University of Chicago in 1929, described a general education as one given between the junior year in high school and the end of the sophomore year in college. (Stoel, 1988; Maeroff, 1983; Killacky & Valadez, 1995)

In Pasadena, California, La Guardia High School (1920) was one of the first to accelerate education by compacting grades nine and ten. This accelerative practice is called "grade telescoping" because it shortens the time required to complete high school by compacting grades nine through 12 into two years and adding grades 13 and 14. The LaGuardia program used a boarding school model, so students faced a social adjustment as well as the accelerated curriculum (Whitlock, 1978; Goldman & Widawski, 1976). Another college to embrace the telescoping idea was Simon's Rock College, Massachusetts, which demonstrated the meaning of Hutchins' theory (1936) by taking high school sophomores into a college middle school (Hechinger, 1984; Maeroff, 1983; Stoel, 1988).

The grade telescoping model was commonly called the 6-4-4 plan. The six referred to elementary school, grades one through six. The first four referred to grades seven through ten, and the final four referred to a combined high school and junior college with grades 11 through 14. The purpose of this model was to link the last two years of high school with the first two general years of college. Curriculum included normal training for teachers; commercial courses for the business world; and courses in agriculture, home management, health, music, drama, and science. Early junior colleges were placed on high school campuses and shared facilities, staff and students. The extension of community colleges met societal goals and needs as the efforts kept students close to home while providing access to the rural and inner city population (Cohen & Brawer, 2003; Dougherty, 1994; Jones & Southern, 1989; Mullen, 1988).

By the 1940s increased population and retraining needs overwhelmed the educational system. The impact of World War II and the resulting funding for veterans

under the GI bill (Servicemen's Readjustment Act of 1944) further strained educational resources. The GI Bill entitled anyone with 90 days of service to one year of higher education, and each additional month of active duty earned a month of schooling up to a maximum of 48 months. During the first year of the program, 8,200 former GI's enrolled and by 1945, the number was 88,000 (Haydock, 1999). By late 1947, total college enrollment in the United States, for the first time, exceeded two million, with over 49% being veterans attending under the GI Bill. To deal with the impact, a form of educational acceleration was developed. The educational system kept returning GIs from flooding the job market and the threat of a return to the depression of the 1930s. The General Education Development (GED) test was modeled after aptitude tests used in World War II to give an equivalency certificate, equal to a high school diploma. The testing allowed for a student to enter college without completing high school and it is still in use today. These competency exams were geared to outcomes that a student would have mastered after completing high school curriculum. Students are able to take the exam at age 16, prior to high school graduation. The GED test erased the time bound concept, focusing on educational attainment (Gifford, 1986; Haydock, 1999; Hoyt, 1999).

The early admissions programs implemented in the 1950s made it apparent that a 16 year-old had the academic ability to do college level work. By this age, many students had already developed their career goals. They were ready to finish formal education and enter the job market. The increased maturity of students lent itself to better adaptation in the educational system (Whitlock, 1978).

In 1951 the Ford Foundation provided funding for 420 college freshmen (through an early admission program) in several states including Illinois. Students could enroll and

complete college coursework while in high school. Thus began another model for educational acceleration. The Ford project established a pathway for students to benefit from advanced learning opportunities with economic benefits. Soon the design, a form of grade telescoping, was being replicated across the country. This advanced placement program enabled students to encounter college-level work before they were 18 years of age. It allowed students to take courses on a college level in high school and upon successful completion, to enter college. These students were either given academic credit or automatic placement in a higher-level course (Maeroff, 1983; Serrano, 1992; Fund for Advancement of Education, 1957).

The Ford program for early admission into college in the 1950s provided students with two years of college. It was sponsored by the Fund for the Advancement of Education (FAE) of the Ford Foundation, and it broke the lockstep of educational inflexibility set up in the 1930s. The program recognized that some students need the challenge of, and can learn, curricula above their grade level. In 1950 twelve institutions in five states joined and agreed to admit students who had completed only the tenth and eleventh years of high school. Forty percent of these college students completed a college degree in three years or less. Shimmer College in Illinois (a Ford project) was one of the first to allow early admission or advanced placement, called "Project Advance." Seventy-seven percent of the "Project Advance" students completing their college degree continued on to graduate school. Other states that duplicated the Ford project included New Jersey, New York, Massachusetts, and Michigan (Whitlock, 1978; Maeroff, 1983; Morgan, 1990).

The Ford project was the subject of a book *They Went to College Early*, published by the Fund for Advancement of Education (1957). The study identified many negatives associated with the early admission project of the Ford Foundation. Results demonstrated that the Ford project students often suffered from social maladjustment. Additionally, the study revealed an unwillingness of college level faculty to believe that secondary school teachers can teach at the college level. Other concerns were gaps or weaknesses in what students learn in an accelerated program and students who work too hard may "burn out" on academics. The conclusion was that a high standardized test score, along with emotional stability, were required to succeed in educational acceleration. It also concluded that college coursework helped students establish interests and build a strong foundation for future learning (Maeroff, 1983; McConnaha, 1996; Serrano, 1992; Swiatek, 1992; Whitlock, 1978).

As a result of the original Ford project, an advanced Ford placement model began in the late 1950s with 12 colleges and 12 high schools and was originally known as the School and College Study of Admission with Advanced Standing (FAE, 1957). The advanced placement (AP) model has been sponsored by the College Entrance Exam Board (http://www.ets.org) since 1955, where students may study one or more college-level courses and then, depending on examination results, receive college credit when they enter college. Students may also use these credits to meet their high school graduation requirements. The AP courses are taught in high schools by selected high school teachers and the AP examinations are given in the high school setting. There are 33 courses in 19 subject areas currently offered worldwide. Credit grant policies of the college differ widely; credit is based on the exam score, ranging from zero to five, the

higher the score the more likely the student will receive college credit. There is no uniform treatment among colleges or within them (Dillon, 1986). However the preparation for these exams bolstered the high school curriculum and has led to increased rigor as well as increased academic intensity. The academic intensity index is modified by the "quality" of the curriculum. Academic ability varies widely by academic subject areas; therefore variables involved in quality include how many AP (Advanced Placement) courses are taken, the highest level of math studied, and numbers of courses completed. (Bracey, 1999; Brody, 1999; Hanson, 1980; LeMay, 1985)

Another example of educational acceleration is the International Baccalaureate program (IB). IB is an accelerative practice that usually provides only enrichment courses, not academic credits. It leads to examinations that focus on an international curriculum. The program began in the early 1960s as a worldwide effort to expand curriculum for advanced students (http://www.ibo.org). It consisted of three courses, each studied for two years, and three that were studied for one year each. In the United States, the courses are English, foreign language, social science, natural science, math, and an elective from art, music, computer science or an extra course in one of the required areas. The Theory of Knowledge is a course that is mandated for two years and is intended to encourage students to develop the ability to analyze evidence that is expressed in rational argument. All exams are prepared and graded at the Geneva, Switzerland headquarters. Today many colleges and universities give college credit when they admit graduates of the program and some states reimburse students for the testing costs. Over 40,000 students will be assessed in 2001. Each year approximately 80% of candidates who

attempt the exams earn the diploma from IB (Gaines & Silbur, 1985; Maeroff, 1983; Rodgers, 1991; Wallinger, 1998).

While interest in links between high schools and post-secondary education increased acceleration of students, the civil rights movement of the 1960s changed the focus. School districts became preoccupied with compensatory education and the challenges of desegregation. There was a call to educate all students in the skills necessary to improve their economic condition and that of the country. Academic excellence, curriculum continuity, and school to college collaboration were forgotten in the effort to integrate the same curriculum and conditions throughout all secondary schools (Adelman, 1983; Maeroff 1983).

However, in the late 1960s, a few states including Ohio, New York, Arizona, Texas, and Florida began to encourage better coordination of vocational programs between high schools and community colleges. Vocational education legislation was first enacted in 1963 (Bragg, 1995; Voorheis, 1979). Another movement was the John Hopkins program, begun in 1969 in the Baltimore school system, it had success identifying individual students excelling in math, and gradually it was recognized that talented students needed accelerated education (Campion, 1981; Durdan, 1985)

As in the 1940s under the GI bill, veterans again flooded the educational institutions with a need for retraining after the Vietnam War in the 1970s. Unemployment was high; education seemed to be the path to jobs and paid employment. Community colleges seemed to grow from the ground up as a way to prepare the work force. Partnerships developed between secondary and post-secondary institutions with accelerated programs on community college campuses ensuring small class sizes and

student support programs including academic advising, marketing, and parental involvement. Reinforcing the idea was federal vocational education legislation in 1972, emphasizing secondary and postsecondary linkages. It addressed duplication of curriculum, awarding articulated credit for skill competencies met (Bragg, 1995). The collaboration began with a common focus on mutual goals for the student rather than individual ownership of curriculum. The competency based vocational vertical articulation clearly outlined secondary and post secondary levels. These efforts supported the belief that real articulation happens when the faculty are involved and there is political and administrative support. One of the benefits of these articulation models was the career ladder, which also allowed horizontal articulation of course work and avoided duplication of curriculum. Articulated curriculum allowed the student to progress without duplication of time, effort or expense to himself or herself or the taxpayer (Freidlander, 1980; Frenkel & Gawkins, 1995).

A good example of articulation is the joint enrollment program begun in Georgia, which allowed students to earn dual credit for high school and college (Crews & Pierce, 1986). Another program in Oregon set the foundation for Tech Prep (technical preparation) education with a "cluster approach" of skills to lead to a more focused occupation preparation. The vocational education amendments in the 1970s reinforced the integration of academic and vocational skills to encourage better coordination of vocational programs between high schools and community colleges. The vocational programs emphasized training and skills needed to be competitive in the workplace (Bragg, 1995; Parnell, 1985).

The 1980s were adverse times for American education. Higher education enrollments were declining for the first time since World War II. The public confidence in American education was very weak (AAHE, 1983). There was a demand for curriculum evaluation and research to address the "drop out" of youths prior to completion of twelfth grade. It was a time for rethinking and revising many long-established educational processes. Consequently, colleges and high schools renewed their relationships to develop new strategies. Partnerships were necessary to improve their curriculums and institutions. There were few requirements to enter college, no foreign language requirement, and minimal pass scores on entrance exams, which created an "open door" policy to higher education. The "open door' policy was set up to serve working adults who needed to update their skills, and increase their education to provide better-educated workers to make higher wages therefore contributing to the nation's tax base. Any meaningful relationship between high school and college seemed to occur by chance not by design (Mabry, 1988; Greenberg, 1988; Wilbur & Chapman, 1978).

In the 1990s a growing number of educators were committed to the premise that college credit interwoven with high school curriculum resulted in a more efficient vehicle for effective education. The Tech Prep movement began as a result of the book, *The Neglected Majority* (Parnell, 1985). The Tech Prep Associate Degree (TPAD) was aimed at students who would not be pursuing a four-year degree. The legislation was an outgrowth of the Oregon cluster program previously discussed. It would improve teaching and learning by connecting knowledge and skills. The Perkins Act of 1990 funded tech prep programs to set up the 11-14 career paths, linkages between high schools and community colleges, and integration of academic and vocational skills. From

this premise came a proliferation of programs that attempted to address the needs of the individual learner. The work force was rapidly changing and many jobs required skill preparation rather than formal academic education. In an effort to meet the economic growth, there existed a need to "speed" the educational process. It served those who were looking for career advancement and enrichment. The career path concept was not new, as educational acceleration had previously occurred through many delivery modes and was becoming institutionalized in vocational articulations (Hollenbeck, 1993; Morgan, 1990).

The School-to-Work Opportunities Act (STWOA) of 1994 also called for secondary to post secondary articulation as a part of reformed educational systems focused on combining school and work in more creative and challenging ways for "all students". It targeted the need to integrate academics with work place skills (Bragg, 1995).

Types of Educational Acceleration

In an effort to forge effective linkages between secondary and postsecondary education, many educational acceleration tracks have been developed to offer an option to all high school students. Many of these paths are well conceived with integrated academic and vocational pathways to raise academic standards for all students (Rodriquez, 1999). Since the 1960's the following programs have set a new direction for education highlighting the need to link secondary and post secondary institutions. These variations of educational acceleration are based on awarding college credit by exams. The International Baccalaureate (IB), Advanced Placement (AP), and College Level Educational Placement (CLEP) are widespread and commonly used.

CLEP (College Level Educational Placement Exam)

CLEP (College Level Educational Placement) is a challenge exam for college credit that is commonly used on community college campuses. CLEP exams began in the 1970s and tests over specific curriculum, giving college credit for coursework (http://www.collegeboard.org). It is available to any student from age 16 to 68. Today, the adult student who is returning to education, and who feels proficient in a content area uses it more commonly than secondary students. CLEP testing is sought by the adult student as a means to validate the proficiency (Whitlock, 1978; Vivion, 1991).

Advanced Placement Testing

Advanced Placement Testing is a test that gives college credit for courses completed in high school. There are 33 advanced placement courses available, and the College Board of Educational Services, regulates the programs and validates the tests. Many agreements are articulated with local colleges to grant credit when a student scores three to five on a range of one to five. Thirty-three courses in 19 subject areas are currently offered. In 2000, over 750,000 students took 1.2 million AP exams. Currently there are over 3,000 colleges nationwide and overseas that recognize the transfer of AP course work. The cost is $75 to $100 per test, comparable to community college tuition of approximately $70 per credit hour (Brown, 1993; Clark, 1968; Cordova, 1997; Goldman & Widawski, 1976; Schwalm, 1991; Kummerer & Jones, 2000; Mercurio, Lambert & Oesterle, 1983). In 1982, there were 141,626 students from 5,525 high schools who took 188,933 exams; however, the testing only accounted for 50% of the students who had taken advanced placement coursework (Monson, 1994).

International Baccalaureate Program

The International Baccalaureate Program, which focuses on the first two years of college, is administered by an organization located in New York, NY. It was founded early in the 1960s and became established in 1968, when 195 schools founded the International Schools Association to study ways to harmonize both curriculum and methods of teaching. The curriculum focuses on critical thinking, intercultural understanding and exposure to a variety of subjects; the six academic areas are language, second language, sociology, sciences, mathematics, arts, and electives. It has similarities to the Advanced Placement program where students do pre-collegiate course that leads to examinations. Approximately 80% of enrollees earn the IB diploma. It seeks to establish a common curriculum and college entry credentials for students moving from one country to another. The program is a vehicle for international currency of credit but not widely accepted, possibly because of cost (Harkins, 1998; Whitlock, 1978; Vivion, 1991; Crossland, 1996).

Tech Prep

Tech Prep (technical preparation program) is a federally funded program that develops articulation agreements between high schools and colleges based on skill competencies. These programs are generally a "two plus two" articulation within the vocational technical curriculum. The program assures clear and effective curriculum from grades eleven through twelve at the high school and first and second years (freshman & sophomore) at the community college. It creates a strong four-year curriculum producing graduates with advanced skills leading to a specific career (Galloway, 1994). Tech Prep articulations identify a sequence of courses to avoid significant gaps or overlap for the

student and match competencies between courses. Tech Prep is the vertical linking of two or more education programs or systems to help students move smoothly from one level of instruction to the next one without experiencing delays or loss of credit (Bottoms, 1984; Long, 1985; Morgan, 1990).

