

AN INVESTIGATION OF STUDENT PERCEPTIONS OF DUAL ENROLLMENT  
AT A MID-SIZED WESTERN COMMUNITY COLLEGE

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In Partial Fulfillment  
of the Requirements for the Degree  
Doctor of Education

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by  
JOANNA J. ANDERSON  
Dr. Phillip E. Messner, Dissertation Supervisor

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The undersigned, appointed by the dean of the Graduate School, have examined the  
dissertation entitled

AN INVESTIGATION OF STUDENT PERCEPTIONS OF DUAL ENROLLMENT AT  
A MID-SIZED WESTERN COMMUNITY COLLEGE

presented by Joanna J. Anderson,  
a candidate for the degree of doctor of education  
and hereby certify that, in their opinion, it is worthy of acceptance.

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Dr. Phillip Messner, chair

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Dr. Joyce Piveral

---

Dr. Frank Grispino

---

Dr. Max Fridell

---

Dr. David Oehler

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AN INVESTIGATION OF STUDENT PERCEPTIONS OF DUAL ENROLLMENT  
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Joanna J. Anderson

Dr. Phillip E. Messner, Dissertation Supervisor

ABSTRACT

Dual enrollment programs have become prominent across the U.S. Several studies show positive outcomes including increased high school completion, improved postsecondary persistence, and higher college degree completion. This study evaluated one dual enrollment program offered by a mid-sized community college in Wyoming.

This research was the institution's first formal assessment of dual enrollment with respect to students' academic preparation for college, social/personal preparation for college, ability to transfer credits, and overall program satisfaction. The purpose of the research was to provide educators and policy makers with information useful for program improvement and National Alliance of Concurrent Enrollment Partnerships (NACEP) accreditation.

A survey administered in July 2009 provided data for this study. Five null hypotheses were tested utilizing chi-square analysis. Findings were: (1) dual enrollment prepared students academically for the challenges of college, (2) dual enrollment enhanced students' understanding of the college student role, (3) dual enrollment did not help students make college/career path decisions, and (4) students were very satisfied with their dual enrollment experience and recommended the program to others. Number of dual enrollment credits acquired had the most significant relationship with improved academic preparation while location of dual enrollment classes (college or high school campus) had the most impact on students' social acclimation.

## CHAPTER ONE

### INTRODUCTION TO THE STUDY

*“It’s pretty cool that you get college credits for free and normal high school credits, too.”*  
(High School Senior, BOCES Brochure, 2007)

This study explored student perceptions of a site specific dual enrollment program to inform high school and community college policy makers on program effectiveness. Study results will be used to improve dual enrollment practices. This chapter presents: (1) background of the study, (2) conceptual underpinnings, (3) statement of the problem, (4) purpose of the study, (5) research questions and null hypotheses, (6) definition of terms, (7) outline of research methodology, (8) limitations of the study, (9) delimitations of the study, and (10) summary.

#### Background of the Study

High school dropout rates, increased college student remediation, confusing transitions from high school to college, rising costs of higher education, and low college graduation rates are issues educators grapple with and policymakers want addressed (Deil-Amen & Rosenbaum, 2002; Hoffman & Vargas, 2005; NCES, 2004). An initiative that appears promising for ameliorating these concerns and one that is growing nationwide is dual enrollment (Bragg, Kim, & Rubin, 2005; Clark, 2001; Karp, Calcagno, Hughes, Jeong, & Bailey, 2007; Krueger, 2006), an accelerated learning program that allows high school student to take college classes, which generally count as both high school and college credit.

The growth of accelerated learning programs, principally dual enrollment, has been described by some as the largest revolution in secondary and postsecondary

education at the beginning of the twenty-first century (Andrews, 2001; Cesta, 2003; Marshall & Andrews, 2002). However, the benefits of dual enrollment are still being weighed. Several studies indicate positive outcomes for student success and educational efficacy (Adelman, 2004; Brown-Ingles, 2003; Cesta, 2003; City University of New York, 2004; Delicath, 1998; Dipuma, 2002; Florida Department of Education, 2004; Kleiman, 2001; Marshall & Andrews, 2002; Washington State Board for Community and Technical Colleges, 2004), but all call for additional research.

In summary, dual enrollment is a growing phenomenon that shows potential for increasing student educational attainment and success. Research is needed at all levels to ascertain overall effectiveness, student benefits, and possible program improvements.

### Conceptual Underpinnings

Conceptual underpinnings for this study included human capital theory, student integration, and sociological role theory. Accelerated learning programs have developed in an effort to increase educational efficiency, which is important for providing the greatest good for the greatest number of citizens. Education should and does benefit all individuals and all society (not just an elite few), and human capital theory explains why. Lending particular impetus to the push for educational efficiency is public criticism and governmental scrutiny.

Discussion of principles underlying the quest for reform is rare in dual enrollment literature. Most articles elide the “why” question with a passing mention of human capital theory or the need for global competitiveness (or with no mention at all). “Workforce development and human capital theories of economic development provide the underlying concept for growing national concerns about promoting college access and

success for more high school students” (Harnish & Lynch, 2005, p. 170). That one-sentence treatment is typical. Bragg et al. (2005, p. 31) provide this partial sentence in a 34-page report: “. . .the impetus for high school reform comes from increasing demand for skilled employees in the rapidly changing world economy.”

Studying human capital theory, sociological role theory, and the impetus for educational efficiency, in addition to dual enrollment, provided an overview on the subjectivity and adequacy of research. Similar to other studies, the growth and current status of accelerated learning programs, an overview of the different kinds of programs including dual enrollment, and problems dual enrollment is thought to address are discussed in Chapter Two. Criticisms are noted and research on existing programs detailed. The literature review for this study stands apart from others by presenting a critical examination of the impetus for educational efficiency, which has given rise to accelerated leaning programs, particularly dual enrollment.

Summarily, this study attempts to add to the existing body of literature by bringing together concepts in ways not seen before. For example, the five “problems in evaluating dual enrollment programs” can all be found individually in the literature but perhaps have never been put together before in this manner.

#### Statement of the Problem

At the institution under study, college and high school decision makers lack research data on the effects of dual enrollment participation on students—important stakeholders in this growing initiative. Student perceptions regarding the impact dual enrollment has on academic preparation and college student role are unknown. Further, there is a lack of data on transferability of dual enrollment courses and overall

satisfaction with the program. This study will provide educators with a better understanding of how dual enrollment is preparing students for the college experience; results also will be utilized for meeting one of the accreditation standards set by the National Alliance of Concurrent Enrollment Partnerships (NACEP, 2002).

*The Elusive Definitive Quantitative Study of Dual Enrollment*

Dual enrollment programs differ by state and institution. The amount of state funding, promotion, and regulation greatly varies. Some programs target only academically gifted students, some target at-risk or underserved populations, and some attempt to do both. Student demographics vary from region to region (rural vs. urban, rich vs. poor, homogenous vs. racially mixed, etc.). Cooperative agreements may be between high schools (or college high schools) and community colleges or between high schools and both public and private universities. Dual enrollment programs may include only academic transfer courses or may try to include students who do not aspire to four-year degrees. Industry may be given an active role or completely excluded (Barnett, Gardner, & Bragg, 2004; Bragg et al., 2005; Education Commission of the States, 2001; Girardi, 2001; Greenberg, 1989; Hughes & Karp, 2006; Karp, Bailey, Hughes, & Fermin, 2004; Krueger, 2006; Puyear, 1998).

These authors also point out other variations in dual enrollment programs. Dual enrollment courses can be taught in high school classrooms, on college campuses, at industrial training centers, or online as a virtual classroom. Classes can be comprised of all high school students or mixed dual credit and regular college students. Courses may be modified high school courses, specifically designed courses, or regular college classes, and they can be taught by high school teachers, full- or part-time college professors, or

adjunct faculty who may or may not also be high school teachers. In addition to these variables, Hodum (2007, p. 19) tells us there are “. . . 146 inputs (characteristics of the student at the time of initial enrollment) that are a standard part of retention studies.” Controlling for even the major preexisting student characteristics in our hypothetical definitive study would be a massive task.

Certainly Intelligence Quotient (IQ), test scores, and grades must be accounted for in comparing any dual enrollment cohort with nonparticipants. Socioeconomic background greatly influences educational attainment as does ethnicity. The amount of parental involvement and support are important influences whether or not students are first generation college aspirants. Study subjects and the control group would need to have similar previous educational experiences (Bean, 1982; Tinto, 1975).

Intelligence Quotient aside, until researchers can adequately control for student drive or motivation, any study showing statistical advantages for a particular accelerated learning program has a gaping hole in the middle. Whatever combination of nature and nurture is responsible, individuals have different levels of motivation, ambition, and drive. The student who is driven to succeed studies harder, but she also is driven to seek out and take advantage of programs that will speed her on her way. Subsequent success may be partly attributable to the program, but a portion of that subsequent success also is attributable to the preexisting ambition (Davis, 2001; Gough & Bradley, 1996).

#### *In Defense of a Site Specific Study*

Even in the absence of a definitive study, legislators must decide how and how much to regulate, promote, and fund dual enrollment programs. School administrators must make many decisions concerning what accelerated learning on their campus is

going to look like. Parents and students must decide upon degree of participation. If a quantitative study controlling for all pertinent variables is beyond the scope of a single doctoral candidate, site specific research may prove more practical. As the Vice President for Student Services at the selected institution of study, this researcher has the potential to put the local findings into actual practice.

Anderson and Keys (2007) calculated that, after covering investment costs, the after-tax present value of a four-year college degree is \$930,000. If the practical outcome of this research is the improvement of a program that encourages just one student to persist to four-year degree, then such an inquiry may have been more useful than one more study saying dual enrollment students graduate with slightly higher GPAs than nonparticipants.

### *Significance of the Problem*

Community colleges have a responsibility to the constituents they serve and the taxpayers who support them, and in Wyoming, community colleges not only are expected to provide a general transfer curriculum but also programs and services that fulfill the state's workforce needs (Wyoming Governor's Office, 2008). According to the Wyoming Department of Employment (2006), the number of jobs available in the state grew by 5,400 from 2003 to 2004. This is significant in a state with a population of 532,668 (U.S. Census Bureau, 2008). Adding to this workforce challenge is the state's stagnant K-12 enrollment and a 76% high school graduation rate, which is second lowest in the region (Cataldi, Laird, & KewalRamani, 2009). The lifetime loss of income for the 2,095 Wyoming high school dropouts (had they graduated) from the Class of 2006 is calculated at \$545 million (Wyoming Business Alliance/Wyoming Heritage Foundation, 2007).



As a result of these workforce concerns, government officials and business leaders are seeking effective ways to address employment issues and high school to college and/or to work transitions. Through their low cost degree programs and services, Wyoming community colleges are expected to positively impact the number of high school students successfully transitioning to college, completing career-oriented certificates or degrees, transferring to a university, and/or entering the work place. One program that appears promising for helping students move seamlessly from secondary to postsecondary systems, thus promoting students' college aspirations and their chances for postsecondary success, is dual enrollment (Bailey & Karp, 2003).

According to the U.S. Department of Education, students in their first year of college who earn fewer than 20 credits face degree completion challenges. "It is all the more reason to begin the transition process in high school with expanded dual enrollment programs offering true postsecondary course work so that students enter higher education with a minimum of six additive credits to help them cross that 20-credit line. Six is good, nine is better, and 12 is a guarantee of momentum" (Adelman, 2006, Page xx).

Nationally, there has been a large increase in dual enrollment programs and student participation. By 2002-2003, 71% of U.S. public high schools offered dual enrollment (Waits, Setzer, & Lewis, 2005) and by 2005 it was available in all 50 states (Bragg et al., 2005) enrolling some 1.2 million students (Kleiner & Lewis, 2005).

Research released by the Wyoming Department of Education in 2006 reported all seven community colleges offered dual enrollment programs to approximately 2,904 high school students in grades 9-12 (Blake & Azin, 2006). The study showed a total of 281 courses were offered for dual enrollment through community college agreements with 80

different high schools in fall 2005; career/technical education courses comprised 74.4% of the courses.

At the institution under study, 834 students in grades 9-12 took dual enrollment courses during the 2007-2008 school year; the overall pass rate was 84% with 4,086 college credits earned (J. Hoyt, personal communication, March 18, 2009). Data show 50% of the high school seniors and 40% of the high school juniors took at least one dual enrollment class. Overall, students achieved a 3.10 college GPA.

Although these data appear positive for the program in general, there are only anecdotal data on the impact of dual enrollment on students: important stakeholders in this growing initiative. This lack of research data is the problem explored in this study. Local college and high school educators support the study of student perceptions of the dual enrollment experience as they seek program improvement and NACEP accreditation.

### Purpose of the Study

The purpose of this case study was to examine student perceptions of participation in dual enrollment community college courses as measured with the *Central Wyoming Accelerated College Education (ACE/BOCES) Student Follow-up Survey* (see Appendix A). This study specifically explored influencers for student participation (one survey item), academic preparation for college (eight survey items), transferability of credit (two survey items), career decision (one survey item), social experiences (five survey items), and overall experience satisfaction (one survey item). Additionally, the study examined student responses as categorized by high school academic plan, location of dual

enrollment course(s), and college credits earned to determine if relationships were evident.

### Research Questions and Null Hypotheses

The following research questions guided this study of dual enrollment participation, and five null hypotheses were tested. Alpha level .05 was used for all statistical tests.

RQ1. *Perception of academic preparation (survey questions 12a-12h)*. Do students perceive that their dual enrollment participation prepared them academically for the challenges of college? Specifically, do students perceive that dual enrollment strengthened their study skills/habits, writing skills, reading skills, math skills, technical skills, computer skills, and critical thinking skills? Is student perception of academic preparation modified when students are categorized by: (a) high school program of study, (b) location of dual enrollment courses, and (c) number of dual enrollment credits earned?

H<sub>0</sub>1: Dual enrollment student perception of academic preparation is not modified by: (a) high school program of study, (b) location of dual enrollment courses, and (c) number of dual enrollment credits earned.

RQ2. *College student role preparation (survey questions 13a-13e)*. Do students perceive their dual enrollment participation prepared them for the role of college student? Specifically, do students perceive that social/personal preparation for college, academic advising, college friendships, college activity participation, and faculty interaction occurred through dual enrollment? Are college student role experiences modified when

students are categorized by: (a) high school program of study, (b) location of dual enrollment courses, and (c) number of dual enrollment credits earned?

H<sub>0</sub>2: Dual enrollment student perception of the college student role is not modified by: (a) high school program of study, (b) location of dual enrollment courses, and (c) number of dual enrollment credits earned.

RQ3. *Transferability of credit (survey questions 9-10)*. To what extent do students pursue transferring courses, and to what extent do dual enrollment courses transfer to their chosen college or university? Is transferability of credit modified by: (a) high school program of study, (b) location of dual enrollment courses, and (c) number of dual enrollment credits earned?

H<sub>0</sub>3: Transferability of dual enrollment credit is not modified by: (a) high school program of study, (b) location of dual enrollment courses, and (c) number of dual enrollment credits earned.

RQ4. *Career decision (survey question 11)*. Did dual enrollment participation help students choose a college major or career path? Is career decision modified by: (a) high school program of study, (b) location of dual enrollment courses, and (c) number of dual enrollment credits earned?

H<sub>0</sub>4: Dual enrollment student perception of career decision is not modified by: (a) high school program of study, (b) location of dual enrollment courses, and (c) number of dual enrollment credits earned.

RQ5. *Student satisfaction (survey questions 15-16)*. To what extent do students rate and recommend dual enrollment to others? Are student ratings and recommendations

modified by: (a) high school program of study, (b) location of dual enrollment courses, and (c) number of dual enrollment credits earned?

H<sub>0</sub>5: Dual enrollment student satisfaction is not modified by: (a) high school program of study, (b) location of dual enrollment courses, and (c) number of dual enrollment credits earned.

Additionally, data were examined to describe student gender, ethnicity, personal background pertaining to family income and first generation college student status, and influencers for dual enrollment participation.

#### Definition of Terms

Terms important to this study and their definitions include:

*Accelerated College Education (ACE)* is the name for the specific dual enrollment program being studied. This program allows students to enroll in community college classes while still in high school. ACE participation is open to all students in a high school program of study within the community college's service region. No minimum grade point average or other restrictions apply.

*BOCES* is the acronym for the local Board of Cooperative Educational Services, which is a partnership between the local community college and the county school district. BOCES pays for up to nine credits of college courses per semester for high school students.

*Concurrent enrollment* in this study utilizes the definition from the National Alliance of Concurrent Enrollment Partnerships: the opportunity for qualified high school students to earn college credit for courses taught by high school faculty during the normal school day on the high school campus (NACEP, 2002).

*Career and technical education (CTE) students* are those high school students whose academic plans include a series of courses that teach specific workplace skills and knowledge such as computer information systems, personal finance, or welding.

*College track students* are those high school students whose academic plans are to prepare them for college or university with general and advanced coursework in mathematics, English, science, and so forth.

*Dual credit* is utilized in this study as the opportunity for high school students to take college-level courses that count as both high school and college credit, which is consistent with the definition given by Andrews and Barnett (2002).

*Dual enrollment* is an accelerated learning program that allows students to take college classes while still in high school. For the purposes of this dissertation, dual enrollment is the terminology used for all such courses regardless of instructor association, class location, and/or acquisition of dual credit.

*Family income* in this study is categorized as low (<\$33,000), medium, or high (>\$150,000).

*First generation college student* is defined as neither parent having attended college.

*Full Time Equivalency (FTE)* is a number computed by colleges to report enrollment. For this study, FTE equals total credit hours generated divided by 12 (the minimum credits needed for full-time enrollment at the institution of study).

*General academic coursework* is defined as those college courses typically required as part of the general education core for associate's or bachelor's degree

completion, including English, science, mathematics, and history, which is consistent with the institution of study.

*NACEP* is the abbreviation for the National Alliance of Concurrent Enrollment Partnerships, an accrediting body for concurrent enrollment.

*NAEP* is the abbreviation for National Assessment of Educational Progress, which is the only nationally representative and continuing assessment of American students in various subject areas developed by the U.S. Department of Education.

#### Outline of Research Methodology

Data from a survey administered by the Board of Cooperative Educational Services (BOCES) in July 2009 was utilized for this dual enrollment study. Blinded, archival data were provided in a Microsoft Office Excel spreadsheet to the researcher. Chi-square analysis was used to test the null hypotheses (Fraenkel & Wallen, 2003; Morgan, Leech, Gloeckner, & Barrett, 2004; Spatz, 2005). Additionally, a logistic regression model was run for significant relationships involving credit-hour attainment.

#### Limitations of the Study

This study was limited to selected high school graduates and home-schooled students who participated in dual enrollment courses offered by a mid-sized, western community college. The study was limited by the overall sample size of 948. Further, with a demographic composition 93.5% Caucasian (IPEDS, 2009), the institution of study is not characteristic of community colleges nationwide, which have minority populations of 35% (AACC, 2009). Although results of the study are interesting and constructive for program improvements at the local level, the findings may not be

generalized to dual enrollment programs offered by other community colleges in the state or nation.

Data were limited to those students who voluntarily chose to participate in the study by completing the survey. Incorrect addresses and students not being accessible during the survey period also limited the study. Other threats to internal validity included data collection method by the local BOCES office and the assumption that survey participants provided truthful responses (Fowler, 2009; Fraenkel & Wallen, 2003; Morgan et al., 2004).

#### Delimitations of the Study

Objective researchers regularly acknowledge the insignificance of their own work in the larger context: in effect saying there is more that we do not know than what we are sure of. Nearly every study examined on dual enrollment proclaimed the need for a definitive study on the effectiveness of these programs, but each recognized that it fell short of this objective. A truly definitive study of dual enrollment controlling for all pertinent student variables (motivation, college entrance test scores, high school grade point average, socioeconomic status, etc.) was beyond the scope of this doctoral student and an intentional delimitation of this study.

This case study was limited to the target institution, a mid-sized, western community college, and a purposefully selected sample of 948 students who had participated in its dual enrollment program in 2007 and 2008. The particular site, the target institution, and the four surrounding high schools were delimitations of this study. Further, results were limited only to those individuals choosing to respond, which may not be representative of the group as a whole. As a result of these delimitations, results of



this study are not generalizable to community colleges and dual enrollment programs overall.

### Summary

Dual enrollment, an accelerated learning program that has experienced rapid growth nationwide during the last 10 years, appears promising for ameliorating educational attainment concerns held by educators and policy makers. These concerns include: high school to college disconnect, duplication of coursework, college remediation, lack of challenge for highly intelligent students, nonpersistence of at-risk students, time to college degree, and cost of college degree. Definitive research on dual enrollment efficacy is limited by the challenge of controlling for numerous student variables and program differences.

This quantitative case study examined student perceptions of one community college's dual enrollment program to inform policy makers on program effectiveness and potential improvement. An overview of dual enrollment, reasons for a case study, and conditions surrounding the institution of study were presented in Chapter One. Purpose of the study, research questions and hypotheses, relevant terms, research methods used, and limitations also were described.

Chapter Two details the impetus for educational reform resulting in the growth of accelerated learning programs and focuses on dual enrollment. A literature review of human capital theory and sociological role theory, which undergird this study, precedes a presentation of potential benefits and problems associated with dual enrollment and current research. Chapter Three explains the research methodology, including a description of the sample, survey instrument, data collection procedures, and data

analysis. Results of this research are reported in Chapter Four, and findings, conclusions, and recommendations for future study are described in Chapter Five.

## CHAPTER TWO

### THE LITERATURE REVIEW

*“Your goal in conducting a literature review is to know what your topic is all about, why the forces that shape your topic have the impact they do, and how your topic fits in the larger scheme of events and matters.”* (Bryant, 2003, p. 64)

This literature review covers the historical events surrounding the dual enrollment phenomenon and the impetus for educational reform, which are foundational to one of the study’s conceptual underpinnings: human capital theory. Two additional theories undergird this study: student integration and sociological role theory. This chapter presents: (1) the impetus for educational efficiency; (2) conceptual underpinnings; (3) accelerated learning programs, which explores the benefits and challenges of such programs, describes the current state of dual enrollment, and reports the findings of recent dual enrollment research; and (4) summary.

By presenting a critical examination of the impetus for educational efficiency, which has given rise to accelerated leaning programs – principally dual enrollment –, this literature review stands apart from others. An extensive dual enrollment literature review by Swanson (2008) expounds on reference group theory (sociological role theory in this study), the theory of individual departure from institutions of higher education, transition to college, and social and academic integration.

#### Impetus for Educational Efficiency

The condition of the American public education system has been generating headlines at least since a post-Sputnik 1958 cover of *Life* magazine declared “Crisis in Education” (*Life*, 1958). Perhaps no study generated more headlines than the Reagan White House's release of *A Nation at Risk: The Imperative for Educational Reform*

(National Commission on Excellence in Education, 1983, p. 1), which said, “If an unfriendly foreign power had attempted to impose on America the mediocre educational performance that exists today, we might well have viewed it as an act of war.” In response to the highly publicized criticisms, public school educators scrambled to implement programs that increased educational efficiency and effectiveness. This portion of the literature review is foundational to understanding the impetus for educational reform and the myths of public school failure by presenting data verifying that efficiencies have occurred. One of the major educational efficiencies implemented and expanded in the last 20 years is that of dual enrollment.

*A Nation at Risk and Myths of Public School Failure*

*A Nation at Risk* proclaimed, “There was a steady decline in science achievement scores of 17-year-olds as measured by national assessments (NAEP) of science in 1969, 1973, and 1977” (National Commission on Excellence in Education, 1983, p. 9). Bracey (2003) points out that the commission studied nine trend lines (three ages in three subjects) and chose to highlight the only one that supported (with extrapolated data) their crisis postulation. According to the Thomas B. Fordham Institute (Finn et al., 2000) those same scores today “. . . remain essentially flat at an unacceptably low level” (p. 5). Conversely, Krueger (1998) found that NAEP scores have increased by .06 standard deviations per decade. The most disadvantaged had the most gains, with African-American 17-year-olds closing the NAEP gap with White students by 50% between the early 1970s and 1990 before losing some ground after 1990.

NAEP science scores for all 17-year-olds were 290 in 1977 and 295 in 1999. Math scores were 300 in 1978 and 308 in 1999. Reading scores were 285 in 1971 and

288 in 1999 (Campbell, Hombo, & Mazzeo, 2000). This increase occurred while the nation absorbed one of the largest waves of immigration in its history, with Hispanic enrollment increasing from 6% in 1972 to 20% in 2005. Total minority enrollment rose from 22% in 1979 to 42% in 2005. The number of students who spoke English with difficulty doubled from 3% in 1979 to 6% in 2005, and special-education enrollment rose from 8% of the total to 14% (NCES, 2007).

*A Nation at Risk* said that Americans were never first or second and were often last in international test-score comparisons. “If only to keep and improve the slim competitive edge we still retain in world markets, we must dedicate ourselves to the reform of our educational system . . .” (National Commission on Excellence in Education, 1983, p. 2). International tests compare all American students against sometimes more homogenous foreign cohorts. Bracy (1994) broke down American test takers into component groups and ranked those groups as if they were countries. Asian-Americans outscored Asians in other countries. The rankings were: (1) Asian-Americans, (2) Taiwan, (3) Korea, (4) advantaged urban American students, and (5) White American students.