School-to-Career

School-to-Career (work) is a systemic renewal effort or change created by partners of the community, school, parents, students, businesses, community based organizations, and labor coming together to provide a kindergarten through adult educational system. The aim of this system is to better prepare students with a strong academic foundation including an integration of general workplace competencies. The concept assumes that early exposure to careers better prepares students for the current and future workplace, understanding business and employer expectations (Hollenbeck, 1993; Darling-Hammond, 2001).

Variations of Dual Credit

CHP (College in the High School Program)

CHP (College in the High School Program) is another form of educational acceleration. The program is physically located in the secondary institution and generally uses high school teachers to offer college coursework. In 1973 Syracuse University in New York partnered with seven local high schools and revived "Project Advance." According to the AAHE (American Association for Higher Education) guide released in 1991, Syracuse University's Project Advance (PA) was the largest program in the United States offering accredited college courses taught in high schools by high school faculty. By 1991 it was serving 95 high schools and approximately 3,800 students in five states.

Coursework included regular introductory college courses such as biology, calculus, chemistry, computer engineering, economics, English/writing, psychology, public affairs, sociology, religion, and nutrition. Project Advance now serves 120 high schools in five states, and has become regional in scope (Edmonds, Mercurio & Bonesteel, 1998; Hudson, 1991; Wilbur& Lambert, 1996).

The Partner in Progress Program was initiated in 1982 at four Miami high schools. A similar Ford Foundation program at Shimmer College (discussed earlier) began in 1951. According to the National Alliance of Concurrent Enrollment Partnerships (NACEP) web site (http://www.nacep.org) the Syracuse program (Project Advance) continues to prosper and enrolls over 3,800 students in over 115 high schools in New York, New Jersey, Massachusetts, Maine, and Michigan. The courses are taught in the high schools by high school faculty who become adjunct faculty of the University; therefore it is considered a college in the high school program. The web site lists 13 similar programs located in Indiana, Ohio, Utah, Missouri North Carolina, Pennsylvania, and Wisconsin.

Many of these "college in the high school" programs are structured where the student pays a fraction of the normal tuition; an example is the University of Pittsburgh, where students pay only 10% of cost (Whitlock, 1978; http://www.nacep.org).

Running Start

Running Start (dual enrollment at a college) is a similar concept. The difference is that the college provides a separate area on the college campus where a special group of high school students study. These bridge programs are characterized by intensive counseling, advising, and mentoring support systems. They are often referred to as

College Middle Schools and focus on students who are first generation college students and a "drop out risk." La Guardia Community College began a Middle College High School in 1974, under the direction of New York City Board of Education and serves high-risk students of average academic ability. It was intended to reduce high dropout rates among students in this area. About one-fifth of the school's 500 students also take college courses, such as psychology, computer science, and calculus before high school graduation. Approximately 94% of entering students graduate from Middle College High School with 90% continuing on to college (Crossland, 1996).

These Middle College High Schools, which were cooperative programs, began on a large scale in 1978 with cooperative agreements in twelve states, including Colorado. The cooperative began originally as a program called SCALE (Secondary Collegiate Articulated Learning Experience) in Chicago and New York in 1974. Most parents are unwilling to send their children away to college below the standard high school graduation age of 17-18 years. The efforts to offer college coursework in the high schools gave students a challenge, while keeping the students in their high school. SCALE looked at subject matter and concluded that one-third of the curriculum was a repetition in the first two years of college, particularly English, math, science, and social studies, and these were the first courses implemented as dual credit or concurrent enrollment (Kronholz, 1999; Whitlock, 1978; Maeroff, 1983; Wilbur& Chapman, 1978).

Georgia calls its dual credit program Postsecondary Readiness Enrichment Program (PREP) for students who are at risk of not attending college. They enroll more than 3,000 students annually. Ten percent of these students enrolled at Georgia Perimeter

College take college coursework. In addition, another 25 community colleges in ten states have high schools on their own campuses for teenagers who are struggling academically.

The dual credit program in Washington, called the Running Start program (1999), is a part of the Learning by Choice Law. The law allows high school juniors and seniors to enroll in college-level courses at community colleges. A follow-up study on the Running Start program reported a 72% increase in participation from 1993 to 1996. This sizable increase in dual credit is fairly consistent across our nation as students realize the financial and educational gain (Crossland, 1996; Galambos, 1982; Greenberg, 1988; Knight, 1992; Friedlander, Schwalm, 1991; Vivion, 1991).

Dual Credit

Dual Credit is defined as a program of study that allows high school students to simultaneously enroll in high school and college courses. Dual enrollment provides students with the opportunity to earn college credit that doubles as credit toward their high school diploma, enabling them to advance their college education before graduating from high school. An example is taking English Composition taught according to college outcomes that also meets the high school senior English requirement. It builds on the core concept adopted by vocational education where competencies and outcomes are identified (Vivion, 1991; Windham, 1998; Wilbur & Chapman, 1978).

As a way to ease the crowding and competition for students attending college, a survey of high school principals in National Association of Secondary School Principals (NASSP) demonstrated their preference for Advanced Placement courses over dual credit coursework. Most of these administrators felt that AP courses and the concomitant examinations offered a standardized format and provided a consistency for the evaluation

of student performance across schools. However, they recommended that State education and policy leaders continue to support and encourage advanced placement along with dual or concurrent enrollment at high schools and community colleges to promote more student transfer and encourage faster time to degree completion (Wallinger, 1998).

There are many different definitions of "dual enrollment" or "dual credit." Although it is a common term, it seems to be interchangeable with "concurrent enrollment." Kansas describes their "concurrent enrollment pupil" as one who is enrolled in either of the grades eleven or twelve maintained by a school district and has demonstrated the ability to benefit from participation in the regular curricula of eligible post-secondary education institutions. Kansas has incorporated " Kansas Challenge to Secondary School Pupils" into the title of their legislative act in reference to their "concurrent enrollment pupil" (Brown, 1993). States using the term concurrent enrollment include Utah, Florida and Georgia while other states may use the term "dual credit."

Several states have identified their dual credit or concurrent enrollment programs with titles: New Hampshire and Nevada have a Running Start Program; Vermont has the Accelerated Schools Project; New Jersey has several options named: (a) Fast Start, (b) Challenger Program, (c) Credit Bank, (d) High School Special Admissions program, (e) Program for Accelerated College Education, and (f) Credits-in-Escrow. In many concurrent enrollment programs students are given an opportunity to attend classes on both high school and college campuses allowing courses taken during their last two years of high school to count as part of their college degree program, while meeting high school requirements (Coram & Kent, 1999; Fincher-Ford, 1997).

In Colorado the advanced studies program grew out of the Post Secondary Enrollment Options (PSEO) legislation. It has been referred to as the "fifth year program" as students spread their high school coursework over five years in order to simultaneously complete an associate's degree. Students enrolled in the "fifth year program" were still high school students and did not meet high school graduation requirements at the end of the fourth year. During the fifth year of high school, they were concurrently enrolled in four to five community college courses each semester that met high school requirements. Upon successful completion of all courses, they received a high school diploma and an associate of arts or associate of science degree. The Colorado Postsecondary Enrollment Options Act was one of the first in the nation to allow a 13th grade for high schoolers (Hale, 2001; Samson, 1998). In the 2000 Colorado audit report it was strongly recommended that the "fifth year" programs be discontinued.

Development of Dual Credit Programs

This section will discuss how secondary education, in an effort to increase standards and improve a graduate's chances for success in the college and university, embraced the concept of delivering college coursework in the high school. Dual credit gave the opportunity for students to experience the rigor and structure of college curriculum. Dual credit accepted the principle that an individual is placed according to individual level of competence. Dual credit demonstrates the value of acceleration and the importance of exposing students to advanced curriculum (Black, 1997; Harkins, 1998; Stanley & Benbow, 1983).

According to Coram and Kent (1999) educational acceleration programs can expand the learning opportunities and motivate high school seniors to achieve

academically. The accelerated learning under dual credit programs is one answer to low test scores, as it emphasizes outcomes and accountability. Processes are implemented to ensure quality, and greater attention given to the ability to apply what has been learned. Education needs to escape the time-bound, place–bound, efficiency-bound and role-bound delivery and through dual credit reforms change these foundations and end duplication (Batchelor, 1997). A national study of high school curricula, including one in 1993 by the National Center for Research in Vocational Education, shows that only 20% of high school students were actively taking college preparatory coursework, and less than 15% were enrolled in vocational or technical coursework (Henry, 1997).

Dual credit programs seem to be an educational reform that takes education to the student instead of the student coming to the college, making college more affordable for the average person thereby increasing accessibility along with the flexibility of where the student physically takes the credit. With college tuition rising annually, the chance to take college courses in high school at no individual cost or reduced cost is an attractive opportunity (Adelman, 1983; Baker, 1988; Greenberg, 1988).

Dual credit programs, allowing eleventh and twelfth graders to enroll for simultaneous college and high school credit, are demonstrating that students can successfully complete their first two years of college while still attending high school. Dual credit appears to be a program that addresses both the motivated student as well as the gifted and talented student. Many of the educational acceleration programs purport to address the needs of low and moderate achieving students to ensure success in college courses while in high school. These dual credit students increased their educational potential while impacting their development and economic contributions for a lifetime.

Dual credit also addresses the importance of issues such as flexibility, differentiation and articulation (Lords, 2000; Nespoli, 1997; Truesdell, 1996).

Dual credit offers an opportunity for early academic and socialization processes to occur. It provides a strong alternative to AP (Advanced Placement) and IB (International Baccalaureate) which often are not possible to mount in small schools due to lack of faculty or sufficient numbers of ready students (VanTassel-Baskaa, 2000). However, for the true academic acceleration model, AP classes should not be viewed as an alternative, rather as a complementary option to dual credit. AP does have the advantage of being more readily accepted by private four-year higher education institutions (LeMay, 1985; Myer, 1994; McCarthy, 1999).

Lords (2000) reported that in Vermont early exposure to college coursework could spark increased interest in academics. The numbers of dual credit students on Vermont's 13 community college campuses has more than doubled from 90 enrollees to 210 enrollees since the dual credit program was created in 1998. College officials hope to enroll 499 dual credit students by 2002. Students under the age of 18 now make up nearly 2% of the 9,000 people taking classes in the community college system.

Dual credit is at a critical crossroads in its development Kummerer & Jones, 2000). The underlying concept of dual credit is solid, innovative, and focused on educational opportunities for any student who desires to learn and achieve. However, challenges at the institutional level concerning student achievement and growth have increased the uncertainty and resistance to dual credit (Donahue, 1994; Galloway, 1994).

Participants feel that dual credit is one of the most promising educational reforms in recent American history with the potential to make a dramatic difference in the lives of

numerous students (Curtain, 1996; Gurule, 1996). Critics feel it devalues education at both the high school and college level. A common concern of collegiate English faculty is the certainty that dual credit contributes to a decrease in writing proficiency and gives automatic college credit (Koelling, 1997). Many feel it is unwise for students to skip entry-level classes, as they will lack the necessary preparation to be successful in advanced coursework. Many officials at selective colleges say that community college coursework is no match for their own general education courses. In addition they find fault with AP courses feeling students are simply "coached" to do well on the tests and essential course material is neglected (Reisberg, 1998; Schwalm, 1991).

Legislative Progress Concerning Dual Credit

Since no national standards exist regarding dual credit, it is difficult to measure continuity among states. Starting in the mid-1980s, various states have passed legislation that guarantees (qualified students) access to college courses, often at no cost to the student, while they dually enroll in high schools. The legislation allows students to pursue their high school activities, retain their identity with home and school, and provide tax-supported revenue for their schools.

Dual credit programs began in the 1970s, however formal legislation did not begin until the 1980s. Today less than one-half of the states emphasize earning college credit in secondary education (McCarthy, 1999). The Education Commission of the States (http://www.ecs.org) lists dual/concurrent enrollment policies on all states. In many states the law removes an historical inequity that predicated accelerated (college) course enrollment on a family's ability to pay tuition by having school districts pay the cost. Florida was an early adopter in 1973 providing educational options to high school

students including dual enrollment both for general education and vocational programs (Fincher-Ford, 1997; Hale, 2001, McCarthy, 1999).

However, the original legislation that dealt specifically with dual credit, Postsecondary Enrollment Options, was enacted in Minnesota in 1985 (Serrano, 1992). In Minnesota students were leaving high school for the rigor of college courses at ever increasing rates. More than 50 high schools established cooperative courses with postsecondary institutions, and began teaching college credit courses in the high school. Dual credit students were given the opportunity to take college courses at no individual cost. During 1985-86 over 50% of the 3,700 students enrolled in this program took their courses at Minnesota community colleges (Osborne & Gaebler, 1992). Minnesota had approximately 2% of eligible students participating in 1985. By 1987 five percent of eligible students participated. The accelerated curriculum renewed student interest in school. In 1999 there were 8,000 students enrolled in dual credit programs in the state (McCarthy, 1999).

In 1996 Utah enacted dual credit legislation. The state had more than 5,400 students signed up for its dual credit program during the 1997-98 academic year. Salt Lake City Community College (SLCC) had 55% of these enrollees. SLCC has seven fulltime teachers who help manage the classes at 25 secondary schools. Utah has begun tracking its dual credit students to see if completion of courses at a high school level reduces the number of college courses a student takes. The State is currently studying the fiscal impact of dual credit on state funding and quality aspects of the curriculum (Smith, 1999). Currently, the student, school district, community college, or the state pays for the dual credit. Utah offers any student who earns an associate's degree within three months

of high school graduation through either AP or dual credit or a combination, a state New Century scholarship that will cover 75% of upper level coursework (Hale, 2001; Sagers, 2000; St. Clair, 1993).

Missouri's initial bill (1990) authorized all public high schools the opportunity to collaborate with a public or private community college or university to offer postsecondary course options to high school students. In 1998 it was amended to expand eligibility for dual credit courses to 9th and 10th graders. This increased their dual credit participation by 50%. It was found that students usually perform well in college, adjust socially, save families' tuition, and expand higher educations programs. A complaint is that these programs divert money from local districts, reduce the number of advanced courses offered at the senior level, remove the brightest students, and pull students away from high school activities and ill-prepare students for college level work (Kummer, 2000). Missouri revised its liberal dual credit policies in 1999, and now allows only five college courses to be taught in the high school (Brody, 1999; Giradi & Stein, 2001; Hale, 2001).

By 2001 twenty-one states reported that they had comprehensive dual/concurrent enrollment legislation that allowed (qualified) students to enroll simultaneously in high school and college courses, and 26 other states had limited options for dual/concurrent enrollment programs, offered through permissive language in local board policy and through individual institutions Although states' laws vary, all stipulate that college tuition fees shall be paid either by the student, student's families or by state tax dollars allocated for K-12 education (Hale,2001).