Much of what affects international competitiveness has little to do with middle-school test scores (Cremin, 1990). Ramirez, Xiaowei, Schofer, & Meyer (2006) compared changes in Gross Domestic Product (GDP) in 38 countries in two 20-year periods with various international test comparisons. Overall, they found little correlation between economic growth and test scores except in cases where test scores were the very lowest there was some correlation to a lower economic growth.

*A Nation at Risk* asserted that increasing mediocrity in U.S. public education would cause our global competitiveness to plunge unless dramatic reforms were made (National Commission on Excellence in Education, 1983). Critics of public schools tell us, “Every word of that indictment is as true in 2003 as in 1983. The tide of mediocrity remains high” (Peterson, 2003, p. 21). Despite these predictions, the World Economic Forum’s (2008) *Global Competitiveness Report* ranks the United States first among nations in global competitiveness in 2007-2008.

Another widely disseminated and accepted view about public education is that real (inflation-adjusted) per-pupil spending has doubled over the last quarter-century (Chub & Hanushek, 1990; Deparle, 1993; Odden, 1992; Schmidt, 1992). Rothstein and Miles (1995, updated 1997) argues that the Consumer Price Index understates inflation in service industries such as education. The “Baumol effect” (Baumol, 1967) points out that manufacturers can more easily increase efficiency and hold down costs than can a barber give more haircuts in a day.

Using what they believed to be a more appropriate inflation assessment, Rothstein and Miles (1995) calculated that education spending grew 61% between 1967 and 1991 instead of the 100% normally quoted. However, when taking into account increases in spending for federally mandated programs (special education, lunch and breakfast programs, bilingual education, attendance programs, dropout counseling, etc.), the increase for “regular” education was about 28% between 1967 and 1996. Since two-thirds of regular education funds go for teachers’ salaries and benefits, much of this 28% had gone for an increase in real teacher compensation. In a market economy, whether this

increase is justified is judged by whether there is a surfeit of applicants for teaching positions (Rothstein & Miles, 1995).

*A Nation at Risk* said, “For the first time in the history of our country, the educational skills of one generation will not surpass, will not equal, will not even approach, those of their parents” (National Commission on Excellence in Education, 1983, p. 4). Greene and Winters (2005) of the free-market Manhattan Institute for Policy Research state, “In the class of 2002, about 78% of White students graduated from high school with a regular diploma, compared to 56% of African-American students and 52% of Hispanic students” (p. 2). Mishel and Roy (2006) contend that data showing a 69% overall graduation rate are based on less-than-ideal methodology.

The U.S. Census Bureau (2007) tracks educational attainment of American citizens. This graduation rate has shown a steady increase over the years for all categories and is now at the highest level ever. In 2007, 86% of all Americans 25 or older had high school diplomas or GEDs and 29% had at least a bachelor’s degree. Twenty-seven percent of those who do drop out of high school today are Hispanic immigrants born outside the U.S. (NCES, 2007).

When *A Nation at Risk* was released in 1983, the high school completion rate was 72% (now 86%) and college degree completion was 19% (now 29%). Graduation rates for minorities have improved more than for the population as a whole. Fifty-seven percent of African-Americans had high school diplomas in 1983; 82% do now. College completion rates for African-Americans were 9.5% in 1983 and 18.5% in 2007. The high school completion rate for Hispanics was 46% in 1983 and 60% in 2007 (U.S. Census Bureau, 2007).

The United States has the highest level of college completion in the world and the rate continues to climb. In 2002, 29% of Americans aged 25-64 had four-year college educations. Japan had the second-highest college completion rate at 20%; the United Kingdom had 19%, Germany 13%, and France 12% (OECD, 2004). According to *The Condition of Education: 2007*, minority enrollment in graduate degree programs in the U.S. increased 269% from 1976 to 2005 and 331% in first professional programs (NCES, 2007).

U.S. high school students in 1982 graduated with 21.7 credits. Today, they take 25.8 credits—a 19% increase. This increase includes more English and foreign languages. Algebra and advanced math credits increased from 1.9 to 3.1, and the number of chemistry and physics credits nearly doubled (NCES, 2007). The number of American high school students who took Advanced Placement (AP) exams increased 160% between 1984 and 1997 (NCES, 2000) and then doubled from 1997 to 2005 (NCES, 2007).

Alas, we must recognize that good news about public schools serves no one's reform agenda . . . Conservatives want vouchers and tuition tax credits; liberals want more resources for schools; free marketers want to privatize the schools and make money; fundamentalists want to teach religion and not worry about the First Amendment; Catholic schools want to stanch their student hemorrhage . . . All groups believe that they will improve their chances of getting what they want if they pummel the publics. (Bracey, 2003, p. 670)

In summary, the 1983 report *A National at Risk: The Imperative for Educational Reform* by the National Commission on Excellence in Education generated negative



headlines for public education and provided impetus for educational reforms. Further, the myths of public school failure were exposed and evidence of efficiencies presented.

### *Basic Philosophical Framework*

Much of the conflict that exists in society today is the tension between two great competing moral philosophies—ethical egoism and utilitarianism. Understanding these competing philosophies is critical to one conceptual underpinning of this study—human capital theory.

Descriptive or psychological egoism says that people always do act selfishly. Prescriptive or normative ethical egoism states that all personal choices should involve self-promotion as the only objective (Beauchamp & Bowie, 1997). When people with societal influence subscribe to egoism, societal laws become geared toward those with influence in a perpetuating cycle. Government or an economy of, by, and for an elite few is fine by and a natural outgrowth of ethical egoism.

Utilitarianism says the overriding principal in societal decision making should be the greatest good for the greatest number of people (Beauchamp & Bowie, 1997). Adequate nutrition, protection from the elements, access to health care, and freedom from fear are agreed to be intrinsically good things to have. Utilitarianism envisions a society with small numbers of rich and poor and the greatest majority comfortably provided with the necessities of life.

An early pioneer of utilitarianism proposed an algorithm (the felicific calculus) by which outcomes of actions could be assigned numerical values, giving mathematical certainty to moral judgments (Bentham, 1789). Subsequent philosophers recognized the

impossibility of evaluating intended and unintended future consequences numerically and noted that moral decisions are often made with imperfect knowledge (Fox, 1912).

America's brightest kids compete well with the brightest kids in any nation (Bracy, 1994). Before the advent of universal public education in the late 19th century, higher education in America was reserved for the privileged few (McConnaha, 1996). Today, U.S. public schools educate all Americans—minorities, special-education students, non-English speakers, and students with all manner of characteristics that put them at risk for not thriving in society. Public education leaves no child behind. Educators who subscribe to the greatest good theory believe that this is as it should be. Educators care about their students individually and believe in education and equal opportunity for all, not just for an elite few. Teachers and administrators believe that all of society benefits from education, a belief that is supported by human capital theory.

#### Conceptual Underpinnings

The U.S. spent \$972 billion on education during the 2006-2007 school year (NCES, 2008). It is valuable to understand how this investment is justified. The collective capabilities of the workforce that are useful for production is called human capital (Psacharopoulos, 2006). In the early 1960s, U.S. economists realized that national income was growing much faster than what could be accounted for by the growth of factories and equipment and increases in the labor force. Economist T. W. Schulz (1961) suggested investment in human capital could explain the growth puzzle. Other pioneering works in the field include those of Becker (1964) and Mincer (1974).

### *Human Capital Theory and the Benefits of Education*

Human capital theory examines the investment needed to develop human capital and the returns generated. There are private and public (social) costs in the educational process and also private and public benefits. Direct private costs of a college degree are the tuition, housing, books, and so forth a student or parent pays out of pocket. The four or five years of earnings the student gives up while attending college are a private indirect opportunity cost. Public costs are the taxpayer subsidies incurred in a student's education.

There is a great deal of research that indicates education is an excellent investment for individuals and for society as a whole. Any future increase in yearly earnings first must cover the direct and indirect costs of the additional education. Future earnings must also be discounted for the time-value of money figuring that money earns interest over time. Anderson and Keys (2007) calculated that, after covering investment costs, the after-tax present value of a four-year college degree is \$930,000. In other words, the average college graduate should be economically indifferent whether she/he receives a lifetime of increased earnings, or what she/he would have alternatively made with a high school diploma plus an immediate check for \$930,000. The present value to the government of future tax collections from the college degree is figured to be \$117,000 (Anderson & Keys, 2007). A high school dropout earns about \$260,000 less during his/her lifetime than a high school graduate and pays about \$60,000 less in taxes (Rouse, 2005).

On average, individuals realize a 10% annual return from the private contribution to their educations (McMahon, 1991; Psacharopoulos & Patrinos, 2004). According to

the latest Labor statistics, the U.S. government gets a 10.5% annual rate of return in the form of increased tax collections from financing public education through the high school level, and a 15% return for financing public education through college completion (McMahon, 2006). This compares favorably with returns the government gets from some of its other investments. Surplus Social Security funds, for example, are invested in U.S. Treasury securities, which currently pay from 1.83% for one-year notes to 4.4% for thirty-year bonds (Star Business Weekly, 2008).

Direct returns from educational investment are impressive but tell only a small portion of the story. There are many indirect (non-market, macro, or external) benefits as well. Research shows that increased levels of schooling lead to increases in social equality, lifespan, health, civic participation, political stability, economic stability, volunteer work, support for human rights, savings rate, charitable giving, conservation awareness, parenting skills, and racial tolerance. Increasing the level of education decreases unemployment, crime, out-of-wedlock pregnancies, child mortality rates, smoking, obesity, depression, cynicism, private and public expenditures for health care, and unquestioning acceptance of dogma (Bynner et al., 2003; Cohn & Kiker, 1986; McMahon, 2006; Wolfe & Zuvekas, 1997).

The incremental, external social benefits from increasing levels of education are dramatic, quantifiable, and supported by many studies. Twenty-seven percent of non-high school graduates 25 to 44 years old vote, compared to 49% of high school graduates, 64% of those with some college and 76% of those who have a bachelor's degree or higher (U.S. Census Bureau, 2005, Table 5). In 2002, 16% of new mothers with high

school diplomas smoked during pregnancy, compared to 9% of those with some college and 2% of college graduates (CDC, 2004).

Fifty-three percent of non-high school graduates have multiple risk factors for heart disease, while 44% of high school graduates, 37% of those with some college, and only 26% of college graduates do (CDC, 2005). Thirty percent of non-high school graduates do volunteer work, versus 40% of graduates, 55% of those with some college, and 65% of those with bachelor's degrees or more (CPECF, 1997). Wolfe and Haveman (2003) identify seven independent studies which affirm that the probability of out-of-wedlock teen pregnancy is inversely related to the educational attainment of the teens' mothers. Differences in income, wealth, ethnicity, and access to health care explain only a fraction of the difference in health status by education level (Ross & Wu, 1996). Mirowsky and Ross (2003) identified several studies that indicate education-fostered skills and attitudes lead to more responsible behaviors.

Education level (unlike test scores) is empirically credited with increasing global competitiveness. Sianesi and Van Reenen (2003) reviewed current research and concluded that, conservatively, an increase of one year in the mean years of schooling for a nation results in a higher growth rate of 1%. This is statistically significant in a world where a 2% yearly growth in GDP is considered disappointing, a 3% growth is average, and 4% is very good (Edgmand, Moomaw, & Olson, 1996).

Economists conclude that the societal external return on human capital investment is about equal to the direct return from increased tax collection. In other words, society reaps a 20-30% annual return on its investment in public education (Krueger & Lindahl, 2001; McMahon, 1999, 2004, 2006; Wolfe & Haveman, 2003). Governments all over the

world recognize that a 20-to-30 percent return is unheard of in any large-scale long-term investment and subsidize education in their countries to the greatest extent they can afford (NCES, 2007; OECD, 2005). The greatest investment any nation can make is in its own people.

No theory that promotes the value of public education is allowed to go unchallenged. The screening hypothesis (also known as the sheepskin effect, credentialism, the signaling process, sorting model, self-selection, etc.) directly opposes human capital theory. “According to this hypothesis, those with more schooling are typically more productive to begin with, indicating that the skills acquired in school may not contribute much (if at all) to subsequent job-related productivity” (Gullason, 1999, p. 141). Again, the literature in the field is a maze of dueling studies between human capital theorists (Arabsheibani, 1989; Lambropoulos, 1992; Layard & Psacharopoulos, 1974) and their opponents (Gullason, 1989; Hungerford & Solon, 1987; Miller & Volker, 1984). Human capital theory proponents agree that preexisting characteristics account for some of the correlational benefits from education, and use equations to control for this influence (Psacharopoulos, 2006).

#### *Tinto's Student Integration Model*

Human capital theory emphasizes that every additional year of schooling is beneficial both to the individual and to society. As a consequence, student retention has long been a focus of research in higher education. This research has led to the development of student integration models (SIMs) which try to explain student retention or attrition in order to increase college persistence. Tinto's integration model, originally proposed in 1975 and last revised in 1997, is based on Durkheim's (1951) suicide theory;

Van Gennep's (1961) separation, transition, and incorporation phases; and Spady's earlier (1970, 1971) integration model (Hodum, 2007; Jong, Sikkema, & Dronkers, 1997).

Tinto's (1997) integration model suggests that student persistence is determined by the degree to which students integrate (1) socially and (2) academically into their institution of higher learning. The degree of social and academic integration is influenced by the student's commitment to obtaining a degree and commitment to that particular institution. Commitment itself is in turn determined by the student's background (family background, skills and abilities, prior schooling, etc.).

Jacobi (1991) states that Tinto's SIM has many characteristics in common with and is often used interchangeably with Astin's (1970) input-environment-outcome (I-E-O) model of involvement. Jacobi explains that Astin focuses on student behavior as affected by student attitude while Tinto emphasizes the attitude that leads to the behavior (Hodum, 2007). A great deal has been written defending and criticizing Tinto and suggesting alternative integration models, but Tinto's remains the standard by which all others are judged (Braxton, 1999, 2000; Braxton, Hirschy, & Mclendon, 2004; Braxton, Sullivan, & Johnson, 1997; Pascarella & Terenzini, 1995; Pascarella, Terenzini, & Wolfe, 1986).

In summary, this section expounded on two conceptual underpinnings that support dual enrollment: human capital theory and Tinto's student integration model. A third conceptual underpinning, sociological role theory, will be presented following the discussion of problems in secondary and postsecondary education since it may provide the justification for dual enrollment's perceived positive impact on such disparate issues.

## Accelerated Learning Programs

A number of incentives exist to increase efficiency in public education. First, educators have always been aware of the public trust—the responsibility for our nation’s future placed upon us by society. Human capital theory explains that global competitiveness, economic growth and therefore prosperity, even political stability, social equality, and health of our citizenry are affected by how well future generations are educated. Second, each individual student’s future and that of his or her family is positively influenced when educators do their jobs well. Finally, the depth, apparent sustainability and political success of the attack on public education lend particular urgency to efforts to improve education. The potential risks for our nation and its citizens from demolishing public education are too substantial to be taken lightly.

### *Problems in Secondary and Postsecondary Education*

Poverty, divorce, single parenting, homelessness, teen pregnancy, racial inequality, family instability, crime, assimilation of immigrants, drug and alcohol abuse, and child abuse and neglect are societal problems. In inner cities where these problems are more concentrated, many public schools are struggling with less success than educators and policy makers would like to see. However, in spite of the rhetoric, these societal problems are ameliorated by education, not caused by it. The courts, police, churches, families, and other social and political institutions struggle with these societal problems just as do public schools.

There have been, however, problems identified in secondary and postsecondary education that educators may have some control over. The growth of certain accelerated learning programs is described by some as the largest revolution in secondary and



postsecondary education at the beginning of the 21st century (Andrews, 2001; Cesta, 2003; Marshall & Andrews, 2002). The problems that accelerated learning programs are posited to have a positive effect on are several and diverse:

- College persistence—although America has by far the greatest college completion rate in the world (OECD, 2004), the potential for further improvement is large. Almost two-thirds of high school graduates enroll in college their first year out of high school, but only 29% of Americans have bachelor’s degrees (NCES, 2006, 2007). Hoffman and Vargas (2005) say a third of enrollees drop out their first year of college, and only half persist to four-year degrees. For minorities, the statistics are worse.
- Time to college degree—bachelor degree recipients in 2000 who had not stopped out of college averaged 55 months from enrollment to degree completion (NCES, 2003). From September of year one to May of year four would be 45 months, so the average was nearly two extra semesters for a four-year degree.
- Cost of college degree—college cost increases since 1990 have outstripped the rate of inflation and growth in median family income (NCES, 2004). Opportunity costs from spending a year in college instead of in the workforce are even larger than the direct costs of a year of college. Since government subsidizes both secondary and postsecondary education, reducing the average time-to-degree would mean significant savings for students, parents, and taxpayers.
- Senioritis—by their senior year, many high school students have already met their basic requirements for graduation, and accomplishments that will determine college admittance have already been achieved (Dipuma, 2002). “The majority of

college bound seniors admit that their final year of high school is a waste of time” (Botstein, 2001, p. 25). According to the National Commission on the High School Senior Year (2001), “. . . serious preparation ends at Grade 11” (p. 6).

- Duplication of coursework—general education courses taken the first two years of college often duplicate courses taken the last two years of high school (Blanchard, 1971). While this duplication may be of some benefit, it can also be a waste of resources (Greenburg, 1989).
- College remediation—nearly 60% of community college and 29% of four-year college freshmen take at least one remedial course (Attewell, Lavin, Domina, & Levy, 2006). Obviously, time, money, and resources are expended when teaching concepts in college that should have been mastered in high school, and high rates of remediation also are associated with higher rates of collegiate nonpersistence (Deil-Amen & Rosenbaum, 2002).
- High school/college disconnect—high school graduation requirements often fall short of requirements needed to enter college (The Education Trust, 1999). High school students correctly believe they can get into some college somewhere without taxing themselves, but fail to understand that they will need remedial courses and are endangering their chances of college success (Rosenbaum, 1998). Another aspect of this disconnect is the variance in testing between high school and college. High school students take state assessment tests, which are not used for college eligibility, and students have little incentive to take them seriously. College bound students take SAT or ACT tests, which cover material not taught in high schools. Upon arrival at college, freshmen take still a third set of tests for

academic placement, which often cover material not covered by the first two tests (Ascher, 1998; Boswell, 2001b; Brown-Ingles, 2003; Hoffman & Vargas, 2005).

- Boredom/nonpersistence of academically gifted students—high ability students need challenging courses, which often are lacking in secondary schools. While society benefits from the education of students with all levels of ability, the greatest individual potential is still with the best and brightest. Students with high intelligence are particularly vulnerable to boredom and subsequent disengagement from the educational process as curricula are necessarily geared toward slower or average students. Accelerated learning programs were originally developed to allow students with high academic ability to race ahead at their own pace (Cattell, 1963; Hunt, 1961; McConnaha, 1996).
- Nonpersistence of at-risk students—although it is important to keep the best and brightest engaged in the educational process, it is recognized that a high percentage of these students will persist to college degrees. High-ability/low-achieving students comprise a smaller pool of potential college graduates than is to be found among less able students. Average and moderate-achieving students have been shown to have the ability to do quite well in college-level courses (Greenburg, 1989, Gurule, 1996). Economic wherewithal, encouragement from families, prior schooling, self-image, racial background, or a host of other background characteristics (as identified by Tinto) put some students at risk for noncompletion of college degrees, vocational certificates, or even high school diplomas (Dipuma, 2002; Farrell & Siefert, 2007; Harrell & Forney, 2003).

To the extent that dual enrollment programs help at-risk students, they promote social and racial equality. These programs also are thought to encourage professional development of high school faculty, enhance the image of community colleges, promote college/community relations, extend and enrich high school curricula, and aid in student recruitment by colleges (Boswell, 2001a; Missouri Coordinating Board, 1999; Oregon University System, 1999; Swanson, 2003).

### *Sociological Role Theory*

How can dual enrollment have a positive effect on such disparate problems—be of benefit to both the academically gifted and academically challenged student? Karp (2007) suggests that sociological role theory helps explain dual enrollment's versatility.

Role theory says that individuals pattern their behavior in society after established roles. The expectations of society model the behavior of individuals—people try to behave in ways so that they will “fit in.” Individuals play many roles simultaneously. When two roles conflict with one another, the individual enacts the behaviors of the role most important in any given circumstance. Throughout life, one must adopt new roles and discard old ones. These role changes can be forced, as in graduation from high school, or voluntary, as in marriage. The behaviors that are normative for any given role also change with time. Individuals enact the same role in different ways—one student may emphasize studying more than another. While role behavior may be partially an “act” in the beginning, with time the role-related expectations become integrated into self-concept. (Biddle, 1986; Blumer, 1969; Smith & Mackie, 2007; Stark, 2000; Turner, 1990).

Roles model the proper behaviors, attitudes, and values without the necessity for trial and painful error. The trick, of course, is in achieving beforehand a proper understanding of what is expected in a given role. The process by which aspirants learn the norms of a role is called anticipatory socialization. Anticipatory socialization covers virtually all preparatory activity, but watching, listening and practicing (role rehearsal) are most important (Merton, 1968; Smith & Mackie, 2007; Stark, 2000). Internships and apprenticeships are rehearsals for the role of employee; babysitting can be rehearsal for the role of parent; and dual enrollment gives high school students a chance to practice ahead of time for the role of college student.

Karp (2007) states that “. . . one reason students may fail to persist in postsecondary education is their lack of understanding of the normative demands placed on college students, and their inability to enact those demands successfully” (p. 10). She also states, “. . . actors unable to successfully enact a role are likely to seek out alternative positions in the social structure, exiting the role in favor of other, more easily enacted ones” (p. 6). Since the transition from high school student to college student must be dealt with by underachievers as well as overachievers, role theory suggests that dual enrollment may aid both groups by promoting college persistence through role rehearsal.

Karp’s (2007) study found that New York City’s College Now dual enrollment program does, in fact, sharpen participants’ conceptions of the role of college student. Eighteen of 26 at-risk students studied “were able to articulate the demands of the role more clearly, more strategically, and with greater depth of understanding” (p. 31) due to their enrollment in College Now.

### *Types of Accelerated Learning Programs*

Just as there are several problems identified in secondary and postsecondary education, there have been several types of accelerated learning programs developed to deal with those problems. These also are sometimes called transition programs because they ease the transition from high school to college or from college to the workforce (Plucker, Chien, & Zaman, 2006). The most common accelerated learning programs include:

- Advanced Placement (AP)—high school students take advanced courses taught by specially trained teachers and then take an AP exam. With a score of three or better out of five (depending on the institution), the student is able to obtain college credit for the course (Plucker et al., 2006).
- International Baccalaureate (IB)—a two-year comprehensive high school program of advanced class work designed to promote international understanding and cooperation. Many colleges grant college credit with successful completion of IB exams (IBO, 2002; Michelau & Prescott, 2005).
- College Level Entrance Program (CLEP)—students take an exam for a particular subject covering basic knowledge expected to be taught in an introductory college course in that subject. With a passing score, the student gets college credit for the course (Bragg, Kim, & Rubin, 2005).
- Tech Prep—not necessarily associated with a four-year degree, Tech Prep encompasses the last two years of high school and two years in a postsecondary program leading to certification and matriculation into the workforce (Hughes &

Karp, 2006). College credit in Tech Prep is articulated, meaning college credit is not awarded until completion of further requirements (Kerr, 2001).

- Middle College High Schools (MCHS)—often targeting at-risk populations, these are high schools administered by colleges and provide a seamless secondary-postsecondary transition. Students often graduate in four or five years (instead of six) with A.A. degrees or enter four-year colleges as juniors (Krueger, 2006; Plucker et al., 2006).
- Early College High Schools (ECHS)—supported by the Bill and Melinda Gates Foundation, these schools are located on or near college campuses and blend high school with the first two years of college. The middle college high school concept is morphing into the early college high school concept (Feemster, 2002), with the main difference being more emphasis on (indeed a mandate for) dual enrollment (Jordon, Cavalluzzo, & Corallo, 2006). ECHSs also make liberal use of Tech Prep, Advanced Placement, and International Baccalaureate (Hoffman & Vargas, 2005).
- Dual enrollment/dual credit/concurrent enrollment—often used interchangeably, “dual enrollment” is becoming the preferred usage (Bailey, Hughes, & Karp, 2002). Technically, dual credit describes the process by which students get both high school and college credit for the same course. With dual enrollment, the student also is enrolled in high school and college at the same time but may or may not get high school and college credit for the same class (Barnett, 2003; Kim, Kirby, & Bragg, 2006).

### *Current State of Dual Enrollment Programs*

Dual enrollment programs are a fact of life in American higher education. Seventy-one percent of U.S. public high schools offered dual enrollment by 2002-2003 (Waits et al., 2005), and by 2005 it was offered in all 50 states (Bragg et al., 2005) enrolling some 1.2 million students (Kleiner & Lewis, 2005). Early programs targeted academically prepared students, but more and more dual enrollment is expanding to include average, at-risk, and under-achieving high school students (Clark, 2001; Karp et al., 2007; Krueger, 2006). Currently, about one-third of states tie their dual enrollment policies to the promotion of college attendance among underserved students (Bragg et al., 2005).