An important feature of the dual credit program, when properly utilized, is that it can enable student to finish an undergraduate degree in less than four years. As in Colorado, the legislation in many states allows both the school district and the college to receive funding for each participating student. Funding allocated for kindergarten to twelfth grade is now used to purchase the curriculum and instruction most appropriate for students' learning. Districts often view dual enrollment as a loss of control over both budget and curricular decision and a potential loss of revenue, as they are required to pay the students' higher education tuition fees, causing contentious fiscal issues to evolve.

Colorado Concurrent Enrollment

In Colorado the Office of the State Auditor undertook a performance audit of Postsecondary Programs for High School Students. They surveyed school districts and higher education institutions regarding their participation in these programs. The audit was conducted from August 2000-February 2001(State of Co. audit report, 2001).

There are two statutory postsecondary programs, Fast Track, and Postsecondary Enrollment Options (PSEO), which give high school students the opportunity to take college courses. They are defined as:

> Postsecondary Enrollment Options (22-35-101...111) is the program that colleges use most frequently to serve high school students. The statute's intent is to provide access to advanced courses not available at high school and to give qualified high school students a jump-start on their college degree. This program is open to high school junior and seniors. Students can receive high school and/or college credit for the courses enrolled under postsecondary options. The type of credit earned determines whether the school or college may claim state support.
>
> High School Fast Track (22-34-101) is a voluntary arrangement designed for high school seniors who have completed high school graduation requirements. This program provides advance opportunities for high-achieving high school seniors. For fast-track students, a college and a school district mutually negotiate an agreement.

The following issues were identified:

1. They found accurate participation numbers do not exist. Therefore it was difficult to analyze the costs of the programs.

2. There were no consistent guidelines for successful completion; a letter grade of C or D was used.

3. Broad calculations in the audit indicate that school districts and higher education institutions received at least $24 million in state FTE (Full-time equivalent) reimbursement funds and PPOR (Per Pupil Operating Revenue) monies for student participating in PSEO (Post Secondary Enrollment Options) programs.

4. The fifth year program is one that allows high school students to voluntarily extend their high school education one year and graduate simultaneously with a high school diploma and an associate's degree. The audit showed that the programs involve a rigorous curriculum and require students to complete a minimum of 60 postsecondary credit hours between their junior and fifth year of high school while also meeting high school graduation requirements. Only 203 students or two-tenths of a percent of Colorado high school juniors and seniors participated in fifth year program during fiscal year 2000. Four community colleges have active fifth year programs. It was estimated that school districts received an extra $370 in PPOR funding for participating. The informal Attorney General opinion sought by the Commission notes the "statutes appear to permit a student to take advantage of the Fast Track and PSEO programs until age 21 by simply deferring some of their high school graduation requirements". In addition representatives of the Office of Legislative Legal Services believe that fifth year programs do not violate the Public School Finance Act. There were concerns as to the legality of the fifth year program; it was recommended that the agencies work together to see if specific statutory authority is needed, and propose changes if appropriate.

5. There is the possibility for school districts to receive funding though three sources for vocational programs: (1) The Colorado Vocational Act (CVA) gives approximately 28% above PPOR (per pupil operating revenue), (2) PPOR funding, and (3) PSEO funding. The average per pupil for PPOR funding was $4,765 in fiscal year 2000.

As a result of the survey undertaken by the Colorado state auditor's office, thirteen recommendations (Appendix A) were sent to the Colorado Department of Education, the Colorado Commission on High Education and State Board for Community

Colleges and Occupational Education to review. Four of the recommendations did not receive support from all agencies. The understanding by the auditor's office is the above agencies will reach a consensus on disputed recommendations. From the audit report, the outcome is there will be no more "fifth year" programming allowed for funding under the Commission on Higher Educations decision (State of Co. audit report, 2001).

Relevant Research Studies

The research focus since 1985 following the first dual credit legislation has been on issues around program funding, compared grade point average (GPA) of participating students to non-participating students, achievement level of minorities and quality issues of the program and curriculum.

There have been at least nine Minnesota studies since 1985. Much of the research has focused on the cost (Osborne & Gabler, 1992). In 1999 there were 8,000 students enrolled in dual credit programs in Minnesota. Currently Minnesota post-secondary institutions receive approximately $120 per semester credit and secondary institutions receive a portion of the PPOR (per pupil general education revenue) related to the number of instructional hours PSEO student remain in the high school. Even if the student is attending a post secondary institution fulltime, the school still receives 12% of the PPOR. In Arizona the program has come under fire from the state budget office twice because both the K-12 system and colleges receive state support (Myer, 1994).

In the past five years, many states, including California, Colorado, Florida, Missouri, Utah, Illinois, Arkansas, Oregon, and Wyoming have reexamined their concurrent enrollment policies. Illinois Community College Board, with support of its 48 community colleges, made a funding change in 1996. The change allows both colleges

and secondary programs to claim students for funding and resulted in a 240% enrollment growth in post secondary enrollment. Because of the funding change in Illinois, a total of 290 secondary schools participated in concurrent enrollment in the 1999-2000 academic year, an increase from 120 secondary schools in 1997-98. The funding change was a result of an affordability study (Blakemore, 1994) that looked at the issues around the length of time it was taking to get a baccalaureate degree, and, where one of the recommendations was to expand accelerated programs to secondary students. Typically a student can finish 30 semester credits prior to starting college, allowing students to enter as college sophomores. An Illinois survey (Andrews, 2000) identified courses in transfer core credit, technology credit and vocational credits; there were over 80 different courses offered. The study demonstrated that dual credit is growing and will continue to.

Utah studies shows that the state pays $100 for each college credit with the public schools receiving $66 and post secondary receiving $34, additionally teachers receive a $100 stipend for each course they provide. The annual cost savings is estimated at $12,500 per student, with education delivered at the high school level. The numerous studies on Utah's dual credit program describe it as a virtual university, one without administration, buildings or a full-time faculty or staff. Approximately 24.5% of high school graduates take advance course work through some dual credit program, and the enrollment number has doubled in the past five years (Baker, 1987; Sagers, 2000; Smith, 1999; Wright, 1997).

Several studies (Mullen, 1999; Kliener, 1999; Gilbert, 1997;Hoyt, 1999; Smith, 1999) have examined the GPA (grade point average) of dually enrolled students. These studies found the GPA for dually enrolled students when they left high school and

continued on in post-secondary education had above a 3.0 GPA. The results were similar for Oregon, Minnesota, Washington, and North Carolina dual credit programs. All found that the concurrently enrolled students earned a higher GPA at the university compared to students who had not completed prior college course work. It was demonstrated that students who had completed dual credit programs usually do well in math but find writing and the humanities more difficult. An additional outcome for the North Carolina study (Hoyt, 1999) found that students who completed dual/concurrent enrollment courses in high school had higher college retention rates than students without dual credit experience.

Additional student achievement studies (Gurule, 1996; Marquez, 1999; McConnaha, 1996; Lipetzky, 1989) looked at dual credit programs in Arizona, Minnesota, New York and Indiana. They were able to identify factors that enable under prepared or moderate achievers to make a successful transition from high school to college. The relationship between the program components (background characteristics, academic and logistical decisions, social and behavioral impact and attitude) and self-concept of dual credit students were compared. The conclusions were that dual credit students have positive attitudes and good self-concepts, but it often has a negative impact on their social lives (limited involvement in high school activities); underachievers do well in dual credit programs, and more often graduate from high school and seek further education.

Student achievements in minority populations have also been examined. A California study (Rodriguez, 1999) looked at whether a dual credit program could improve college preparation among average achieving African American and Latino

populations. It surveyed students, and personnel at the high school, as well as evaluating the students' GPAs; it concluded that the program motivated students to attend college.

Issues and concerns about the quality of the programs were the focus of several studies (Maddox, 1998; Vogt, 1991). High standardized test scores are required along with maturity, emotional stability, and a need for acceleration, for success in dual credit programs. The issues identified included a need for better articulation of credits, counselor support, and improvement of college environment for students. Furthermore guidelines around awarding of credits, course prerequisites, uniform tuition, common textbooks and transportation issues need to be standardized.

There is scant research on articulation and uniform tracking of dual credit students. A recent study of Southside Virginia Community College students found students who had completed 44 credits in high school had good insight into typical college classes and were well prepared for college. In the study over 95% of students reported they had enrolled in further college coursework, and over 89% of their dual credits transferred successfully. One student took 41 credits to William and Mary College and is now a graduate student at Harvard University. In looking at dual credit programs, the study identified three types of partnerships: a college professor goes to the high school, a qualified high school teacher teaches college courses, or the student goes to the college campus. The study concluded that any of the three partnerships could be successful; the important elements were administration/leadership, communications and relations.

Koelling (1997) compiled a list of several colleges and universities, Brigham Young University, Notre Dame, Rice, Colorado College, and the University of Southern

California, that refuse to accept dual credit courses; the guideline is to accept no college credit earned prior to high school graduation. Koelling goes on to state, "that high school and college are different in terms of environment, diversity, and intellectual rigor."

Summary

There are more than 30,000 high schools in the United States and their graduates are creating a greater demand on colleges and universities. There is also an increase in student population (three to five percent) as baby boomers send their children off to college (Tucker, 2001). Record numbers of students are also signing up for AP classes or dual credit in ever-increasing numbers. The University of Michigan in Ann Arbor says that 80% of college freshmen arrive with some college credits. The University of North Carolina has admitted students with as many as 48 college credits, enough to make them second semester sophomores before they ever set foot on a campus (Kronholz, 1999).

In the Policy brief (ECS) Education Commission of the States, it was stated, "In the competitive world economy there is a need to examine barriers that impede students from gaining the education and skills they need in the new economy." State leaders are calling for the creation of seamless K-16 systems that allow students to move smoothly between primary, secondary, and post-secondary levels (Boswell, 2000). There is a demand for greater collaboration on teacher education, professional development, the creation of academic standards and the adoption of technology across the systems. The policy recommended that state policymakers should consider funding the dual or concurrent enrollment of upper division high school students in community college courses and provide incentives to students to accelerate their educational progress. Their rationale is that this creates more productivity in the senior year, eases the strain on

colleges and universities, helps students progress quicker through their college education, and saves the state and students money while freeing up opportunities for other students.

The literature review has shown that there are numerous collaborative efforts surrounding dual credit between secondary and post secondary institutions. For the most part these collaborations have enhanced curriculum and allowed students to have an easier transition to a college experience. It seems to be a growing effort to accelerate student learning through the dual credit process. The purpose of this study is to examine the data on access and participation of high schools and their students to determine the extent that the goals of Post-Secondary Enrollment Option legislation are being met.

CHAPTER 3

Methodology

In previous chapters, the rationale for examining the effectiveness of dual credit was developed. The review of literature revealed the lack of an evaluation of dual credit programs within the state of Colorado. This study, although not designed to answer all questions around dual credit, is intended to look at the intent of the postsecondary law and determine whether students are being served.

This chapter is concerned with the methodology and procedures employed in collecting and analyzing the study data. It describes the data set, selected variables, the sample and procedures used. The methods used in this study are largely descriptive and evaluative. Policy questions will be analyzed using the data bases acquired from the Colorado Community College System and the Colorado Department of Education. Inferences made as to the effectiveness of dual credit should be arrived at by examining valid and reliable data.

Research Approach and Rationale

The basic purpose for this study was to examine Colorado dual credit programs in the northeast corner of the state. It looked at how the enactment of Post Secondary Enrollment Options (PSEO) legislation has impacted secondary education. A second purpose was to investigate the demographic variables of school size, economic level, gender, and ethnicity. It looked at participation in high schools of differing populations. A

third purpose sought to study the level of participation in academic and vocational courses. A fourth purpose was to determine if mandatory college entrance exams affected dual credit enrollment.

Participants

Population

For this study, participants were secondary students in Colorado who successfully completed college credits during their junior and senior year prior to high school graduation. The study is based on a rural community college, its five centers and the 29 high schools served by that specific college. The College has participated in dual credit under post-secondary enrollment options with area high schools for at least nine years. The study utilized a recent database and is a longitudinal study involving high schools and their respective students who had completed a dual credit course between 1995-2003. These years were selected to give a better view of the long-term effect of dual credit programs.

Sampling Procedures

The sampling procedures were based on the inclusion of all of the 29 high schools within the community college service area. The sample size was based on total numbers of students completing college credits prior to high school graduation. It includes a chronological sample from the1995-2003 academic years. All dual enrollment students who were juniors and seniors in high school were identified and tracked to determine participation level of the school and the number of credits per student completed. The percentage of the school population involved was determined.

Measures

The site selection was based on accessibility. The study was limited to students who had completed dual credit coursework through the five college centers, which are a part of Morgan Community College. The College was selected due to its ability to provide the initial data, enrollment size and its proximity to the researcher. Another advantage was the ability of the researcher to visit the high schools giving a descriptive view. Although the study was limited to northeast Colorado, the results should generalize to all Colorado dual credit students completing college credits while simultaneously earning high school credit for the same course. This study assumed that the sample dual credit program was indicative of all educational accelerated programs within Colorado and elsewhere.

Variables

The following variables were established for this investigation. The study investigated the relationship between student participation, academic/vocational coursework and the college entrance exam. It also looked at the variables of school size, distance from a college center, ethnicity, gender and socio-economic level.

Instrumentation

A descriptive and evaluative framework was chosen to give a clear referent for the practice of dual enrollment in Colorado. Information was gathered by a focus report, which uses computer programming language to access data from the SIS (Student Information System) existing databases of the community college system. It is not Windows friendly; therefore, it was summarized in Excel spreadsheets to sort and extract the records indicating dual credit enrollment. The summarized data give a clear referent for the practice of dual

credit: what courses are taught, who takes them, and what is the impact of these events on the goals of PSEO (Post Secondary Enrollment Options) legislation.

Materials

The completed databases included comparable data for nine years:1994-1995, 1995-96, 1996-97, 1997-98, 1998-99, 1999-2000, 2000-01, 2001-2002, and 2002-2003. These longitudinal data were important and were based on student records (SIS) that account for courses and credits earned. Additional information included student characteristics such as race, gender, school size, and socio-economic level. Materials used were from the Colorado Department of Education website and from the web site manager, accessing hard copy data, and the Student Information System (SIS) of the Colorado Community Colleges.

Validity and Reliability

One of the biggest challenges of this research was the collection of reliable and valid data. The task turned out to be more cumbersome than anticipated. Information gathered from the SIS (Student Information system) based on student age did not adequately screen dual credit students. It was necessary to sort by codes according to whether the student was seeking a GED (General Education Diploma) or an underage non-graduate enrolled in dual credit, not affiliated with a dual credit high school program. Therefore, the researcher's initial efforts to access data from the identified sources were flawed in identifying students and the focus report was revised as necessary. Students were sorted according to birth date and arbitral fields based on birth dates were assigned. During this process, consideration was given to the course, school and students' identifiers to access valid data. The academic students were identified by enrollment in the college level English Composition course. Instructor identifiers tracked the vocational students through the same data bank.

The web site for the Department of Education gives access to just the three previous years; therefore, it was necessary to contact the web masters to access copies of the data. They were very cooperative and provided me a CD with the information. It was a laborious process to sort, as it included information on all secondary schools within the state.

Screening questions used to verify the appropriateness of a member included in the population were: the age of the student, site location, prefix of the course enrolled in, and selection criteria. If the screening indicated a non-match to the population criteria for dual credit, then the student was removed from the population.

Procedures for Data Collection

Two primary data sources were used to collect the data: the Colorado Community College System's SIS (student information system—data base) and the Colorado Department of Education.

1. Official records of the Morgan Community College student information system (SIS) for the entire population of students nineteen years of age and younger with college credits prior to high school graduation was identified.
2. The 29 high schools were aligned with the College center that offered the dual credit program.
3. The study focused on the community college dual credit students and looked at dual credit completers for nine distinct years.
4. Course prefixes and instructor load were used as identifiers for vocational or academic course work, plus the determination of college-entrance exams.
5. The student cohorts were tracked using student identification numbers (social security numbers) identified by the community college.

6. These students have completed dual credits while their class status in high school was at junior or senior level.
7. The Department of Education was contacted to verify students, total enrollment numbers, gender, ethnicity, and socio-economic level.

The first step was to gain approval to use the Colorado Community College System data mall, the SIS (Student Information System). The next step was to verify high schools and their enrollment through the Colorado Department of Education. It determined high schools involved student head count and the annual enrollment by class, and the number of credits taken per student. Once the cohort of students was verified by the participating community college and high schools, the researcher was able to determine if there was any screening criteria for participation, and what it was. The data demonstrate the level of involvement of high schools and community colleges, and the portion of the student body involved. The average number of credits completed per student ranged from 3 credits to 24 credits (maximum required for reimbursement funding under PSEO).

Data Analysis Plan

The outcome of the study gave enrollment rates of students and how many participants took college credit while in high school. It identified the level of involvement by institutions and the participation level of qualified students.

The demographic characteristics of the population groups of students was described and analyzed by reporting the gender, ages, and ethnic breakdown. The data from the Colorado Department of Education identified student populations and demographic information.

Tabulation and Analysis

Question One

What screening criterion did participating institutions use to determine if a high school student was qualified for participation in a dual credit program?

In evaluating equity, the five centers were polled to determine what screening tools were utilized with individual high schools for admission of students into dual credit programs.

Question Two

What, if any, changes in dual credit program enrollment have occurred over time (1995-2003) and especially since 2001, when the CCHE (Colorado Commission on Higher Education) required that all new students take a placement exam?

The changes were looked at by comparing data collected before and after 2001-02, the first year of mandatory testing. It looked at changes in participation rates for all high schools selected.

Question Three

What percentages of eligible students from each of the high schools selected for this study participated in dual credit programs during the 1995-2003 time period?

To fully understand the outcome of dual credit, the growth of the dual credit program was examined. To answer the question on participation, the database demonstrated the frequency of courses taken by students. Tables were created to describe the growth of participation, the involvement of high schools, and the number of credits that were awarded.

Question Four

How did enrollment in academic and vocational dual credit programs change from 1995-2003?

To examine the participation by high schools in vocational or academic course work, the data base shows the frequency of enrollment in the selected courses and identifies whether the student is consider academic or vocational. The total enrollment number yields the percentages of participating students enrolled in vocational coursework. A variable was whether vocational courses were offered at the given high school.

Question 5

What differences exist in dual-credit vocational and academic track program participation in terms of gender and ethnicity?

The gender ethnicity was not available on all students in the SIS database. In order to compare gender and ethnicity patterns, the information recorded by students on their college entrance exam (accuplacer) was used. This sample size consisted of 135 students in vocational coursework and 135 different students enrolled in academic coursework.

Question Six

What relationships, if any, exist between percent of dual credit enrollments in a school and school size, network availability, distance from a college center, student characteristics (% minority, % male, % free or reduced lunch) of individual schools?

Correlations were computed to look at the variables related to dual enrollment from 1995-2003. They included but were not limited to, the size of school, distance from the College Center and from the College main campus, the availability of distance education networks, and the rate of participation and demographic information.

Summary

This study will examine the access, selection and participation of students in dual credit throughout rural eastern Colorado as a result of the collaborative efforts of a rural community college, its five centers and the high schools in the area. The data from the Colorado Community College system and Colorado Department of Education will be used to evaluate the college, centers and high school involvement. Data demonstrating school size, distance from a center, and student demographics will be used as comparative data and to determine enrollment rates.

CHAPTER 4

Introduction

Study Purpose

The primary purpose of this study is to use currently available data on dual-credit programs in Colorado—including high school participation, numbers of high school juniors and seniors with access to college courses, and average number of college credits earned by high school students—to identify factors that affect program enrollment. Any change patterns in dual credit enrollment at 29 Colorado high schools served by five Morgan Community College Centers between 1995 and 2003 were examined.

Sample and Site Descriptions

Morgan Community College (MCC) has a service area of over 11,500 square miles covering seven counties: the eastern halves of Adams and Arapahoe and all of Kit Carson, Lincoln, Morgan, Yuma, and Washington counties. Every year, Morgan Community College serves more than 3,000 students from this vast rural/agricultural area of nearly 75,000 residents. The demographics of the student population reflect the general population of Eastern Colorado, which is mostly white and middle class with a high school education. In addition to the main campus at Ft. Morgan, Morgan Community College operates centers in the towns of Limon, Burlington, Yuma, Wray, and Bennett.

There are 25 K-12 school districts in the college's general service area, 10 with less than 150 students each. The study sample consisted of 16,802 different juniors and seniors

attending 29 high schools over nine years in this rural section of northeast Colorado. The students enroll through the five college centers used in this sample: Morgan, Limon, Burlington, Wray/Yuma, and Bennett. During the nine-year study period, the average number of eligible students was 1,867 per year.

The Morgan Center, the largest in the study, serves 8 high schools, 5 located in Morgan County and 3 connected via a distance education network. The high schools in remote Weld and Logan counties are not within the official MCC geographic service area, but the college center is permitted to offer courses via distance delivery. The Morgan Center is located near the intersection of I-76 and U.S. Hwy 34, approximately 75 miles from Denver. The high schools served by the Morgan Center had the highest combined minority enrollment during the study period—a yearly average of 22%. Perhaps because of its size, Morgan offered the largest number of vocational programs of the five community college centers in this study. Between 1995 and 2003 it served 618 vocational students, and 5 of the 8 high schools in its coverage area offered dual credit vocational courses. The largest high school in the Morgan Center service area had minimal participation in academic coursework but a strong vocational dual-credit enrollment.

Also during the study period, a significant number of high school juniors and seniors in this coverage area participated in an academic dual-credit track via two distance learning networks that allowed Morgan faculty to reach students at several remote sites simultaneously. The system permits instructors to watch and interact with their students, some of whom attend schools in isolated and sparsely populated areas. Four high schools (all of which participated in dual enrollment programs during the study period) were connected by one network, and three high schools (two of which were

active participants), were connected by the other. Dual-credit courses were also offered on-site at all seven high schools. The eighth high school did not participate in the distance learning interactive system, but it did participate in the MCC dual-enrollment program.

The Limon Center serves seven high schools, with one located outside of its official geographic service area but connected by a distance-learning network. During the study period, minority enrollment at these schools averaged 7% per year, from an average yearly junior and senior population of 241 (2,175 over nine years). These high schools are small and rural, with only one school having more than 50 eligible students per year. Students in the Limon dual-enrollment program had fewer vocational opportunities compared to students at other centers—only 1 program was offered three times during the study period, compared to 23 vocational program opportunities for the same period at the Morgan Center. Five of the 6 high schools had access to a distance education network for academic courses, and some participating students were allowed to take classes on-site. The one high school that was not served by the network did not offer on-site dual-credit courses until 2002.

The Wray/Yuma Center, which served 6 high schools with 3,065 eligible juniors and seniors during the study period (average 340 per year), had a 6% yearly average minority enrollment. Also during this period, 5 of the 6 high schools participated in dual-enrollment programs. Students in the Wray/Yuma service area had 3 vocational dual-credit course opportunities between 1995 and 2003, with 76 students enrolled. Since the center did not have any distance education facilities, all college courses were offered at the individual high schools.

The four high schools served by the Bennett Center had a 6% yearly average minority population and 2,876 eligible juniors and seniors (annual average of 319). Bennett was the first of the five centers to offer dual-credit opportunities; all four high schools have been participants since the program's inception, and have been linked via an interactive distance-learning network since 1994. Vocational courses were offered two years at the Bennett in 2001 and 2002; total enrollment in vocational dual-credit courses was 22 students.

The smallest center, Burlington, also served four high schools (1,840) juniors and seniors between 1995 and 2003, a yearly average of 204 eligible participants). Average annual minority enrollment at these high schools was 10%. Burlington did not offer vocational courses. The distance education network connected one of the four schools to the Limon Center system, so students at that high school were able to participate in interactive instruction as well as on-site courses. The four schools also participated in dual-credit courses offered through the Burlington Center, which is farthest from the main college and closest to the Kansas border. Burlington High is the only school in this center with an annual enrollment of more than 50 students.

Research Question Responses

Question One

What screening criteria did the participating institutions use to determine if a high school student was qualified for participation in a dual-credit program?

The screening criteria for student participation in dual-credit academic coursework was consistent across the five community college centers. In 1995 and 1996 no formal assessments were required. Students were allowed to enroll in dual-credit classes if they

achieved a minimum 2.5 GPA and were recommended by a school counselor or principal. In 1997 eligible students were required to take a college placement exam, but students who scored one-two points below the cut-off level were still allowed to take courses if they had the support of their principals or counselors.

A state-mandated placement exam was initiated in 2001. According to Colorado Commission on Higher Education (CCHE) requirements, all new students wanting to enroll in college-level credit courses were required to take the exam. Currently, all students must take an "accuplacer" exam on a computer or the written companion exam, regardless of whether their intention is to enroll in a vocational or academic degree program.

In 2001 changes were made to the minimum scores (established in 1997) required for permission to enroll in dual-credit classes at the five community college centers. The minimum score for college-level English remained at 86, but the reading minimum was reduced from 87 to 83 and the math minimum reduced from 78 to 72. This state board policy (BP 9-41) change went into effect for all degree-seeking students in Fall 2001. Under these guidelines, students must achieve the revised minimums in order to enroll in dual-credit classes and cannot be accepted simply on the basis of a recommendation from a principal or counselor.

The data in Table 1 show the mean "accuplacer" score for the available sample of high school students at the Morgan Center who applied for enrollment in academic dual credit courses. "Accuplacer" is the brand name for computerized placement tests in reading comprehension, sentence skills, and arithmetic. The standardized tests are released through

the College Board in New York. Each year the average student score has exceeded the required scores.

The areas the CCHE-mandated scores required for entry are for college-level math and English courses. On Table 1 the mean student score for each "accuplacer" placement exam is given by years.

Table 1

Comparison of the Mean Accuplacer Test Scores for Annual Sample of 45 High School Juniors and Seniors Who Applied to Enroll in Academic Dual-credit Courses at the Morgan Center in 2001-2003 (n=135)

Score	Elementary Algebra	Reading	Sentence Skills
CCHE[1]	**72**	**83**	**86**
2001 Mean	90	80	88
% below	24%	55%	35%
2002 Mean	97	88	96
% below	4%	24%	4%
2003 Mean	79	86	89
% below	45%	33%	26%
Average % below	25%	39%	24%

Note. [1] Colorado Commission on Higher Education state-mandated entry-level score.

However, each year there were under prepared students testing for entry. As one might expect, remedial classes are not offered by participating high schools whose focus is on teaching a high school curriculum. Data in Table 1 demonstrate that the reading placement score was the most difficult for students to achieve. On the total sample size of 135 students, 53 (39%) were below the required score. The reading score does not keep a student from enrolling in dual credit courses, except English Composition. In math, 30

students (25%) tested below the required score so were unable to enroll in a college-level math class. In sentence skills, 32 students (24%) did not meet the entry level score for English Composition.

The data in Table 2 represent mean "accuplacer" exam scores for secondary students who wanted to enroll in dual-credit vocational classes at the Morgan Center of Morgan Community College. In the table, these test scores are compared to a) Colorado Commission of Higher Education (CCHE) college entrance scores and b) minimum Ability to Benefit (ATB) scores for measuring student eligibility for federal PELL grants for vocational programs.

Table 2

Comparison of the Mean Accuplacer Test Scores for Annual Sample of 45 High School Juniors and Seniors Who Applied to Enroll in Vocational Dual-credit Courses at the Morgan Center in 2001-2003 (n=135)

		Elementary Algebra	Reading	Sentence Skills
CCHE[1] minimum		**72**	**83**	**86**
Mean	2001	51	67	67
Mean	2002	68	79	82
Mean	2003	46	69	73
Total below		73%	67%	59%
ATB[2] minimum		**34**	**55**	**60**
Mean	2001	51	67	67
Mean	2002	68	79	82
Mean	2003	46	69	73
Total below		25%	24%	22%

Note. [1] Colorado Commission on Higher Education state-mandated entry-level score.
[2] Ability to Benefit, or minimum score required for a student to be eligible for federal postsecondary financial aid (PELL grants).

The data show that the student mean often fell below the CCHE required scores. Individual data demonstrate that in sentence skills, 80 students scored below 86, the cut off

score, making 59% of the sample group ineligible to take English Composition. For math, 73% were ineligible for College Algebra. In reading, 90 (67%) students scored below 83.

The student mean was above the suggested levels for ATB (ability to benefit) level. However, individual scores demonstrate that 24% in the sample scored below the minimum ATB score for reading, 22% scored below the ATB minimum for English, and 25% scored below the ATB minimum for math.

Although the "accuplacer" exam was mandated in 2001, only the students who wished to enroll in dual credit were given the "accuplacer" exam, so it is not possible to tell the total percentage of students who were below criteria. Prior to 2001, the test was given, but no records were available.

The other test data available were between 1996 and 2000. Students who wanted to enroll in the Morgan Center's vocational dual-credit classes were required to take a "work keys" job readiness test designed by the American College Testing Program (www.act.org/workkeys). Individual tests are available to measure skills in applied mathematics, applied technology, business writing, listening, locating information, observation, reading for information, writing, and teamwork. Morgan Center administrators chose to test potential students on teamwork, writing, math, and listening skills. The similarities noted were that on both assessment exams, the students scored the lowest in English (writing or sentence skills) proficiency. The work keys exam was administered to a sample of vocational dual-credit students at the Morgan Center; exam results are presented in Table 3.

Table 3

Comparison of the Mean Work Keys Test Scores for a Sample of High School Juniors and Seniors Who Applied to Enroll in Dual-credit Vocational Courses at the Morgan Center in 1997-2001

	1997		1998		1999		2000		2001	
	Score	HC[1]	Score	HC	Score	HC	Score	HC	Score	HC
Teamwork	3.6	101	3.9	79	3.8	54	3.9	45	3.5	44
Writing	3.0	47	2.9	67	2.7	26	2.7	26	2.9	31
Math	4.4	26	3.7	17	3.7	21	3.3	13	4.2	20
Listening	3.2	47	2.9	34	3.0	26	3.0	26	3.2	31

Note. Skills were rated according to the following scales: teamwork, 3-6; writing, 3-5; math, 3-7; and listening, 3-5.
[1] Head count, or sample size.