### *Criticisms of Dual Enrollment Programs*

The literature describes several issues and concerns with dual enrollment programs. The common criticisms include:

- Course quality—educators must be alert that dual credit courses are not “watered down” to accommodate high school students with consequent grade inflation and cheapening of similar college-only courses (Clark, 2001; Davis, 2001).
- Transferability of credit—because of doubts about course quality, acceptance of dual enrollment credit by four-year institutions has not been automatic (Barnett, 2003). Sometimes this is no fault of the program; some four-year college academic departments maintain “gatekeeper status,” demanding prerequisite courses that are only acceptable if taken at their institution (Hoffman & Vargas, 2005).



- High school experience—students report that the amount of extra effort required for dual credit courses left them less time than desired for friends and for extracurricular high school activities (Fortier, 1995; McConnaha, 1996; Tollefson, 1994).
- College integration—while some students feel shortchanged in their high school experience, others feel less than fully integrated into college life (Midcap, 2002). As Tinto stresses the importance of social as well as academic integration to student retention, a pressing question is whether this lack of connection is overcome or carried over when these students become full-time college students.
- Inadequate advising—many dual credit students and researchers expressed a need for more advisement at either the high school or college level (Davis, 2001; Midcap, 2002) or both (Hughes, Karp, Fermin, & Bailey, 2005). According to a U.S. Department of Education survey, in 2003 the ratio of high school counselors to students was 284 to 1 (Parsad, Alexander, Farris, & Hudson, 2003).
- Inadequate recruitment/dissemination of information—one college registrar in Makela’s (2005, p. 28) snapshot of dual credit in Illinois said, “This survey is a reminder that we need to make our policy more formal.” Information was most commonly passed along by word of mouth. “Student handbooks, course catalogs and websites should include clear and unambiguous information about dual credit” (Makela, 2005, p. 28). McCarthy (1999) says lack of information can effectively eliminate a year of dual enrollment experience, and information dissemination should begin in middle school. Hughes et al. (2005) say that dual

enrollment programs could benefit from formal recruitment strategies involving middle and high school guidance counselors, parents, teachers, and students.

- Double dipping—double dipping occurs when both colleges and high schools receive state aid for the same student in the same class. Many programs are deliberately designed this way to promote dual enrollment, but some critics believe the extra educational investment is unjustified (Andrews & Barnett, 2002; Bailey, Hughes, & Karp, 2002; Farrell & Seifert, 2007; Harnish & Lynch, 2005).

Proper design with adequate assessment and oversight are necessary to maintain the integrity of programs and ensure credit acceptance by colleges (Fincher-Ford, 1997; Krueger, 2006). The more closely dual credit classes mirror traditional college classes (taught on campus, with college professors and with college students in the classroom), the more integrated dual credit students feel (Burns & Lewis, 2000; Karp, 2007; Reisberg, 1998).

It is not surprising that students give something up (the high school experience) in order to participate in accelerated learning programs. Evaluation of present cost vs. future benefit is one of those personal fuzzy logic decisions individuals must make every day. Whether states get an adequate return from their educational investment in the form of student and societal outcomes (should double dipping occur or not) is, of course, the ultimate question of all research on dual credit and the focus of the debate between human capital theory and the screening hypothesis.

### *Career Pathways*

A recent effort to promote academic success for average or at-risk students and more closely tie curriculum to industry needs is the development of career pathway

programs. Career-technical education (CTE) classes in some states are a larger component of dual enrollment than academic transfer classes—in Illinois in 2002 there were 8,952 CTE enrollments compared to 5,633 academic transfer classes (Barnett, Gardner, & Bragg, 2004). Nearly three-fourths of the courses offered for dual enrollment in Wyoming are CTE classes (Blake & Azin, 2006).

Harnish and Lynch (2005) found that many students who could benefit from career-technical education were not being reached. Bragg (2001) discovered high school CTE enrollees often are not aware that their classes could generate college credit, and Hershey, Silverberg, Owens, and Hulsey (1998) concluded there is insufficient effort to encourage CTE students to obtain college degrees. “Unfortunately, the message received by students who are enrolled in career or technical courses is that they are not preparing for college” (Uzureau, 2001, p. 10). Often, applied associate degrees which are awarded to Tech Prep students will not substitute for the first two years of a bachelor’s degree (Hughes & Karp, 2006).

“A career pathway is a coherent, articulated sequence of rigorous academic and career courses, commencing in the ninth grade and leading to an associate degree, an industry recognized certificate and licensure, or a baccalaureate degree and beyond” (Hughes & Karp, 2006, p. 2). Career pathways seem to be a refinement of traditional Tech Prep, with earlier enrollment, more rigorous coursework and advising, seamless secondary-postsecondary cooperation, and more emphasis on college degree completion. Some career pathway efforts replace articulated Tech Prep credit with immediate dual credit (Uzureau, 2001). There is particular effort to erase the division between academic

and career-technical education and to encourage employer participation in the process (Hughes & Karp, 2006).

### *Problems in Evaluating Dual Enrollment Programs*

Evaluating dual enrollment is challenging for researchers due to the great variety of programs and differences in administration, regulation, and funding. Lack of data, self-selection, student accessibility, and institutional swirling compound the problem.

*Variability.* Dual enrollment programs vary by state and institution. The amount of state funding, promotion, and regulation greatly varies. Some programs target only academically gifted students, some target at-risk or underserved populations, and some attempt to do both. Student demographics vary from region to region (rural vs. urban, rich vs. poor, homogenous vs. racially mixed, etc.). Cooperative agreements may be between high schools (or college high schools) and community colleges or between high schools and four-year universities. Dual enrollment programs may include only academic transfer courses or may include career-technical courses. Industry may be given an active role or completely excluded.

Dual enrollment courses can be taught in high school classrooms, on college campuses or at an industrial training center, or they can be taught online or in a virtual classroom. Classes can be comprised of all high school students or mixed dual credit and regular college students. They may be modified high school courses, specifically designed courses, or regular college classes, and they can be taught by high school teachers, full- or part-time college professors, or adjunct faculty who may or may not also be high school teachers (Barnett, Gardner, & Bragg, 2004; Bragg et al., 2005; Education Commission of the States, 2001; Girardi, 2001; Greenberg, 1989; Hughes & Karp, 2006;

Karp et al., 2004; Krueger, 2006; Puyear, 1998). Conclusions that hold true for any one dual enrollment program may not hold true for another, much less for all of them.

*Lack of data.* Only one state (Florida) has a comprehensive K-16 record-keeping system (Karp et al., 2007). Many dual enrollment sites do not give priority to systematic data collection (especially for long-term outcomes) and have insufficient data-collection capacity. High schools and colleges maintain separate data systems, may use different definitions for the same variable, and do not share data with each other. Confidentiality concerns mean data that are shared may not be linkable to individual students, complicating evaluation of long-term outcomes (Hughes et al., 2005).

*Self-selection.* Essentially the same thing as the screening hypothesis in human capital theory, self-selection is one of the greatest problems in studying dual enrollment. Correlational relationships are not necessarily causal relationships. In one Texas study, 85% of dual credit students were either Alpha or Gamma personality types (Davis, 2001). Normally, only 39% of high school students and 56% of college students are these two types (Gough & Bradley, 1996). Alpha Type personalities are generally assertive, action-oriented, ambitious, confident, energetic, sociable, well organized, and goal-directed. Gammas are sociable, creative and imaginative. These qualities themselves, rather than program participation, can lead to college persistence, higher GPAs, reduced time to degrees, or other positive correlations (Davis, 2001; McAllister, 1996).

*Accessibility.* Some dual enrollment programs are specifically designed to encourage accessibility to higher education for at-risk or underserved populations. As opposed to the self-selected, at-risk students possess attributes which may lead to lower student outcomes (Swanson, 2003). Nitske (2002) says, “The goal of (college)

completion was (at Erewhon Technical College) subordinate to the goal of providing access. In fact, conditions that improve completion seem to conflict with conditions that promote access” (p. 91). A dual enrollment program might be very successful in increasing the percentage of the population who receive college degrees, which according to human capital theory greatly benefits those individuals and society. At the same time, participants in these programs might have lower GPAs, higher dropout rates, and/or take longer to graduate than do nonparticipants.

Nitske (2002) found that students in Erewhon Technical College’s dual enrollment program received four-year or two-year degrees at a lower rate than the control group. Still, the program “. . . appears to have increased participation and access for a previously underserved demographic” (p. 92). Dipuma’s (2002) study of a Nevada accelerated learning program targeting at-risk students found them to have lower college GPAs than the community college average. However, these targeted at-risk students were less likely to fail or drop out of college courses, had lower rates of remediation, and overwhelmingly gravitated towards college transfer courses rather than vocational courses.

*Swirling.* For Americans, postsecondary (or even secondary) education is neither linear nor completed by any proscribed age. Students may go directly from high school to community college to four-year institution (or directly from high school to university) but they also may not. Every possible transfer, reverse transfer, and double-reverse transfer from community college to university to workforce is seen. Swirling is the terminology educators use to describe this enrollment phenomenon. Students transfer from community college to community college, from university to university, and from one state to

another, all with attendant GPA transfer shock (Townsend, 2001). Hughes and Karp (2006) point out that multiple entry points are needed into both career-technical and academic transition programs to accommodate immigrants and displaced workers returning to education.

### *Indications of Dual Enrollment Success*

There are studies which show positive correlational outcomes for dual enrollment programs (Adelman, 2004; Brown-Ingles, 2003; Cesta, 2003; City University of New York, 2004; Delicath, 1998; Dipuma, 2002; Florida Department of Education, 2004; Kleiman, 2001; Marshall & Andrews, 2002; Washington State Board for Community and Technical Colleges, 2004). However, researchers “. . . often do not use rigorous statistical methods to control for preexisting student characteristics . . .” (Karp et al., 2007, p. 2).

Karp et al.'s (2007) study of Florida dual enrollment does make a concerted effort to control for preexisting characteristics. Florida's K-20 Education Data Warehouse tracks students from first entry into public schools all the way through advanced college degrees, and the study sample contained almost 300,000 students. The longitudinal nature of the data enabled these researchers to compare dual enrollment students with non-dual enrollment cohorts having like GPAs, ethnicity, disabilities, English proficiency, and gender. They were able to control for socioeconomic status (family income, family educational background, cultural resources, etc.) to some extent by identifying those who had qualified for free or reduced lunch programs. Making separate calculations for career and technical education programs (CTE) allowed an additional layer of control, as “. . . both CTE dual enrollment students and their non-participating peers had technically-oriented goals while in high school” (Karp et al., 2007, p. 3).

After controlling for these preexisting characteristics, dual enrollment students in Florida were 4.3% more likely than their non-dual enrollment peers to graduate from high school, while CTE students were 1% more likely. Dual enrollment students were 7.7% more likely and CTE students were 8.6% more likely to enroll in a four-year institution than their peers and more inclined to enroll full time. Dual enrollment students had .21 point higher GPAs (.26 points higher for CTE) than non-dual enrollment students one year after high school graduation. This positive GPA relationship continued throughout the students' postsecondary careers.

Three years after high school, dual enrollment and CTE participants had earned 15 more college credits than nonparticipants (the time period covered by the data did not allow for evaluation of impact on credential attainment). The study also found that, males (which are increasingly under-represented in higher education attendance), low-income students, and low-achieving high school students all appear to benefit from participation in dual enrollment to a greater extent than their dual enrollment peers who enter college courses with more social, economic, and educational advantages (Karp et al., 2007, p. 63).

Although these five researchers had \$2.4 million and the largest dual enrollment data set in the country at their disposal, they make no claim to have created a definitive study.

Without a randomized design, we were unable to control for all possibly important preexisting characteristics. Positive findings may therefore be due to unmeasured factors that are not accounted for in our models rather than to dual enrollment participation. By not controlling for important factors affecting the



decision to participate in dual enrollment, it is possible that our models may generate what appear to be positive impacts when in fact there are no such impacts or there are negative impacts. Future research should seek additional control variables as well as experimental and quasi-experimental designs to establish a causal relationship between dual enrollment participation and educational outcomes. (Karp et al., 2007, pp. 3-4).

Appropriately enough, one of the earliest and most damning dual enrollment studies was from Florida. Legg (1993) found the vast majority of dual enrollment chemistry students had to retake their chemistry courses upon leaving community college and entry into the University of Florida. These findings caused such consternation among Florida's community colleges that they undertook their own research, which ". . . completely reversed the results of . . ." Legg's published results (Andrews, 2001, p. 62). Of 51,382 dual enrollment classes taken between 1992 and 1995, only 140 classes had to be retaken upon matriculation to four-year institutions (Windham, 1997).

Swanson (2008) also found positive results for dual enrollment participation in her study utilizing national data sets constructed by the "NCES from the NELS: 88/2000 and the Postsecondary Education Transcript Study" (p. 2). Swanson concluded dual enrollment students had a higher persistence in postsecondary education and were more likely to earn a college degree than nonparticipants. This study is among the few using logistic regression and controlling for multiple student characteristics.