The goal of the work keys testing program is to ensure that college and technical school graduates have the necessary skills to perform the jobs they have been trained for. Many schools issue score-based employability certificates: a silver certificate for 4.0 scores in three content areas and a gold certificate for scores of 5.0 or higher in three content areas. A score of 3.0 is considered minimum for passing. As Table 2 data show the average for students in all areas was at a 3, the minimum accepted score. Writing was the most difficult area for students to achieve the needed score, for all three years, students scored 3 or below.

Question Two

What, if any, changes in dual-credit program enrollments have occurred since 2001, when the Colorado Commission on Higher Education (CCHE) required that all new students take a placement exam?

During the study period, student population at the high schools within the College Centers fluctuated. The school population is taken from CDE (Colorado Department of

Education) data. Table 4 presents the available data on dual- credit program enrollments in the time period of the study.

Table 4

Changes in Student Cohort with Related Changes in Dual Credit Enrollment from 1995 to 2003 for the Total Number of High School Juniors and Seniors Enrolled in Dual-credit Courses at Morgan Community College

Year	Student Cohort	Dual Credit Enrollment	% Enrolled
1995	1659	282	17%
1996	1787	407	23%
1997	1810	399	22%
1998	1912	568	30%
1999	1972	516	26%
2000	1932	670	35%
2001	1909	595	31%
2002	1908	698	37%
2003	1913	550	29%
Totals	16,802	4685	28%

In 1995 there were 1,659 students, who were juniors and seniors at the 29 high schools, and by 2003 this number had increased to 1,913 students. In the year 2000, the year preceding the mandated placement exam, there were 670 (35%) students enrolled in dual credit. The following year the enrollment was 595 (31%). This decrease makes it appear that the placement exam did affect enrollment. However, in 2002 the enrollment climbed to a new high of 698 students (37% participation). In 2003 the enrollment dropped to 550 students (29%). Looking at the cohort, the largest group was in 1999; there were 1,972 juniors and seniors enrolled at the high schools within the College Centers and 26% were enrolled in dual credit coursework. Figure 1 shows the changes that occurred in the study period from 1995-2003.

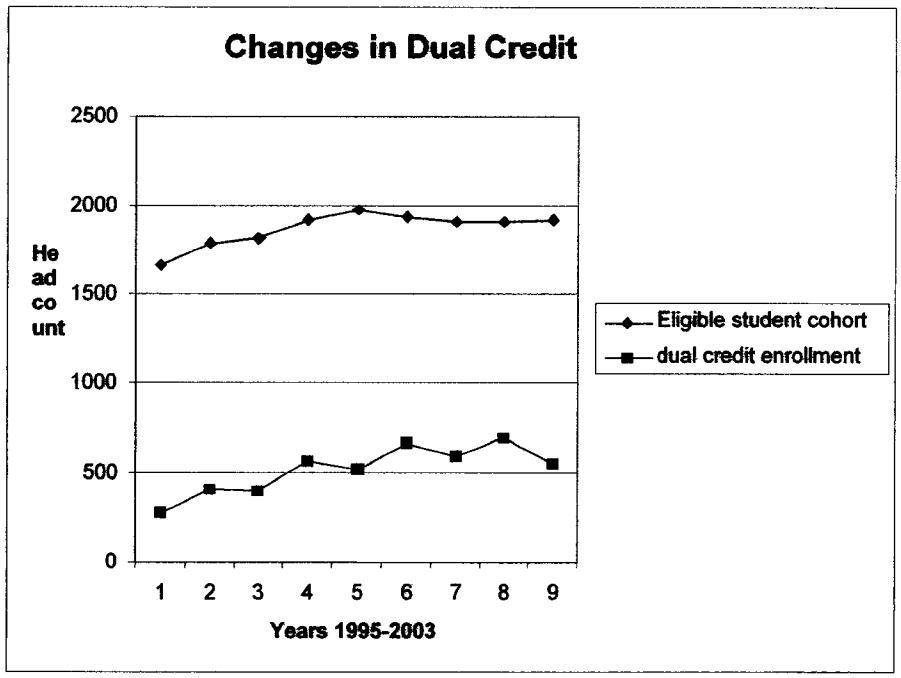

Figure 1. Dual credit enrollment patterns from 1995-2003 for 29 high schools in northeast Colorado.

The required minimum scores on the "accuplacer" exam did not seem to make a significant difference in enrollment patterns. Dual credit enrollment has been fairly stable since 1998. Looking at three-year trends, there is a fairly consistent enrollment pattern with percentage growth in the triads--21% total from 1995-1997, 30% from 1998-2000, and 32% from 2001-2003.

Question Three

What percentages of student cohorts from the high schools selected for this study participated in dual-credit programs during the 1995-2003 time period?

During the study period, school and student participation rates for dual-credit programs varied among the five community college centers. The data in Table 5 present the size of the school, the participation rate by years for the 29 high schools in this study. It also identifies the schools linked by an interactive network.

Table 5

Comparisons of Size of School with Percentage of Dual Enrollment for the 29 High Schools Included in this Study Data From 1995-2003

School[1]	TC[2]	P[3]	N[4]	School[1]	TC[2]	P[3]	N[4]
Lone Star	131	7	0	Genoa/Hugo	343	56	X
Lincoln	139	13	0	Merino	366	7	X
Karval	150	8	0	Stratton	412	15	0
Briggsdale	158	34	X	Byers	578	55	X
Hi Plains	176	18	X	Akron	582	31	X
Bethune	181	6	0	Wiggins	708	30	X
Arickaree	184	65	X	Limon	752	49	X
Kit Carson	192	5	X	Strasburg	833	41	X
Liberty	201	0	0	Yuma	1065	12	0
Woodlin	224	60	X	Burlington	1071	27	0
Weldona	233	42	X	Wray	1173	12	0
Otis	240	44	0	Bennett	1224	43	X
Deertrail	241	50	X	Brush	1719	33	X
Idalia	255	31	0	Fort Morgan	2941	15	0
Flagler	330	37	X				

Note. [1] High schools able to participate in dual credit courses
[2] Total cohort of students from 1995-2001 for enrollment in dual credit, showing school size.
[3] Percentage of cohort enrolled in dual credit courses
[4] connected by a network. =X

In 1995 only 6 of the 29 (21%) high schools surveyed for this study were participating in academic dual-credit programs, but by 2003 that number had increased to 28/29 (97%). There was a 100% participation of high schools in dual credit programs at each of the centers, except the Wray/Yuma Center. That Center is not connected via any interactive video networks, and one rural school did not participate. There were 17 (59%) of the 29 high schools connected by an interactive network. The participation rate for the networked schools included both the next to lowest participation rate at 5% (Kit Carson) to the highest participation rate at 65% (Arickaree). These two schools are connected by the same network, and similar in size, 192 and 184 total population in the nine years of the study. The

school with no participation rate, Liberty, is not networked. Seventeen of the 29 high schools were served by an interactive network, and averaged 39% participation. The remaining 11 high schools not on a network averaged 17% participation.

Between 1995 and 2003, the Bennett Center had some participation from all of the four high schools it served. Among those schools in the Bennett Center, the percentages of eligible juniors and seniors who enrolled in dual-credit courses ranged from 43 to 55 (the average center cohort was 100 students per year during the nine-year study period). Data on participation rates for the Bennett Center are presented in Table 6.

Table 6

Percentage of High School Students Enrolled for Dual Credit at the Bennett Center

	YEAR									
High School	1995	1996	1997	1998	1999	2000	2001	2002	2003	Average
Bennett	26	32	43	55	46	32	53	75	35	43
Byers	45	83	73	35	46	49	63	52	58	55
Deer Trail	87	52	38	59	37	32	22	53	50	50
Strasburg	65	52	33	32	35	47	34	46	38	41

The data in Table 6 show that 43% of Bennett High School juniors and seniors participated in the PSEO dual–credit program during the nine-year study period. Bennett was the first center to fully participate in the dual-credit program. For Byers High School the figure was 55%, for Deer Trail 50%, and for Strasburg 41%. Of these schools, Byers (with the second smallest student population in this center) had the highest participation rate. The schools are all on the same interactive network. Figure 2 shows the total enrollment pattern for the four high schools in the Bennett Center.

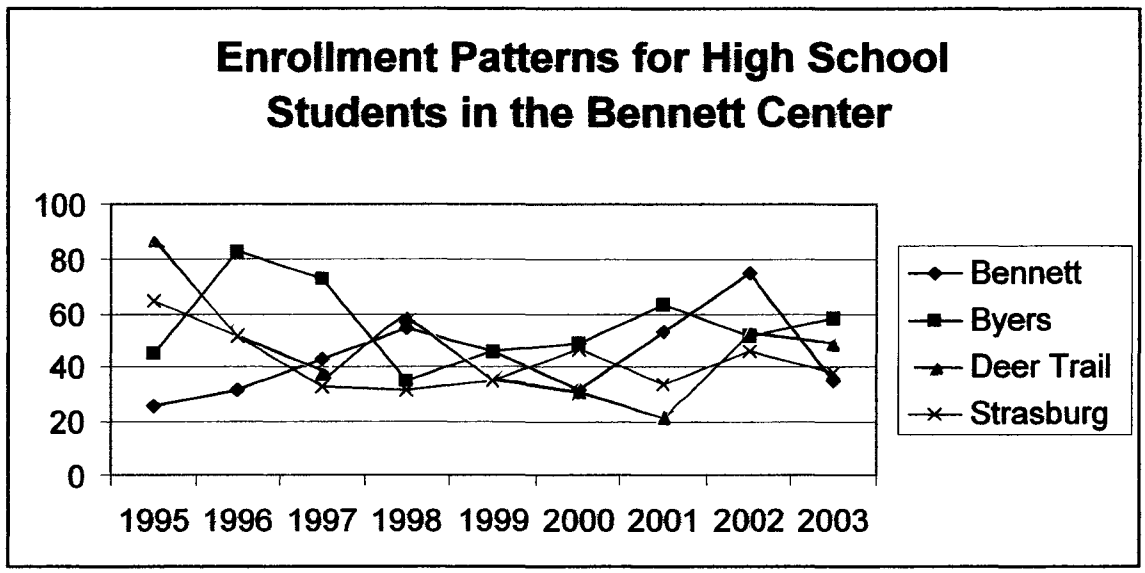

Figure 2. Dual credit enrollment patterns from 1995-2003 for the Bennett Center.

All four schools are located along the I-70 corridor that runs east from Aurora--Bennett the closest (approximately 20 miles from Aurora and 70 miles from the College campus. Even though the area is experiencing a growth spurt, it is still considered rural. The four schools are connected via an interactive network, and the majority of dual-credit classes are offered in that format.

Of the five centers involved in the study, the Burlington Center had the smallest percentage of students participating in dual credit during the study period.

Table 7

Percentage of High School Students Enrolled for Dual Credit at the Burlington Center

	YEAR									
High School	1995	1996	1997	1998	1999	2000	2001	2002	2003	Average
Bethune	0	0	0	3	11	4	4	21	5	6
Burlington	7	40	31	26	21	27	20	27	37	27
HiPlains	0	0	0	0	10	6	28	68	39	18
Stratton	15	0	0	4	50	37	0	36	0	15

According to the data in Table 7, only 6% of Bethune High School juniors and seniors participated in PSEO dual-credit courses during the study period. Burlington, the largest of the four schools, had the largest dual-credit course enrollment rate—27%. Hi Plains was second at 18% and Stratton was third at 15%. Figure 3 shows the enrollment pattern for the Burlington Center in the study period.

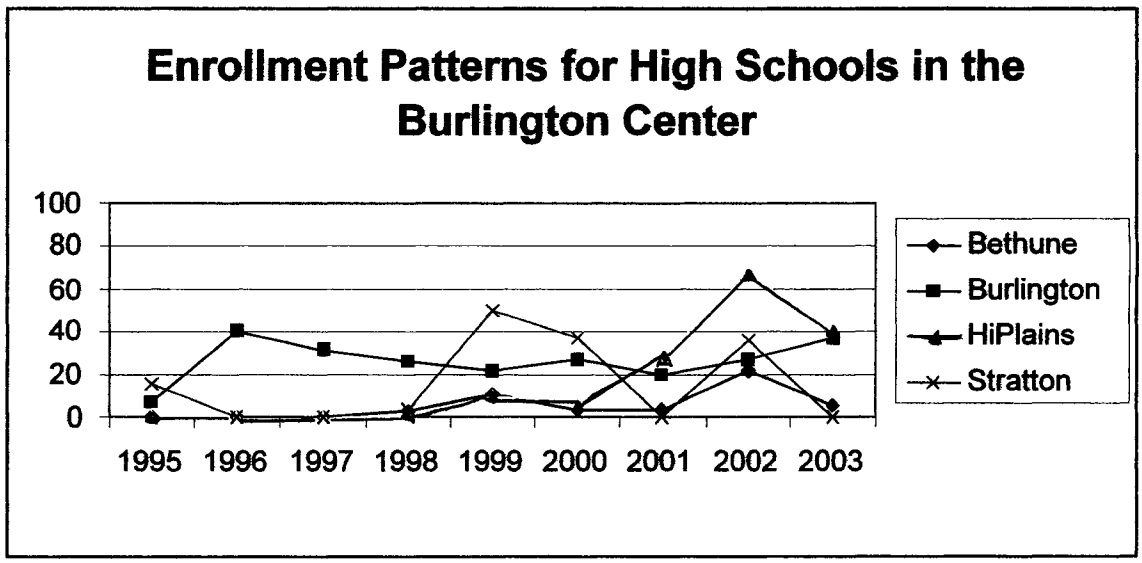

Figure 3. Dual credit enrollment patterns at the Burlington Center 1995-2003.

These schools are also located along the I-70 corridor, but in sparsely populated communities between Limon and the Kansas border. Dual-credit classes are held at the individual high schools. Hi Plains has an interactive network connection to the Limon Center that was funded and built by the Eastern Colorado Board of Cooperative Services (BOCES). Although the courses are delivered via the network from the Limon Center, Hi Plains students enroll through the Burlington Center for their dual-credit courses.

The Table 8 data show that Arickaree High School (the second smallest in the Limon center) had the highest participation rate among the six schools in this group, with 65% of its juniors and seniors enrolling in dual-credit courses during the nine-year study

period. In fact, it had the highest participation rate of all the 29 high schools involved in the study as demonstrated in Table 5.