Specifically, Swanson (2008) determined that dual enrollment students had an 11% higher first-to-second year college persistence rate than non-participating students, were "12% more likely to enter college within seven months of high school graduation,"

and “28% more likely to persist through the second year in college” if they had completed 20 or more dual credits (p. 3).

### Summary

Chapter Two provided the historical context for the educational reform initiative under study and the impetus for educational efficiency resulting in a proliferation of accelerated learning programs including dual enrollment. A discussion of human capital theory, student integration models, and sociological role theory were described as conceptual underpinnings. Additionally, this literature review described a cadre of problems in secondary and postsecondary education sought to be addressed by dual enrollment, outlined the current state of dual enrollment including criticisms and benefits, and provided details on the challenges and results of dual enrollment research.

Chapter Three presents the methodology used for this quantitative case study of dual enrollment at a mid-sized, western community college. The methods chapter includes a description of the institutional setting, purpose for the study, and research questions posed. A description of the research design, procedures for data collection, data analysis techniques and a chapter summary also are provided. Results will be presented in Chapter Four and conclusions in Chapter Five.

## CHAPTER THREE

### RESEARCH METHODOLOGY

*“Despite dual enrollment’s popularity, not much is known about its effectiveness in meeting program goals, particularly those goals addressing college preparedness and completion.” (Karp & Jeong, 2008)*

Chapter Three describes the research methodology used to study student perceptions of dual enrollment participation at a selected institution. This chapter provides: (1) an overview of the institutional setting and program description, (2) statement of the problem, (3) purpose of the study, (4) questions the researcher posed, (5) a review of the research design and data collection process, (6) methods employed for data analysis, and (7) summary.

#### Setting

Dual enrollment programs are a fact of life in American higher education, serving some 1.2 million students (Kleiner & Lewis, 2005). Every state and the majority of high schools (71%) provide opportunities for students to earn college credits while in high school (Bragg et al., 2005; Waits et al., 2005). Although early programs targeted highly intelligent and academically prepared students, dual enrollment has expanded to include average, at-risk, and under-achieving high school students (Clark, 2001; Karp et al., 2007; Krueger, 2006). Currently, about one-third of states tie their dual enrollment policies to the promotion of college attendance by underserved students (Bragg et al., 2005). A review of literature indicates a need for research on the growing dual enrollment phenomenon (Andrews, 2001; Karp et al., 2007; Karp & Jeong, 2008).

### *Institutional Snapshot*

This study was conducted at a mid-sized, western community college offering a comprehensive general education curriculum and extensive career-technical programs. Located in the largest city (population 52,000) within its one-county service region, the college is 290 miles from the nearest large metropolitan city of Denver. This isolation plus the area's historical emphasis on ranching and energy production has shaped the college's character and culture. Signature programs such as agriculture, welding, and energy technologies prepare students for traditional workplace jobs while theatre, dance, and music help fill a cultural void.

Situated on a 200-acre campus, the college has expanded in every way during its 63-year history. Fall 2008 enrollment topped 4,100 (an 8% increase since 2006), and set a full-time equivalency (FTE) record (IPEDS, 2009). Academic program expansion has resulted in more than 140 associate degrees and certificates covering an extensive array of careers including animal science, engineering, geology, construction management, musical theatre, early childhood education, women's studies, pre-medicine, occupational therapy assistant, paralegal, fire science, anthropology, diesel technology, and aviation. New programs in wind power, robotics, geographic information systems, paramedic, and surgical technician are being added to address the area's changing workforce needs.

One of the strengths touted by the institution is its emphasis on full-time faculty (170), which comprises 45% of the workforce and generates 81% of the total FTE. The college has a six percent penetration rate in its service region, which is one-and-a-half times the national average for community colleges. Student demographic composition includes: gender, 58% female; race/ethnicity, 93.5% White non-Hispanic; age, 63% 24

and under (IPEDS, 2009). Additionally, the institution's 60% retention rate is higher than the community college national average of about 50%. The institution offers varsity athletics for men in basketball and rodeo and for women in basketball, rodeo, and volleyball. The institution has been accredited by the North Central Association of Colleges and Schools of The Higher Learning Commission since 1960.

#### *Local Dual Enrollment History*

The institution of study has delivered dual enrollment courses to area high school students since 1992 when 100 students completed 407 credits. In 15 years, dual enrollment has grown to include 834 students taking 4,846 credits. The program, known as Accelerated College Education (ACE), is administered by the college in cooperation with the local Board of Cooperative Educational Services (BOCES). Students can attend classes at their respective high schools or on the college campus during the regular high school day, in the evening, or on weekends; some take classes online. In 1992, 84% of the dual enrollment credits were taken on the college campus compared to 42% of the credits in 2008 (Casper College, 2009). Seventy-five high school courses have been articulated for college credit at four different high schools with the majority classified as career-technical education (J. Hoyt, personal communication, April 18, 2009). There is no minimum high school GPA requirement for dual enrollment; however, students must meet appropriate course prerequisites or entrance requirements set by the college.

BOCES pays the cost of tuition and books for up to nine ACE credits per semester.

#### *Tracking of Dual Enrollment*

BOCES tracks data for dual enrollment participation by high school and by GPA attainment. Tables 1-2 in Appendix B depict ACE enrollment, GPA achieved, credits

attempted, and credits passed by grade level for the 2007-2008 academic year. BOCES program specialist (J. Hoyt, personal communication, April 18, 2009) provided current program data showing: students with low socioeconomic status enrolled in the ACE program at a lower rate than average; juniors/seniors on free and reduced lunch (not all who qualify sign up) had a dual enrollment participation rate of 33% compared to 46% for all juniors/seniors; and 28 home-school students took dual enrollment courses. Most of the students (78.7%) attempted nine or fewer dual credits, and only 1.9% attempted 24 or more. Additionally, 76% of ACE students attending high school passed all attempted dual enrollment classes compared with only 68% of home-schoolers.

#### Problem Statement

Enrollment, pass rates, and GPA data for ACE students have been quantified and appear positive for the program in general. However, only anecdotal data were available on the student perspective of dual enrollment participation. The benefits for college and/or workforce preparation were unknown. As a result, local college and high school educators sought answers regarding the academic and social benefits of dual enrollment for some of the most important stakeholders in this growing initiative—the students.

#### Purpose of the Study

The purpose of this case study was to investigate student perceptions of academic preparation and college student role preparation through participation in dual enrollment community college courses as measured by the *Central Wyoming Accelerated College Education (ACE/BOCES) Student Follow-up Survey* (see Appendix A). This study specifically explored influencers for student participation, academic preparation for college, transferability of credit, career decision, college student role preparation, and

overall experience satisfaction. Additionally, the study determined if there were differences in student experiences based on categorization by high school academic plan, location of dual enrollment course(s), and college credits earned. The desired outcome of this study was to inform educators and policy makers on the efficacy of dual enrollment and provide data for program assessment and improvement.

### Research Questions

Five research questions and their corresponding null hypotheses guided this study. Additionally, descriptive statistics were computed and the data examined to describe student gender, ethnicity, personal background pertaining to family income and first generation college student status, and influencers for dual enrollment participation.

RQ1. *Perception of academic preparation (survey questions 12a-12h)*. Do students perceive their dual enrollment participation prepared them academically for the challenges of college? Specifically, do students perceive that dual enrollment strengthened their study skills/habits, writing skills, reading skills, math skills, technical skills, computer skills, and critical thinking skills? Is student perception of academic preparation modified when students are categorized by: (a) high school program of study, (b) location of dual enrollment courses, and (c) number of dual enrollment credits earned?

H<sub>0</sub>1: Dual enrollment student perception of academic preparation is not modified by: (a) high school program of study, (b) location of dual enrollment courses, and (c) number of dual enrollment credits earned ( $\alpha=.05$ ).

RQ2. *College student role experiences (survey questions 13a-13e)*. Do students perceive their dual enrollment participation prepared them for the role of college student?

Specifically, do students perceive that social/personal preparation for college, academic advising, college friendships, college activity participation, and faculty interaction occurred through dual enrollment? Is the college student role modified when students are categorized by: (a) high school program of study, (b) location of dual enrollment courses, and (c) number of dual enrollment credits earned?

H<sub>0</sub>2: Dual enrollment student perception of college student role is not modified by: (a) high school program of study, (b) location of dual enrollment courses, and (c) number of dual enrollment credits earned.

RQ3. *Transferability of credit (survey questions 9-10)*. To what extent do students pursue transferring courses, and to what extent do dual enrollment courses transfer to their chosen college or university? Is transferability of credit modified by: (a) high school program of study, (b) location of dual enrollment courses, and (c) number of dual enrollment credits earned?

H<sub>0</sub>3: Transferability of dual enrollment credit is not modified by: (a) high school program of study, (b) location of dual enrollment courses, and (c) number of dual enrollment credits earned.

RQ4. *Career decision (survey question 11)*. Did dual enrollment participation help students choose a college major or career path? Is career decision modified by: (a) high school program of study, (b) location of dual enrollment courses, and (c) number of dual enrollment credits earned?

H<sub>0</sub>4: Dual enrollment student perception of career decision is not modified by: (a) high school program of study, (b) location of dual enrollment courses, and (c) number of dual enrollment credits earned.



RQ5. *Student satisfaction (survey questions 15-16)*. To what extent do students rate and recommend dual enrollment to others? Are student ratings and recommendations modified by: (a) high school program of study, (b) location of dual enrollment courses, and (c) number of dual enrollment credits earned?

H<sub>05</sub>: Dual enrollment student satisfaction is not modified by: (a) high school program of study, (b) location of dual enrollment courses, and (c) number of dual enrollment credits earned.

### Research Design

This study was designed to provide a detailed analysis of self-reported data by a select group of individuals (dual enrollment participants) at a designated point in time. Therefore, the methodology was a descriptive, non-experimental case study utilizing survey research. The design employed a postpositivist world view for testing hypotheses of dual enrollment outcomes as measured by participant responses (Creswell, 2009).

#### *Survey research*

Essential components of survey research include sampling, instrument design and evaluation, data collection, data preparation, and data analysis (Creswell, 2009; Fowler, 2009; Fraenkel & Wallen, 2003). These components were incorporated in the seven-step research process. Phase one was conducted prior to the researcher becoming involved in the process and includes three separate steps. Phase two, which is the essence of this study, included four steps conducted by the researcher. Figure 1 depicts the steps followed in the research process.

PHASE 1:	Step 1 – BOCES survey development of the WACESFS
Researcher Pre-involvement	Step 2 – Instrument validation by BOCES
	Step 3 – BOCES data collection
PHASE 2:	Step 4 – Requested blinded, archival data set (Excel Spreadsheet)
Researcher Involvement	Step 5 – Investigated data set to answer research questions using SPSS researcher software
	Step 6 – Reported findings
	Step 7 – Drew meaning and derived conclusions and recommendations

*Figure 1.* Steps in the research process.

### *Study Group*

The study group was comprised of dual enrollment students from all four high schools plus home-schooled students in the selected institution’s service area who completed a high school program of study in 2007 or 2008 and also participated in the ACE dual enrollment program. A total of 948 students met the study group criteria and all were included in the research sample.

### Instrumentation and Data Collection

This section includes a description of the research instrumentation and data collection methods utilized in this study. Instrumentation is described first as it covers Steps 1-2 in the research process followed by data collection, which was Step 3.

### *Instrumentation*

The *Central Wyoming Accelerated College Education (ACE/BOCES) Student Follow-up Survey* used in this study was based on an instrument obtained from the National Alliance of Concurrent Enrollment Partnerships through their public domain resources (NACEP, 2009). NACEP developed the student follow-up survey to assist

concurrent enrollment programs in meeting its certification standards. Modifications to the survey, which NACEP allows, were suggested by members of the BOCES advisory committee and additional questions were included. The BOCES program specialist piloted the survey (May 2009) with a small group of high school dual enrollment students to check for comprehension and control survey error. A final version of the survey was approved by the BOCES Board on May 18, 2009 (J. Hoyt, personal communication, May 18, 2009).

#### *Data Collection*

In July 2009, the Board of Cooperative Educational Services solicited the study group for voluntary participation in the *Central Wyoming Accelerated College Education (ACE/BOCES) Student Follow-up Survey*. A multimode data collection method using both mail and the Internet was employed to increase participation. According to Fowler (2009), "Mixing modes can enable researchers to reach people who are inaccessible via a single mode" (p. 61). A letter of invitation describing the purpose and goals of the research project along with a paper survey was mailed to each student's permanent address on record from high school (see Appendix A). To participate, students were given the option of completing the paper survey or going online to access the Internet version utilizing SurveyMonkey.com. Students were given a deadline for questionnaire completion. To reduce nonresponse, researchers recommend repeated requests, including by mail or phone, and financial incentives to boost survey completion (Creswell, 2009; Fowler, 2009; Fraenkel & Wallen, 2003). Utilizing that advice, a reminder letter was sent to the study group one week later followed by a telephone call asking those who had not

responded to complete the survey. BOCES also offered \$50 incentive prize drawings to encourage participation and increase the return rate.

### Data Analysis

The software program *Statistical Package for the Social Sciences (SPSS) Graduate Pack 16.0* for Windows was utilized for data analysis. The purpose of the analysis was to provide descriptive statistics for all variables and to test the null hypotheses proposed in this study.

#### *Variables*

The variables in this study are described as categorical and utilize the nominal scale for data type. Tables 1-5 identify the descriptive, independent, and dependent variables including data type and survey item(s).

Table 1

#### *Identification of Descriptive Variables*

Variable Name	Data Type	Survey Item
High School: (Public) (Private/Parochial) (Home School)	Nominal (1, 2, 3)	Question 2
Gender: (M) (F)	Nominal (1, 2)	Question 21
Ethnicity: (American Indian) (Asian, Pacific Islander) (Black, Non-Hispanic) (Hispanic) (Non-Resident Alien) (White, Non-Hispanic)	Nominal (1, 2, 3, 4, 5, 6)	Question 22
Parents attend college: (No) (Yes)	Nominal (1, 2)	Question 17
Family income: (Low) (Medium) (High)	Nominal (1, 2, 3)	Question 18
Participated reduced lunch plan: (No) (Yes)	Nominal (1, 2)	Question 19
Eligible for Pell grant: (No) (Yes)	Nominal (1, 2)	Question 20
Influencers for participation: (Family) (College credit in HS) (Friends) (Free classes) (Teachers) (Classes not at HS) (Gain career skills)	Nominal (1, 2, 3, 4, 5, 6, 7)	Question 5

Table 2

*Identification of Independent Variables*

Variable Name	Data Type	Survey Item
High school academic plan: (CTE) (college)	Nominal (1, 2)	Question 3
Dual enrollment location: (high school) (college) (both)	Nominal (1, 2, 3)	Question 4
ACE college credits earned: (0-6) (7-12) (>12)	Nominal (1, 2, 3)	Question 6

Table 3

*Identification of Dependent Variables – Academic Preparation Construct*

Variable Name	Data Type	Survey Item
Academic preparation: (Likert 1-4)	Nominal	Question 12a
Study habits/skills: (Likert 1-4)	Nominal	Question 12b
Writing skills: (Likert 1-4)	Nominal	Question 12c
Speaking skills: (Likert 1-4)	Nominal	Question 12d
Math skills: (Likert 1-4)	Nominal	Question 12e
Technical skills: (Likert 1-4)	Nominal	Question 12f
Computer skills: (Likert 1-4)	Nominal	Question 12g
Critical thinking skills: (Likert 1-4)	Nominal	Question 12h

Table 4

*Identification of Dependent Variables – College Student Role Construct*

Variable Name	Nominal	Survey Item
Social/personal preparation: (Likert 1-4)	Nominal	Question 13a
Academic advising: (Likert 1-4)	Nominal	Question 13b
Relationships with other college students: (Likert 1-4)	Nominal	Question 13c
Participation in college activities: (Likert 1-4)	Nominal	Question 13d
Interaction with college faculty: (Likert 1-4)	Nominal	Question 13e

Table 5

*Identification of Dependent Variables – Other*

Variable Name	Data Type	Survey Item
Attempt to transfer credit (Not yet transferred) (No) (Yes)	Nominal	Question 9
Transferability of credit (exempted) (advanced) (some/all) (none)	(1, 2, 3, 4)	Question 10
Career decision (No) (Yes)	Nominal (1, 2)	Question 11
Overall satisfaction: (Likert 1-4)	Nominal (1, 2, 3, 4)	Question 15
Recommend ACE/BOCES (No) (Yes)	Nominal (1, 2)	Question 16

*Statistical Techniques*

Descriptive statistics were computed and the data examined to describe student gender, ethnicity, personal background pertaining to family income and first generation college student status, and influencers for dual enrollment participation. The null hypotheses were tested through the statistical analysis chi-square for each of the independent variables on each of the dependent variables (Fraenkel & Wallen, 2003; Morgan et al., 2004; Spatz, 2005). Logistical regression further explored significant chi-square results for college credits earned. Results of the statistical analyses are reported in Chapter Four.

Summary

Dual enrollment programs, which provide opportunities for high school students to earn college credits, are touted to provide numerous educational benefits to students including improved high school to college transition, enhanced high school curriculum, challenge for highly intelligent students, increased college persistence, higher college degree completion, and financial savings (Bragg et al., 2005; Clark, 2001; Karp et al., 2007; Krueger, 2006; McConnaha, 1996; Swanson, 2008). While early programs targeted

high-achieving students, dual enrollment has expanded to include average, at-risk, and under-achieving high school students (Clark, 2001; Karp et al., 2007; Krueger, 2006). A review of dual enrollment literature indicates a need for research on this burgeoning educational initiative (Andrews, 2001; Karp et al., 2007).

This case study was conducted to determine student perceptions of the dual enrollment program offered at a mid-sized, western community college. The institution of study has delivered dual enrollment courses to area high school students since 1992 and currently has more than 800 students taking dual enrollment courses. Although limited data indicate positive overall outcomes (course completion and GPA) for the program, local educators are seeking evidence of dual enrollment benefits. Further, college and school administrators expect the data to inform policy decisions on program improvement.

The unit of analysis included high school graduates (from 2007 and 2008) who participated in the selected institution's dual enrollment program and completed the *Central Wyoming Accelerated College Education (ACE/BOCES) Student Follow-up Survey* (n=181). The study group was surveyed by BOCES during July 2009, and blinded, archival data were provided to the researcher for analysis.

Descriptive statistics were computed for all variables. The nonparametric statistical technique chi-square was conducted to determine if expected frequencies differed from observed frequencies for the independent and dependent variables. Findings of the data analysis are reported in Chapter Four. Analysis of the findings and conclusions are drawn in Chapter Five followed by a final summation of this dual enrollment study.

CHAPTER FOUR  
RESEARCH RESULTS

*“Results of the ACE study were interesting and informative. This is the first time we have seen data from the student point of view. Some of the data confirmed our beliefs, while other results were surprising.”*

(BOCES Advisory Board Member, personal communication, March 23, 2010)

Chapter Four presents the data analysis of this site specific dual enrollment study. An overview of this present research is followed by: (1) treatment of the data, (2) description of the research sample, (3) null hypotheses and relationships between dependent and independent variables, and (4) chapter summary.

Introduction

The purpose of this study was to investigate the perceptions of dual enrollment students at a mid-sized, western community college with respect to academic preparation, college student role, transferability of credit, career decision, and overall program satisfaction. Five research questions guided this study.

1. Do students perceive their dual enrollment participation prepared them academically for the challenges of college?
2. Do students perceive their dual enrollment participation prepared them socially/personally for the challenges of college?
3. To what extent do dual enrollment students pursue transferring courses, and to what extent do dual enrollment courses transfer to their chosen transfer college or university?
4. Did dual enrollment participation help students choose a college major or career path?



5. To what extent do students rate and recommend dual enrollment to others?

From these questions, five null hypotheses were formulated, and student perceptions were examined to see if relationships existed between variables based upon student categorization by: (a) high school program of study, (b) location of dual enrollment courses, and (c) number of dual enrollment credits earned. Additionally, summary statistics were computed and a description of student characteristics with respect to gender, ethnicity, family income, and first generation college student are presented. Influencers for dual enrollment participation also were analyzed. Results of this data analysis were provided to BOCES and college and high school administrators seeking program improvement and accreditation by the National Alliance of Concurrent Enrollment Partnerships (NACEP).

#### Treatment of the Data

In October 2009, the researcher obtained blinded, archival data from the *Central Wyoming Accelerated College Education (ACE/BOCES) Student Follow-up Survey (CWACESFS)* administered by the Board of Cooperative Educational Services (BOCES). An Excel spreadsheet containing the data was inspected to verify that the values were within acceptable ranges. Two participants were eliminated due to their responses of being under age 18. Verbal answers for all closed questions were recoded as numeric values (i.e., no=0, yes=1, etc.) and all blank cells changed to a decimal point for missing data necessary for data analysis using *SPSS Graduate Pack 16.0*.

Data were recoded for some dependent variables to reduce low cell counts and provide a stronger analysis. The five Likert scale values originally assigned to question 12 were combined and recoded as: 1=disagree/strongly disagree, and 2=agree/strongly

agree; the response for "not applicable" was recoded as missing data. A similar recoding process was used for the four Likert scale values on question 13: 1=disagree/strongly disagree, and 2=agree/strongly agree. Items for the dependent variable transferability of credit (questions 9 and 10) were combined and recoded. For attempted transfer of ACE credits, responses for "at CC" were recoded as yes. The first three items for the question how credits transferred were all positive choices and recoded yes.

Two of the independent variables also were recoded. Dual enrollment location became: 1=high school campus only, and 2=college campus any, which combined the choices college campus only and both high school and college campus. Additionally, the scale values for number of credit hours earned were converted to three credit categories: 1= 0-6 credits, 2=7-12 credits, and 3=>12 credits. Because variables in this study were categorical, the null hypotheses were tested using Pearson's Chi-Square Test for Independence (Field, 2005). When chi-square was significant for the independent variable of credit hours (using credit category), a logistic regression was run to analyze number of credits that would predict the dependent variable. The alpha level for all statistical tests was .05, which is considered strong evidence for rejecting the null hypothesis. The researcher was aware that a 95% probability of the findings being true could result in Type I error (Spatz, 2005).

#### Description of the Research Sample

The study sample was the total population of 948 students who had participated in the Accelerated College Education (ACE) dual enrollment program and graduated high school in 2007 and 2008. There were 181 valid respondents, which produced a survey statistical accuracy of 95% +/- 6.56%.

### *Participant Characteristics*

Frequency tables were run to analyze the descriptive variables and determine participant characteristics (see Table 6). All but two of the respondents (n=179) reported their high school as public (99%); one student indicated private and one home-school. Respondents were predominantly female (71%) and nearly all Caucasian (97%) with only four students (3%) indicating an ethnicity other than White. Most participants reported having parents who attended college (83%) and therefore did not have first generation college student status. The majority also indicated a moderate family income (74%), did not participate in the reduced lunch plan (88%), and were not eligible for Pell grants (79%).

Students reported their college GPA for survey Question 14. The GPA mean was 3.38 (n=159). Eighteen percent (n=28) reported less than 3.0; 74% (n=118) reported 3.0-3.99; and 8% (n=13) reported a perfect 4.0.

Table 6

*Frequency Analysis for Descriptive Variables - Participant Characteristics*

Description	Characteristic	Frequency (n=181)	Percent	Valid Percent
High School Type	Public	179	98.9	98.9
	Private	1	.6	.6
	Home-school	1	.6	.6
Gender	Male	52	28.7	28.9
	Female	128	70.7	71.1
Ethnicity	Caucasian	174	96.1	97.2
	Hispanic	2	1.1	1.1
	Asian	1	.6	.6
	Other	1	.6	.6
Parents Attend College	No	31	17.1	17.2
	Yes	149	82.3	82.8
Family Income	Low	16	8.8	9.1
	Moderate	130	71.8	74.3
	High	29	16	16.6
In Reduced Lunch Plan	No	157	86.7	87.7
	Yes	22	12.2	12.3
Eligible for Pell	No	140	77.3	79.5
	Yes	36	19.9	20.5

(Valid percent accounts for missing data.)

*Influencers for Dual Enrollment Participation*

Increasing participation is one goal of the Accelerated College Education (ACE) program. Question 5 asked students to indicate what influenced them to enroll in college classes while in high school. Participants could check one or all choices. A crosstab was run to determine frequency by gender for each item. Opportunity to earn college credit received the highest count (n=150) followed by free college classes (n=128), and parents/family (n=107). Table 7 presents frequencies and rankings for the seven participation variables with results for males and females.

Table 7

*Influencers for Dual Enrollment Participation*

Item	Male	Female	Frequency (n=181)	Overall Ranking
Opportunity to earn college credit while in HS % within gender	42 80.8%	107 83.6%	149	1
Free college classes % within gender	38 73.1%	90 70.3%	128	2
Parents and/or family members % within gender	30 57.7%	76 59.4%	106	3
Teachers/guidance counselors % within gender	27 51.9%	59 46.1%	86	4
Opportunity to take classes not offered at HS % within gender	20 38.5%	38 29.7%	58	5
Friends % within gender	14 26.9%	23 18%	37	6
Opportunity to gain career skills % within gender	8 15.4%	24 18.8%	32	7

*Independent Variables*

A frequency analysis was conducted on the independent variables: (a) high school plan, (b) dual enrollment location, and (c) ACE college credits earned (see Table 8). Nearly 90% of students (n=161) indicated their high school plan was college track, and 60% took some/all of their classes on the college campus (n=109). Students reported earning zero to 64 college credits through dual enrollment with 38% earning more than 12 credits (n=57).