Table 8

Percentage of High School Students Enrolled for Dual Credit at the Limon Center

	YEAR									
High School	1995	1996	1997	1998	1999	2000	2001	2002	2003	Average
Arickaree	0	82	88	71	73	91	46	58	69	65
Arriba/Flagler	0	19	67	63	68	70	44	0	6	37
Genoa/Hugo	41	41	29	29	79	90	73	76	12	56
Kit Carson	0	0	0	0	4	14	38	0	0	5
Karval	0	0	0	0	0	0	0	31	41	8
Limon	62	46	54	59	60	41	20	53	55	49
Woodlin	57	64	95	95	44	39	15	79	88	60

The other schools in the Center were Limon (49% participation), Genoa-Hugo (55% participation), and Woodlin (60% participation) were in the top six schools for dual-credit involvement in the study of the 29 high schools. The rate for Arriba/Flagler High School was 37% and for Kit Carson 5%. A seventh high school, Karval was the last school to implement dual credit, beginning in 2002. It is both the smallest (150 total eligible students during the study period) and the most remote school. The second smallest, Kit Carson, is not located within the same service area as the other schools, but is connected to the Limon Center via the BOCES network, a partner in the dual-credit program. The partnership allows high school students to enroll in classes that are not available in their high school curriculum. Figure 4 shows the enrollment pattern for the Limon Center in the study period.

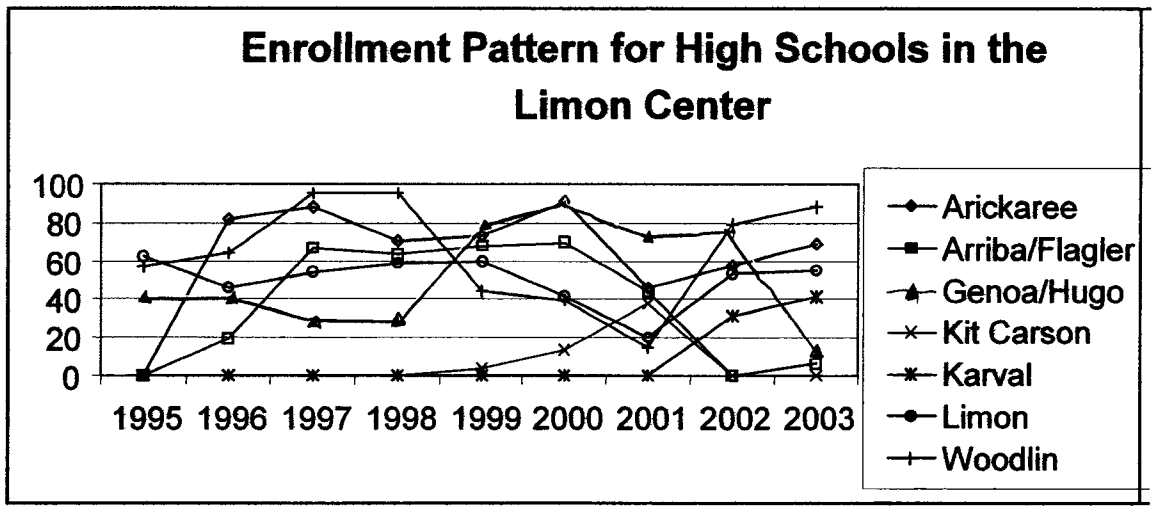

Figure 4. Dual credit enrollment patterns at the Limon Center 1995-2003.

Even though Kit Carson students are included in this study as they take dual credit classes via the BOCES interactive network from the Limon Center, the school is located in the Lamar Community College service area. Therefore students enroll and receive their dual credits through Lamar Community College. These schools are scattered along the 1-70 corridor between Strasburg and Limon, a sparsely populated section of Colorado.

The Morgan Center was the largest center in this study. The data in Table 9 show that 5 of the 8 schools in this group participated during every year of the study period.

Weldon Valley had the highest rate of participation—42% of eligible students. Briggsdale is outside of the Morgan Center's service area, and is connected via an interactive network; it had 34% participation. Merino, another school with the same characteristics (located outside of service area, connected via network), had a 7% participation rate. Akron and Brush high schools, both connected to the network but located within the service area, had 31% and 33% participation rates, respectively. Brush is the

Table 9

Percentage of High School Students Enrolled for Dual Credit at the Morgan Center

	YEAR									
High School	1995	1996	1997	1998	1999	2000	2001	2002	2003	Average
Akron	40	0	26	27	13	61	54	33	26	31
Briggsdale	0	0	0	12	18	32	96	37	44	34
Brush	14	38	14	14	17	67	77	43	26	33
Ft. Morgan	6	7	7	7	7	21	21	26	28	15
Merino	0	0	0	0	24	20	20	0	0	7
Weldon Valley	52	52	28	24	17	47	47	41	59	42
Wiggins	10	33	25	24	18	22	22	38	51	30
Lincoln	0	0	0	25	0	0	0	30	26	13

only school on the network that also participates in the Morgan Center's vocational course work. Figure 5 shows the enrollment pattern for the Morgan Center in the study period.

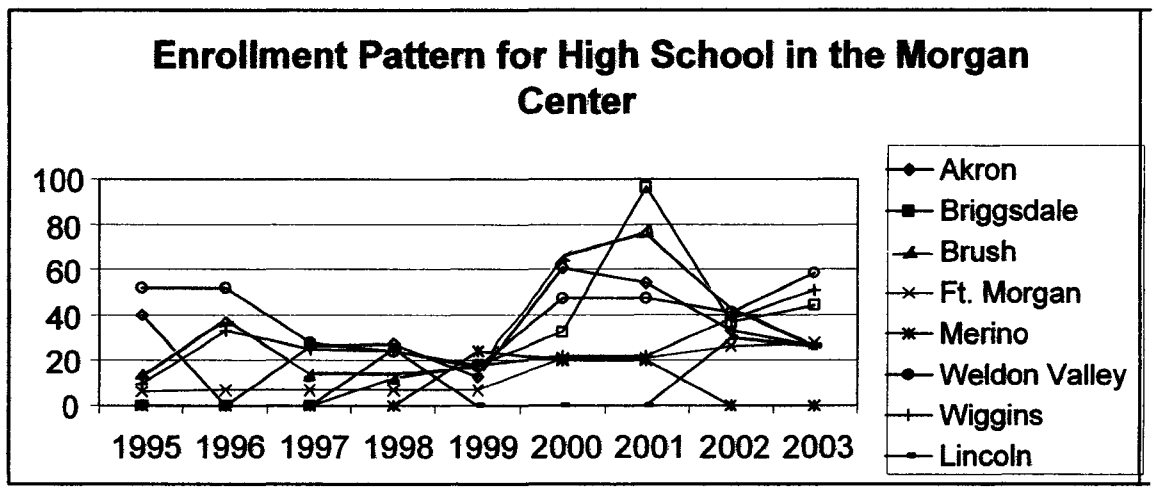

Figure 5. Dual credit enrollment patterns at the Morgan Center 1995-2003.

The largest high school, Ft. Morgan, had a 15% participation rate, with the majority of enrolled students taking vocational courses. The smallest school, Lincoln Alternative High School, had a 13% participation rate but only enrolled students in

vocational courses for the three years that it took part in the program. The participation rate for Wiggins High School was 30%, with their students enrolled in both vocational and academic courses. Brush, Ft. Morgan, Lincoln, Weldon Valley, and Wiggins all send their vocational students to the Morgan Center for classes (see Table 11).

The Wray/Yuma Center maintains a physical presence in both communities; however, the center building is located in Wray. The Table 10 data show that Otis High School had the highest participation rate among the six schools in this group: 44% of its juniors and seniors were enrolled in dual-credit courses during the nine-year study period.

Table 10

Percentage of High School Students Enrolled for Dual Credit at the Wray/Yuma Center

	Year									
High School	1995	1996	1997	1998	1999	2000	2001	2002	2003	Average
Idalia	19	0	52	53	39	29	3	35	68	31
Liberty	0	0	0	0	0	0	0	0	0	0
Lone Star	0	0	0	23	6	6	0	25	6	7
Otis	0	0	0	94	73	84	30	69	46	44
Wray	0	5	10	0	28	24	5	17	15	12
Yuma	0	0	0	69	1	10	13	4	0	12

Table 10 shows that Idalia High School had the most years of involvement, eight of the nine years. Although Otis didn't become involved until 1998, it was highest with a 44% participation rate; Idalia was second with a 31% participation rate. Both vocational and academic courses were offered on-site at the individual high schools. Yuma (the second largest school in this group) was third with 12%; students at these schools enrolled in both vocational and academic courses. Wray, the largest school, also had a 12% rate (academic courses only) and Lone Star, the smallest (131 total cohort over 9 years), had a 6% rate. Liberty High School, the second smallest school in this center (201 total eligible student

cohort during the study period) had a zero participation rate. Liberty High School, located in Joes, Colorado, is the only high school in this study group who had no participation in dual credit coursework. Joes is located 48 miles from the Center and 86 miles from the College campus. Figure 6 shows the enrollment pattern for the Wray/Yuma Center in the study period.

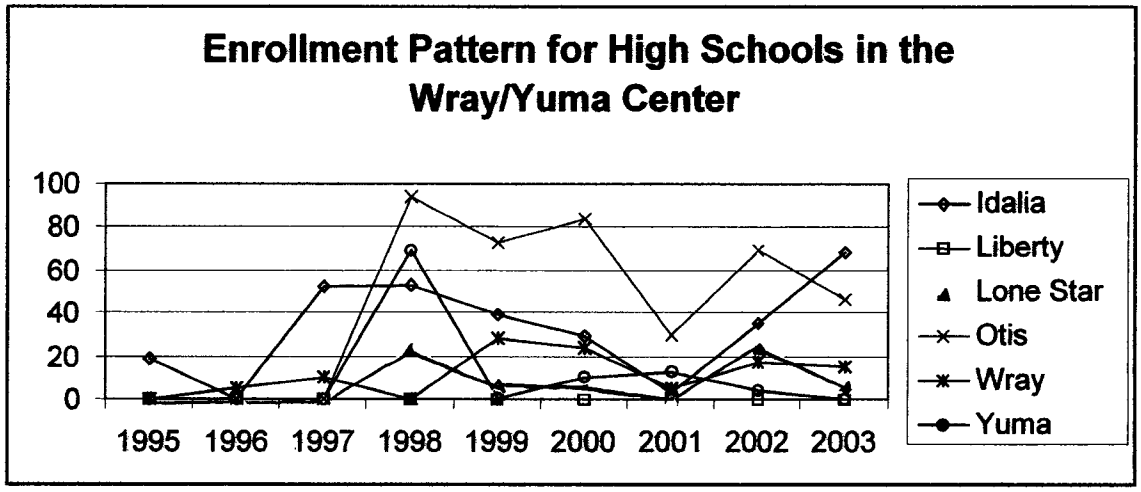

Figure 6. Dual credit enrollment patterns at the Wray/Yuma Center.

These schools, located in sparsely populated areas of northeastern Colorado between Highways 24 and 36, do not have access to interactive networks.

Question Four

How did enrollment in academic and vocational dual-credit programs change from 1995-2003?

In this study, the term "vocational programs" refers to programs that focus on helping students develop technical and other career skills required for specific occupations. The courses, which reflect the requirements of particular industries, tend to attract high school students who are ready to enter the job market upon graduation.

The academic courses offered through the PSEO program were Colorado Community College System general education classes. The course with the highest enrollment was a college level English Composition class (3 credits). Comparison data on the average number of students enrolled in vocational or academic credit hours is in Table 11.

Table 11

Percentage of Students Enrolled in Academic and Vocational Dual-Enrollment Programs at Five Morgan Community College Centers Between 1995 and 2003

	Bennett		Burlington		Limon		Morgan		Wray/Yuma	
Year	ACA	VOC	ACA	VOC	ACA	VOC	ACA	VOC	ACA	VOC
1995	45%	0%	8%	0%	29%	0%	6%	4%	1%	0%
1996	45%	0%	24%	0%	39%	0%	1%	4%	8%	0%
1997	45%	0%	15%	0%	47%	2%	1%	4%	38%	0%
1998	45%	0%	16%	0%	50%	8%	8%	4%	31%	7%
1999	41%	0%	25%	0%	46%	4%	7%	4%	19%	1%
2000	40%	0%	24%	0%	45%	6%	30%	8%	15%	5%
2001	54%	3%	12%	0%	26%	2%	15%	21%	3%	6%
2002	67%	5%	23%	0%	51%	4%	21%	15%	3%	2%
2003	34%	0%	28%	0%	51%	4%	17%	14%	17%	0%

Of the 16,802 dual credit-eligible students attending the 29 targeted high schools during the nine-year study period, 762 (5%) enrolled in vocational courses compared to 3,923 (23%) enrolled in academic courses). That made a combined participation rate of 28% for all eligible students. The total enrollment numbers at the participating high schools ranged from 131 eligible at the smallest to 2,941 at the largest (see Table 5). The Burlington Center (the most remote) had a zero participation rate in vocational dual-credit classes. The Table 11 data also show that only one of the five college centers offered vocational courses throughout the entire study period. The largest center (serving eight high schools) grew in

terms of vocational dual credit enrollment, from 4% participation in 1995 to 21% participation in 2001 and regressing to 14% participation in 2003. However, only 11 of the 29 high schools (38%) offered vocational dual-credit courses. Because of the costs involved in buying supplies and equipment, smaller schools were generally unable to offer these courses to their students. In addition, only seniors were eligible for enrollment in vocational dual-credit courses between 1995 and 1999.

Question 5

What differences exist in dual-credit vocational and academic track program participation in terms of gender and ethnicity?

The gender and ethnicity of vocational and academic track participants was not readily available. The only data found was on the individual student "accuplacer" reports at the Morgan Center. Therefore the sample groups available in the "accuplacer" test information from 2001-2003 is used to demonstrate ethnicity enrollments.

Table 12

Percentage of Minority Enrollment in Sample of 45 Students Each Year Applying for Academic or Vocational Programs at the Morgan Center 2001-2003

Year	Aca	%	Voc	%
2001	6	13%	14	31%
2002	9	20%	9	20%
2003	11	24%	11	24%
Overall	26	19%	34	25%

According to the National Research Center for Career and Technical Education (NCCTE) (http://www.nccte.org) minority students have higher enrollment percentages in career and technical programs across the country. However, the NCCTE data show that enrollments are generally representative of the demographics of specific areas, and

the data for this study confirm that assumption: the population in the study area is predominantly Caucasian, as are the student populations at all 29 schools. Minority subpopulations include Mexican-Americans, Native Americans, Asians, and African Americans. Morgan, the largest center in this study, had the largest minority component (22% average minority student cohort annually). In the sample group minority vocational enrollment was 31% in 2001, a low of 20% in 2002, and the third year data was 24%, an average of 25% minority. This is close to the percentage of the total school minority enrollment. The data follow the national trend by demonstrating more minority enrollment in vocational dual credit (25%) than in academic dual credit (19%).

The three-year gender data is taken from the Morgan Center individual student "accuplacer" information from 2001-2003. It is presented in Table 12.

Table 13

Percentage of Male Enrollment in Sample of 45 Students Each Year Applying for Academic or Vocational Programs at the Morgan Center 2001-2003

Year	Academic	%	Vocational	%
2001	27	60%	32	71%
2002	25	56%	21	47%
2003	24	53%	22	49%
Overall	76	56%	75	56%

The percentage of males enrolled in vocational courses was similar to the enrollment of females, but the same was true for academic coursework, males participated more in dual credit opportunities than their female counterparts. In the number of males in this sample, no differences were noted between dual credit academic (56%) and vocational (56%) class enrollments. The gender balance could be related to the diverse group of vocational

programs that were offered, including health occupations and multimedia, which balance the typically male dominated programs such as automotive and welding.

Question Six

What relationships, if any, exist between percentage of students in dual enrollment and school size, network availability, distance from centers, student characteristics (percent minority, percent male, percent on free /reduced lunch) of individual schools and percent vocational enrollment?

Using SPSS software, correlations were calculated on the given variables. The independent variables identified were student demographics, minority, males, and students on free/ reduced lunch. The school demographics were-- size, network availability, distance from a center, and distance to the Morgan Community College Campus. The dependent variables are the percentage of students at a school who enroll in dual credit courses and the total number of dual credits enrollments in each high school. The data are presented in Table 14.

Table 14

Correlations for Relationships of Students and School factors with Dual Credit Enrollment among 29 High School from 1995-2003

	% Enr	DC Enr
Total Juniors	-.084	.764*
# Years Networked	.610*	.320
Miles to Closest Center	-.050	-.586*
Miles from Campus	-.212	-.341
% Minorities	-.157	.251
% Males	-.096	-.058
% Free/reduced lunch	-.220	-.407*
% Vocational	-.084	.229

Note. * Correlation is significant at the 0.05 level (2-tailed)

The correlation (r =.61) is significant for the relationship between percentage of students with dual credit enrollment and number of years that the high school was networked through an interactive network system. This means that schools that had a high percentage of their students take dual credit also were networked for most of the years and those without networks had a lower percentage enrolled.

There was more involvement (total dual credit enrollment) in the larger schools (r = .76) and in the schools closest to a Center (r = -.59). Dual credit enrollment is used less in economically disadvantaged schools (r = -.41). As expected the larger schools had more credits taken, but not more in percentage involvement.

Conclusion

Like programs in other states, the Colorado Post Secondary Enrollment Options program was established as an educational choice. It is one way that educational choices in public schools have been expanded. The findings in this study indicate that participation in dual credit is growing. It also demonstrates that dual credit students take the same proficiency test for entry into college level courses as any other first time college student. The dual credit students score consistently with the average score of first time college students.

The dual-credit programs have become a functional component of the college course offerings at each college center. The program participation varies among the high schools served by the five centers at Morgan Community College.

CHAPTER 5

Summary, Conclusions, and Recommendations

Discussion

This chapter presents a summary of the purpose and procedures of the study and a discussion of the results and recommendations, including (a) how type of courses offered affected dual credit enrollment (b) conclusions regarding those factors which were perceived to have facilitated or inhibited the development of dual credit enrollment; (c) an analysis of the effect of screening criteria on enrollment and changes to enrollment with a mandatory placement score for enrollment, and (d) a summary analysis of the gender, ethnicity, economic level, and size of schools participating. The chapter also contains recommendations for research based upon the findings of the study.

Summary of Purpose and Procedures

Purpose

The purpose of this study was to analyze the available data on dual credit programs. To fulfill this purpose, the study examined the degree of high school participation by looking at the numbers of juniors and seniors at each high school who enrolled in college courses through the college centers. The research investigated size of school, location, economic level, minority status, and gender as possible factors related to dual credit enrollment. The study also looked at any differences occurring when mandatory placement scores were needed to enroll.

Further the study examined if all students were provided access to post-secondary education. The study examined the changes in dual credit enrollment at 29 high schools served through five college centers of one community college over a time span of nine years. In other words, the primary purpose of the study was to determine whether or not the intended goals of PSEO legislation in Colorado were being met. House Bill 98-1162 was signed into law on March 27, 1998 (Samson, 1998).

According to the legislative declaration, 22-25-102,

> (1) The general assembly hereby finds, determines, and declares that high school pupils need to be continually challenged in order to maintain their academic interest; that such challenges must include rigorous academic pursuits; that, for some students, exposure to such academic challenges declines during the last two years of high school as pupils complete their graduation requirements; that there is a high rate of dropouts at the eleventh and twelfth grade levels; that, for some students, courses not offered in high school or courses offered in a different setting may stimulate or maintain their interest; that providing a wider variety of option to high school pupils by encouraging and enabling secondary pupils to enroll in courses offered by state institutions of higher education provides new and exciting academic challenges to such pupils; and that such enrollment opportunities provide access to excellence in education.

Procedures

Five college centers, which are part of Morgan Community College, are the main focus in the study. They were not randomly selected from representative groups of community college centers but they offered the advantage of being a cooperative setting that the researcher had full access to for data collection. The data bases used were from the Colorado Department of Education and the Colorado Community College System. Course prefixes, student identification number and instructor were used as identifiers, plus the status of the student (age and still enrolled in high school).

The centers ranged in size from 70 to 562 total FTE (student full time equivalents based on 30 semester credits annually). Each center worked with at least 4 high schools. The centers within the sample represented a range of differences. The 29 high schools were aligned with a college center that offered the dual credit program. High school size ranged from less than 20 to 330 students annually. Total dual credit program enrollment ranged from 0 to 120 students. The participants from the individual centers were 16,802 different students over the nine years of the study, with a total participation of 3,476 students or 28%. High schools averaged from 0% to 65% participation of students.

Discussion of Results and Recommendations

How Types of Courses Offered Affected Dual Credit Enrollment

It appears that the dual credit program was effective in providing college credits in remote communities. An unexpected result was the impact of the interactive video distance learning networks. Networks allowed a greater number of students to access the dual credit opportunities. The networked schools through interactive systems had a huge impact on participation rates. Seventeen of the 29 schools were linked via networks. Nine of the 10 schools with the highest percentage (all above 40%) of eligible students participating were serviced by an interactive network. The 10 schools with the lowest student participation rate (less than 15% participating) were not networked.

The largest school was Ft. Morgan (2941 eligible students in 9 years with 15% participation), which was on a network but did not participate in networked courses. However Ft. Morgan High School is less than .5 mile from the Morgan Center. The smallest school (Lone Star, 131 eligible students in 9 years) was not on a network and had 7% participation. Lone Star was 66 miles from the closest center. It was expected

that the larger schools were able to offer a better variety of courses than their smaller counterparts. However, two of the 10 smallest schools (both networked) had the highest participation rates of students with 65% participating at Arickaree (184 students in nine years) and 60% at Woodlin (221 students in nine years). All 29 high schools except Liberty (201 students) have had some participation in dual credit. Overall, there was no correlation of size and rate of participation. It should be noted that in 2004 (after the study) Liberty High School began participation in dual credit so now there is 100% participation of the schools served by the 5 college centers. Participation of students has grown from 17% in 1995 to an average of 33% for the last 4 years.

Factors Affecting Development of Dual Credit Enrollment

Within this study, over one-fourth of the eligible student cohort began post-secondary experiences while still in high school by enrolling in dual credit courses. There was a high rate of some participation in dual credit among schools through the 5 college centers; 28 of the selected 29 schools provided dual credit opportunities to students--97%. Dual credit programs provided another option for students who are looking for challenges, many who would begin part time jobs and lose interest in school. Perhaps these students were "bored" with high school curriculum, looking for a career choice or wanting to get a head start on their college course work (Kronholz; 1999). The students who possessed information regarding dual credit enrollment were able to accumulate college credits while completing their high school requirements. The unanswered question is did the high schools provide information to all students, or only to students they felt would succeed in college level coursework?

However, in personal contact with the high schools, it appears evident that these educational decisions were made by administrators in local high schools whether to make dual credit enrollment opportunities available for secondary students. It is not clear how much emphasis is placed on dual credit enrollments in the individual high schools and whether this impacted enrollment numbers.

As an example, at Bennett Center in 2002, there was a 67% participation rate in dual credit that fell to 34% the following year (2003). One of the reasons was that a new high school administrator felt Advanced Placement (AP) coursework was a better route than dual credit for the students. Although 2004 numbers are just estimates, it appears that the AP program was discontinued and the result is a subsequent surge in dual credit enrollment.

Other factors affecting participation is a change in the way tuition costs are covered. When the program was first implemented the local school districts either paid the students' tuition or reimbursed the student for the cost upon successful course completion. In 2004, it appears that approximately 30% of the students involved in dual credit receive no financial support from the local school district. Increasing costs for connectivity of the interactive networks caused the networks to be disconnected at the Limon Center. It is unclear the impact that will have at the 7 high schools served, as dual credit courses will not have the advantage of a few students at many sites, instead all students would have to be at one site.

Administrators were also pivotal in the types of course work that were offered at local schools. There was a significantly greater participation in academic general education courses (23%) than the vocational courses (5%). School participation in

vocational courses was 38%, eleven schools of the twenty-nine in the selected cohort. The two largest schools in the study had vocational courses each of the nine years (1995-2003). Only 2 of the 10 smallest schools had any dual credit vocational courses, however 8 of the same schools (smallest) offered academic general education. High school administration played a big role in determining which students would benefit from dual credit. The role of information is crucial to students at any point in their transition to post-secondary education.

Effect of Screening Criteria on Dual Credit Enrollment

The requirements for admission of secondary students changed over the course of the study. In the first 2 years of the study, admission was based solely on recommendation from a principal or counselor. For the next four years, a college placement exam was given, but students were allowed to enroll if they scored 1-2 points under the required score and had the support of the high school administration. In the seventh year of the study, state mandated entry level scores were initiated at the college. There was a decrease of 4% in enrollment the following year (2001), but the next year (2002) enrollment increased by 2% over 2000.

Based upon the findings in this study, there should be a concern for the low scores students demonstrated in entry level assessments. Vocational students who completed the work keys exam, (1997-2001) often scored below the norm (3) in writing skills. In the five years of available data, there was only one year that the selected cohort averaged a score of 3 in writing skills.

Of the available 135 vocational students' scores for the mandated entry exam- "accuplacer" in 2001-03, 73% had scores below the norm for reading, 57% were below

the norm for sentence skills, and 59% were below the norm for math. Another 135 available student scores for academic general education courses in 2001-03 demonstrated that 25% were below the required entry score in math, 39% were below in reading, and 24% were below in sentence skills.

The low scores have a great implication for potential student success. High school students should all be assessed as early as possible to allow the remediation process to occur at the secondary level. Students who score low should be prescribed a sequence of courses that would ultimately prepare them for academic success. Enrollment behaviors that increase student achievement must be stressed as early as possible in dual credit enrollment programs. The positive result is that students are taking the proficiency exam early in their high school career, which helps the student, parents, and teachers understand what is needed to ready the individual for college work. It is important that student understand what is expected of them in post-secondary education.

Even with the high percentage of students ineligible for enrollment, the dual credit enrollments were stable, which probably reflects an increased interest in earning college credits simultaneously with high school credits. Studies, such as "Running Start" in the literature review, outlined the benefits of dual credit, which were getting a start on college level skills prior to formal attendance at a college and keeping the students in their high school (Serrano, 1992). The marketing that takes place among their peer group entices more students to apply for acceptance into the dual credit program. Many students perform at a higher level when challenged in academically rigorous and engaging courses. These students respond well to high expectations, which encourage the spread of

dual credit to a larger population of students (Lords, 2000). These factors could explain the negligible differences in dual credit enrollment following mandated placement exams.

Analysis of the Relationship of Demographic Factors With Dual Credit Enrollment

Although it was expected that relatively more males would enroll in dual credit vocational courses, there was no difference in the 2001-2003 student sample. Both academic and vocational enrollment averaged 56% male. The homogeneity could be a reflection of changes that have occurred in vocational programs. Just as the vocational name changed to career and technical education, these occupational programs have broadened their scope. The workplace has changed. The school-to-work initiatives and the Tech Prep (technical preparation) program enacted in the 1990's encouraged more students to explore a variety of careers. Schools have implemented a curriculum based on student choices from among broad career clusters. The career focused curriculum builds on a strong academic foundation with ongoing professional development for faculty centered on contextual teaching strategies (Bond, 2003). The expanding health care and computer industries have opened more possibilities. Vocational courses with the industry standard labs located at community colleges give options to students who may not have access to vocational programs in their high school. There is also a trend for females to enroll in typically male occupations such as automotive and welding that mirror the gender equity in the work place. The results of these analyses show that at the high school level there seemed to be an equal representation of males in general education dual credit coursework and in vocational dual credit.

Dual credit programs were used less in economically disadvantaged schools. The socio-economic level was determined by using data on free-reduced lunch. Even though

tuition reimbursement, through the Post-Secondary Enrollment Options (PSEO) legislation, allows high schools to reimburse the cost if the student successfully completes, the resources of these schools impacted the uses of dual credit opportunities. Additionally students or their parents pay the initial cost of tuition and upon successful completion, the school may reimburse the cost of tuition, but it is not mandated. A conclusion could be that there is not equal access to dual credit enrollment based on financial resources.

The enrollment of minorities was also virtually the same for academic (26%) and vocational (25%). Again the statistics available from the National Research Center for Career and Technical Education reveal that minorities have the highest enrollment nationally in career and technical programs, but their data demonstrate that enrollments are similar to demographics of the area. In the geographic area of the study minority students comprise 22% of total secondary population, again no significant difference.

Implication for Future Research

Community colleges cannot anticipate or meet all the educational needs in their communities; however, they seem to be creating appropriate programs with their secondary school partners. Dual credit students enrolled in courses that give both high school and college credits comprise about one-fourth (28%) of the high school students within this study. It is apparent to the researcher that the interaction between faculty at the high school and community college level has led to the sharing of standards and curriculum. This validation of competencies should lead to better prepared high school graduates, and has provided a wider range of curricula to the participating students. Dual credit courses serve as a link between the two educational levels, and can lead to other

partnerships based on these relationships. In this study, only one college and its five centers were analyzed for dual credit enrollment over nine years. The study could be expanded to look at participation rates of all high schools and community colleges in Colorado.

Are all Colorado colleges using identical guidelines for their dual credit programs? Does dual-credit truly compact education – lessening time required to completion of a baccalaureate degree (Mullen, 1988)?

Community colleges in Colorado are completing a decade of providing their secondary partners with educational opportunities under post secondary enrollment options. As dual credit programs continue to mature and additional years of data become available, it is essential that further research be conducted. It should focus on the participant cohort and the tracking of student success. There needs to be an evaluation of the dual credit program curriculum to determine if it is helping students readily access further education.

The mission of the community college began with providing lower division courses leading to the baccalaureate degree and then included occupationally specific programs. Now, the mission also encompasses short-term and skills-based training for work force development. The outreach and partnerships established with secondary schools in the dual credit programs seems to have expanded the community college mission and role. For 80% of the population post-secondary access is at the community college (www.nccte.org). Dual credit enrollment allows early access. A further study could investigate how the students have used the credits earned in the secondary program,

whether they are continuing on to a baccalaureate degree or if they have improved their employment opportunities.

The students who take the "accuplacer" entry exam are beginning a link to post-secondary education. Is it because of the social aspect of the programs or the financial support for tuition that the dual credit programs appear to have sparked an interest in academics? Or is it the ability of students to accumulate college credit in high school, sometimes up to 30 credits? The increase in popularity seems to match the literature (Lords, 2000).

A research question not considered in the present study, and one not addressed in the research reviewed in this study is how do the "accuplacer" entry level scores of dual credit students compare to the scores of non dual credit students entering the community college? Developmental education at the community college seems to be expanding as more occupations require educations beyond the high school diploma. Under-prepared students pursuing additional education compel post-secondary institutions to offer a full schedule of developmental education.

Another study could look at the perception of the high school administration, parents and students to the value of dual-credit in Colorado. Is there support in the local community for allowing high school students to complete college level courses? How does the transition occur to post-secondary education? In an Arizona study (Gurule, 2000) the findings supported that participation in dual credit often limited involvement in high school activities with an impact on students' social adjustment.

Conclusion

The focus of this study was to examine the data on 29 high schools in a rural Colorado community college service area to determine the viability of dual credit enrollment. Secondary schools are important partners with community and technical colleges in Colorado and throughout the country. In the United States, there are 1,721 community colleges (2000 data- http://nces.ed.gov/), and in Colorado there are 13 public community colleges. These dual credit programs produce enrollment, not only in general education but also in career and technical area. These factors result in reportable headcount and credit hour generation. These programs serve as an entry level for individuals moving from secondary to post secondary education. Other benefits of dual credit programs to community colleges include recruitment of student and forging linkages with high schools.

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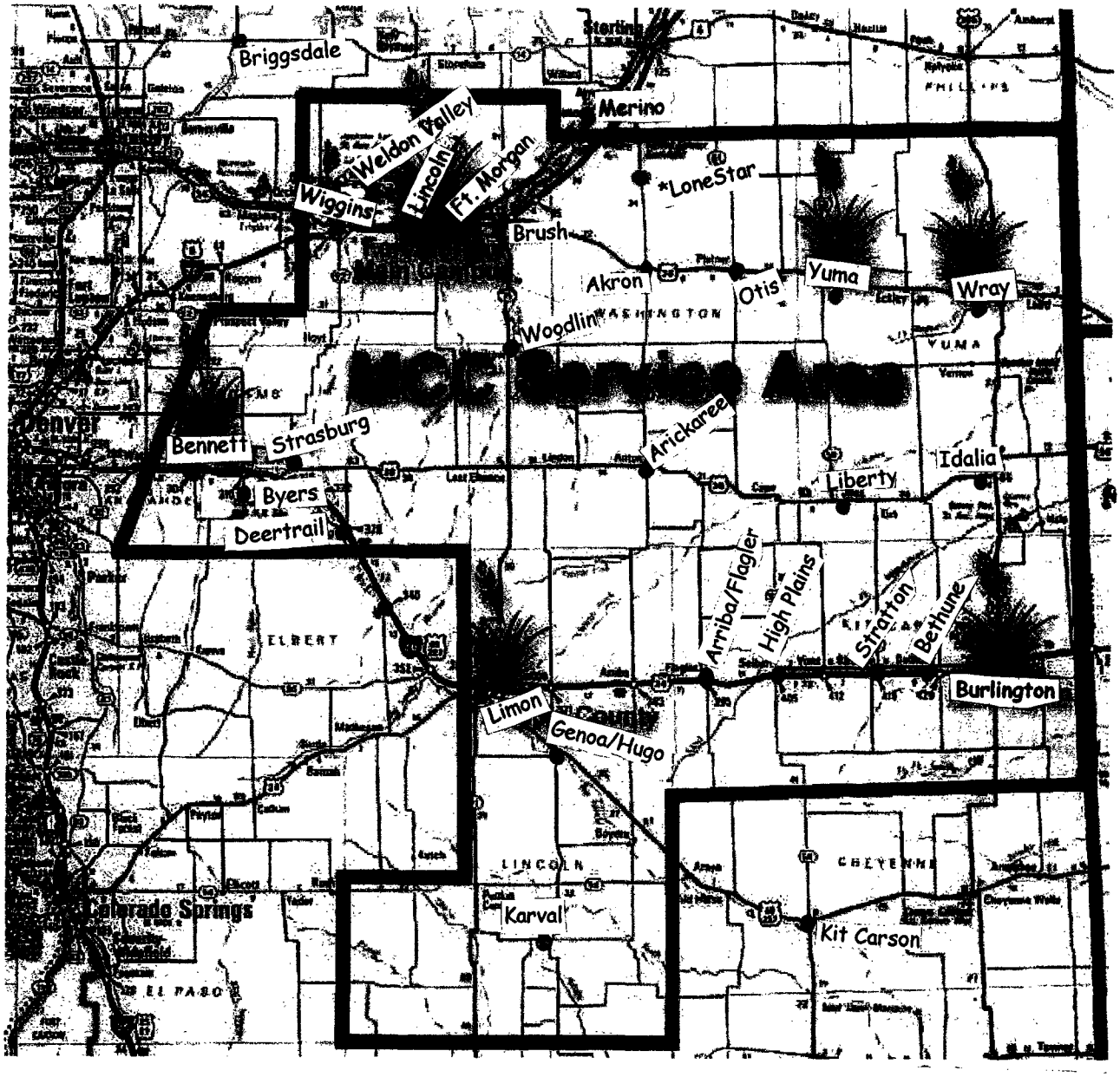
APPENDICES



Bennett Center

- Bennett High School
- Strasburg
- Byers
- Deertrail

Limon Center

- Arickaree (Anton)
- Arriba/Flagler (Flagler)
- Genoa/Hugo (Hugo)
- Kit Carson
- Karval
- Limon
- Woodlin (Woodrow)

Burlington Center

* Bethune
* Burlington
* High Plains (Seibert)
* Stratton

Morgan Center

* Akron
* Briggsdale
* Brush
* Ft. Morgan plus *Lincoln
* Merino
* Weldon Valley (Weldona)
* Wiggins

Wray Center

*Idalia
*Liberty(Joes)
*LoneStar(rural)
*Otis
* Wray
* Yuma

STATEWIDE AGREEMENT
BETWEEN
COLORADO SCHOOL DISTRICT and a COLORADO COLLEGE
HIGH SCHOOL CONCURRENT ENROLLMENT

You have indicated that you are interested in enrolling in a college course while a high school student. The State of Colorado provides several options for high school students who meet high school standards to begin college early. To promote content standards, provide academic challenges, and provide access to academic courses that may not be available at a local high school to meet high school graduation requirements. All Colorado public four-year and two-year colleges, four area vocational schools, and the three private colleges participate in the following dual enrollment programs.

High school seniors who have completed their high school graduation requirements may begin college under the FAST TRACK PROGRAM (The school district pays the tuition at the time the student registers and there is no limit on the number of courses).

High school juniors (11th grade) and seniors (12th grade) who are ready for college work in one or more subject areas are encouraged to enroll in college level work under the POSTSECONDARY ENROLLMENT OPTIONS PROGRAM (School districts reimburse the students for the tuition if they pass the course). Students are entitled to reimbursement for two courses per semester. According to the law, school districts may voluntarily agree to pay for additional courses beyond two courses per term. PSEO does not include course enrollments during summer session.

High school students 16 years or older may open enroll in colleges courses as SPECIAL NON-DEGREE SEEKING STUDENTS. There are no limits on the type of course other than academic prerequisites and placement tests required for specific courses. Because these enrollments are not state-funded under the School Finance Act, the student is not entitled to tuition reimbursement by the school district.

Section A: To be completed by student

Name of Student _____

SSN **School ID** **Birth Date**

Address

City **State** **Zip Code** **Telephone**

Name of Parent/Guardian

School District **Date Student Enrolled in 9th Grade**

High School **HS Principal**

College **Term** _____ **Year** **2002-03**

College Course(s): **Approved (Initials)**

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

Take this form to your high school counselor. Section B will indicate which options are available for you.

This contract is student and college specific. A separate contract must be completed for each college that the high school student plans to attend.

Section B: Student Eligibility: To be completed by High School counselor/principal. Check all that apply.

a)____This student is a senior who has met or will meet the high school graduation requirements before the start of the college course enrollment. – FAST TRACK
b)____This student is eligible to participate and has the maturity to enroll in a college level course and complete the assignments for the course.
c)____The school district agrees to pay the tuition for _____ Fast track courses this term.

d)___This student is enrolled in 11th grade.
e)___This student is enrolled in 12th grade.
f)____This student is eligible to participate and has the maturity to enroll in a college level course and complete the assignments for the course.
g) ___The school district agrees to pay tuition reimbursement for ____PSEO courses this term.

h)____This student is enrolled in grade 13, often referred to as a fifth year senior. INELIGIBLE for PSEO
i)____This is an international student attending high school on a F1 Visa. INELIGIBLE FOR PSEO
j)____This student is interested in remedial, pre-college level, or p.e. courses. INELIGIBLE FOR PSEO.
k)____This student wishes to enroll in a course for high school credit only. NOT CLAIMABLE FOR FTE
l)____ Student wishes to pay own tuition. Go to section D and sign.

Signed: _____ Date: _____

Title _____

For districts that require central administration approval, School District Central Administration sign below.

Signed: _____ Date: _____

Title _____

Section C: Approved by college administrator (or designated college staff who administers high school concurrent enrollment program). Keep copy of signed agreement on file at the college.

Name of College _____
Approval Stamp
Or
Comments

Signed: _____ Date: _____

Title _____

Section D: To be signed by student and student's parent/guardian

I understand that this agreement entitles me/my child to enroll in college courses. I understand the following:

1) **The course is a college-level course (i.e., remedial instruction and pre-college level courses are not eligible) and I will meet the same course requirements as college students.**
2) **The course satisfies college graduation requirements (note: physical education courses, remedial, basic skill courses, and advanced placement courses are not eligible under Fast Track or PSEO).**
3) **The course credits will only transfer if I earn a C or better in the course.**
4) **The grade received in this course will appear on my college transcript.**
5) **If I withdraw from the course after drop/add date, I will receive a W or F on my college transcript and will not be eligible for tuition reimbursement.**
6) **I am not eligible for the privileges of a college student, i.e., may not participate in college activities or sports, not eligible for federal or state-funded financial aid, including institutional scholarships funded with general fund dollars.**
7) **The application entitles me to enroll as a high school concurrent student and does not admit me into the college or a degree program.**
8) **I may be eligible for tuition reimbursement by the school district if I meet my district's requirements. Waived if (l) is checked in Section B.**

In signing this agreement, I authorize the college to release my transcript to my school district at the end of the course.

_____ _____
Student's signature **Date**

_____ _____
Parent's signature

Correlations

Descriptive Statistics

	Mean	Std. Deviation	N
% enr. dc	30.7117%	19.80608%	29
Sum of dc. enr	163.4828	156.46716	29
Closest Center	24.5690	20.38221	29
Miles from MCC	74.3966	46.87929	29
Sum of FTE	44.8717	51.92257	29
Total Juniors	299.0000	327.09402	29
# Years NW	5.3103	4.47296	29
% Minorities	10.6174%	9.64607%	29
% Males	51.2725%	5.53116%	29
Free lunch	28.7503%	8.97322%	29
% Vocational	11.9865%	22.21577%	29

Correlations

		% enr. dc	Sum of dc. enr	Closest Center	Miles from MCC	um of FTE	otal Junior	Years NW	% Minorities	% Males	ree lunch	Vocationa
% enr. dc	Pearson Corre	1	.385*	-.050	-.212	.322	-.084	.610**	-.157	-.096	-.220	-.084
	Sig. (2-tailed)	.	.039	.798	.269	.088	.666	.000	.417	.620	.252	.667
	N	29	29	29	29	29	29	29	29	29	29	29
Sum of dc. e	Pearson Corre	.385*	1	-.586**	-.341	.931**	.764**	.320	.251	-.058	-.407*	.229
	Sig. (2-tailed)	.039	.	.001	.071	.000	.000	.091	.189	.766	.028	.232
	N	29	29	29	29	29	29	29	29	29	29	29
Closest Cen	Pearson Corre	-.050	-.586**	1	.120	-.531**	-.540**	.067	-.346	.019	.128	-.359
	Sig. (2-tailed)	.798	.001	.	.535	.003	.003	.731	.066	.921	.508	.056
	N	29	29	29	29	29	29	29	29	29	29	29
Miles from M	Pearson Corre	-.212	-.341	.120	1	-.364	-.352	-.244	-.503**	.567**	.033	-.588**
	Sig. (2-tailed)	.269	.071	.535	.	.052	.061	.203	.005	.001	.867	.001
	N	29	29	29	29	29	29	29	29	29	29	29
Sum of FTE	Pearson Corre	.322	.931**	-.531**	-.364	1	.835**	.215	.286	-.010	-.307	.389*
	Sig. (2-tailed)	.088	.000	.003	.052	.	.000	.263	.133	.961	.105	.037
	N	29	29	29	29	29	29	29	29	29	29	29
Total Junior	Pearson Corre	-.084	.764**	-.540**	-.352	.835**	1	-.091	.393*	-.043	-.184	.524**
	Sig. (2-tailed)	.666	.000	.003	.061	.000	.	.639	.035	.824	.339	.004
	N	29	29	29	29	29	29	29	29	29	29	29
# Years NW	Pearson Corre	.610**	.320	.067	-.244	.215	-.091	1	-.178	-.172	-.484**	-.241
	Sig. (2-tailed)	.000	.091	.731	.203	.263	.639	.	.355	.372	.008	.208
	N	29	29	29	29	29	29	29	29	29	29	29
% Minorities	Pearson Corre	-.157	.251	-.346	-.503**	.286	.393*	-.178	1	-.335	.324	.800**
	Sig. (2-tailed)	.417	.189	.066	.005	.133	.035	.355	.	.076	.086	.000
	N	29	29	29	29	29	29	29	29	29	29	29
% Males	Pearson Corre	-.096	-.058	.019	.567**	-.010	-.043	-.172	-.335	1	-.021	-.395*
	Sig. (2-tailed)	.620	.766	.921	.001	.961	.824	.372	.076	.	.916	.034
	N	29	29	29	29	29	29	29	29	29	29	29
Free lunch	Pearson Corre	-.220	-.407*	.128	.033	-.307	-.184	-.484**	.324	-.021	1	.249
	Sig. (2-tailed)	.252	.028	.508	.867	.105	.339	.008	.086	.916	.	.194
	N	29	29	29	29	29	29	29	29	29	29	29
% Vocationa	Pearson Corre	-.084	.229	-.359	-.588**	.389*	.524**	-.241	.800**	-.395*	.249	1
	Sig. (2-tailed)	.667	.232	.056	.001	.037	.004	.208	.000	.034	.194	.
	N	29	29	29	29	29	29	29	29	29	29	29

*Correlation is significant at the 0.05 level (2-tailed).

**Correlation is significant at the 0.01 level (2-tailed).

Source: web site of http://www.colorado.gov/ House Bill 98-1162, original was house bill no. 1244
Colorado Statutes/TITLE 22 EDUCATION/SCHOOL DISTRICTS/ARTICLE 35 POSTSECONDARY ENROLLMENT OPTIONS ACT

ARTICLE 35
POSTSECONDARY ENROLLMENT OPTIONS ACT

Section