Table 8

*Frequency Analysis for Independent Variables*

Description	Value	Frequency (n=181)	Percent	Valid Percent
High school academic plan	College track	161	89.0	89.9
	Career & Technical track	18	9.9	10.1
Dual enrollment location	High School only	70	38.7	39.1
	College Campus any	109	60.2	60.9
ACE college credits earned	0-6	52	28.7	34.7
	7-12	41	22.7	27.3
	>12	57	31.5	38.0

(Valid percent accounts for missing data.)

#### *Dependent Variables*

A frequency analysis was conducted on the dependent variables: (a) academic preparation, (b) social/personal preparation, (c) transferability of credit, (d) career decision, and (e) ACE program satisfaction (see Tables 9-13). Nearly 90% of students agreed dual enrollment better prepared them academically and strengthened their critical thinking skills. For all other academic items, more than 63% of students agreed dual enrollment strengthened their skills. Frequency analysis of the college student role found 75% of students agreed dual enrollment better prepared them socially/personally for college; 71% agreed they discussed goals with an advisor or counselor; and 66% agreed they made college friends. Students responded negatively to two social construct items: attended college activities (75% disagreed) and interacted with college faculty (66% disagreed).

Frequency analysis of transferability of credit found 91% of students attempted transferring dual enrollment credit: 46% were at the community college of study and 45% attended another college. Ninety-one percent also agreed some or all of the credits

transferred to the college in which they were enrolled. For item college major/career path, 60% of students disagreed that dual enrollment helped them make a decision. Overall satisfaction with the ACE program was evident: 98% of students ranked it good or excellent, and 100% of students said they would recommend ACE to current high school students.

Table 9

*Academic Preparation Construct*

Description	Value	Frequency (n=181)	Percent	Valid Percent
Better prepared academically	Disagree	18	9.9	10.5
	Agree	153	84.5	89.5
Strengthened study habits	Disagree	44	24.3	27.7
	Agree	115	63.5	72.3
Strengthened writing skills	Disagree	43	23.8	28.3
	Agree	109	60.2	71.7
Strengthened speaking skills	Disagree	53	29.3	35.8
	Agree	95	52.5	64.2
Strengthened math skills	Disagree	43	23.8	30.9
	Agree	96	53.0	69.1
Strengthened technical skills	Disagree	41	22.7	31.5
	Agree	89	49.2	68.5
Strengthened computer skills	Disagree	49	27.1	36.8
	Agree	84	46.4	63.2
Strengthened critical thinking skills	Disagree	18	8.8	11.1
	Agree	144	79.6	88.9

(Valid percent accounts for missing data.)

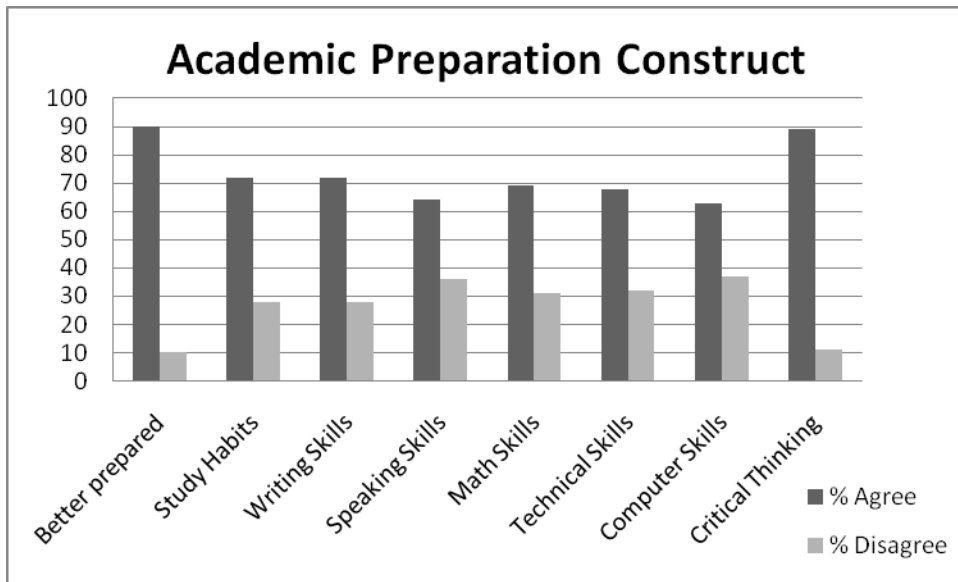


Figure 2. Dual enrollment student perceptions of academic preparation (valid percent).

Table 10

*College Student Role Construct - Social/Personal Preparation*

Description	Value	Frequency (n=181)	Percent	Valid Percent
Better prepared socially/personally for college	Disagree	42	23.2	24.9
	Agree	127	70.2	75.1
Discussed goals with advisor/ counselor	Disagree	48	26.5	28.9
	Agree	118	65.2	71.1
Made friends with college students	Disagree	56	30.9	33.5
	Agree	111	61.3	66.5
Attended college activities	Disagree	121	66.9	75.2
	Agree	40	22.1	24.8
Interacted with college faculty	Disagree	107	59.1	66.0
	Agree	55	30.4	34.0

(Valid percent accounts for missing data.)



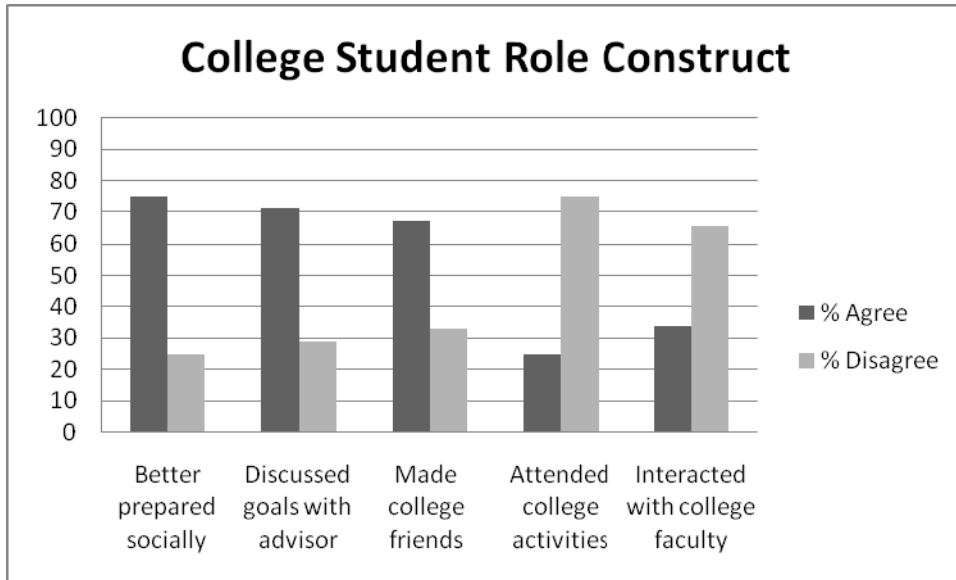


Figure 3. Dual enrollment student perceptions of college student role preparation (valid percent).

Table 11

*Transferability of Credit*

Description	Value	Frequency (n=181)	Percent	Valid Percent
Attempted transfer of ACE credits	No	16	8.8	9.4
	Yes	154	85.1	90.6
Credits transferred (exempted from required course, start in more advanced course, counted some/all toward degree program)	No	15	8.3	9.0
	Yes	152	84.0	91.0

(Valid percent accounts for missing data.)

Table 12

*Career Decision*

Description	Value	Frequency (n=181)	Percent	Valid Percent
ACE program helped decide college major/career path	No	102	56.4	59.6
	Yes	69	38.1	40.4

(Valid percent accounts for missing data.)

Table 13

*ACE Program Satisfaction*

Description	Value	Frequency (n=181)	Percent	Valid Percent
Overall satisfaction	Poor	4	2.2	2.2
	Good	79	43.6	44.4
	Excellent	95	52.5	53.4
Recommend ACE program	No	0	0	0
	Yes	180	99.4	100.0

(Valid percent accounts for missing data.)

### Null Hypotheses and Relationship Analysis

The null hypotheses were tested by computing chi-square for the independent and dependent variables. Relationships were investigated for the constructs of college academic preparation, college student role preparation, transferability of credit, career/major decision, and overall satisfaction of the ACE dual enrollment program. For each construct, the null hypothesis is given followed by tables presenting results of the chi-square analysis, and a discussion of significant relationships.

#### *Academic Preparation Construct*

H<sub>0</sub>1: Student perception of academic preparation is not modified by (a) high school program of study, (b) location of dual enrollment courses, and (c) number of dual enrollment credits earned. The following results provide sufficient evidence to justify rejection of the null hypothesis at the .05 level for (c) number of dual enrollment credits earned.

Eight dependent variables were examined to investigate the construct of academic preparation: (1) overall academic preparation, (2) study habits/skills, (3) writing skills, (4) speaking skills, (5) math skills, (6) technical skills, (7) computer skills, and (8) critical

thinking skills. The only independent variable showing a significant relationship on any of the academic dependent variables was that of credit hours earned (see Table 16). There were no significant relationships with high school plan or ACE course location.

*High School Plan.* A chi-square analysis was run for the academic construct items and high school plan (college track or career/technical education track). No significant relationships were identified as evidenced in Table 14.

Table 14

*Academic Construct vs. High School Plan - Chi-square Test*

<i>High School Plan</i>	<i>College Track</i>	<i>CTE Track</i>			
Item	Agree %	Agree %	Chi-square	Df	Sig.
Better prepared academically	89.2	90.9	.030	1	.862
Strengthened study habits	71.9	72.7	.003	1	.954
Strengthened writing skills	72.9	70.0	.038	1	.845
Strengthened speaking skills	65.2	54.5	.502	1	.479
Strengthened math skills	69.8	55.6	.792	1	.373
Strengthened technical skills	68.4	63.6	.104	1	.747
Strengthened computer skills	63.1	55.6	.205	1	.651
Strengthened critical thinking	89.3	81.8	.568	1	.451

\*Significant at  $p < .05$

*ACE Location.* A crosstab investigation of the relationships between the academic construct variables and the location where students took ACE courses (high school only or college campus any) found no significant results using the chi-square test for independence (see Table 15).

Table 15

*Academic Construct vs. ACE Location - Chi-square Test*

<i>ACE Location</i>	<i>High School only</i>	<i>College Campus any</i>			
Item	Agree %	Agree %	Chi-square	Df	Sig.
Better prepared academically	87.9	90.3	.246	1	.620
Strengthened study habits	70.5	72.9	.109	1	.742
Strengthened writing skills	69.5	72.5	.161	1	.688
Strengthened speaking skills	61.4	66.3	.362	1	.547
Strengthened math skills	64.9	72.5	.901	1	.342
Strengthened technical skills	69.6	68.1	.037	1	.848
Strengthened computer skills	63.6	63.2	.003	1	.955
Strengthened critical thinking skills	85.9	90.6	.845	1	.358

\*Significant at  $p < .05$

*Credit Category.* A crosstab of the academic construct variables and credit category (0-6, 7-12, >12) found two significant relationships (see Table 16). There was a positive relationship between credits and math skills for students who accumulated seven or more credits. There also was a positive relationship between credits and computer skills for students who earned >12 credits.

Table 16

*Academic Construct vs. Credit Category - Chi-square Test*

<i>Credit Category</i>	<i>0-6</i>	<i>7-12</i>	<i>&gt;12</i>			
Item	Agree %	Agree %	Agree %	Chi-square	Df	Sig.
Better prepared academically	87.0	90.2	92.7	.939	2	.625
Strengthened study habits	66.7	73.2	81.6	2.685	2	.261
Strengthened writing skills	59.0	73.7	76.9	3.711	2	.156
Strengthened speaking skills	60.5	61.1	70.0	1.103	2	.576
Strengthened math skills	53.8	74.2	77.6	6.242	2	.044*
Strengthened technical skills	59.5	66.7	79.1	3.695	2	.158
Strengthened computer skills	51.4	56.7	76.1	6.037	2	.049*
Strengthened critical thinking skills	86.0	85.0	94.3	2.574	2	.276

\*Significant at  $p < .05$

Bar graphs of the two significant results illustrate the relationship between number of credits earned and the academic constructs of strengthened math skills and strengthened computer skills (see Figures 4-5). For strengthened math skills, students earning seven or more credits (two categories) indicated about 75% agreement versus 54% agreement for those with six credits or fewer. Only students earning the highest number of credits (>12) predominantly agreed (76%) that computer skills were strengthened by taking dual enrollment classes.

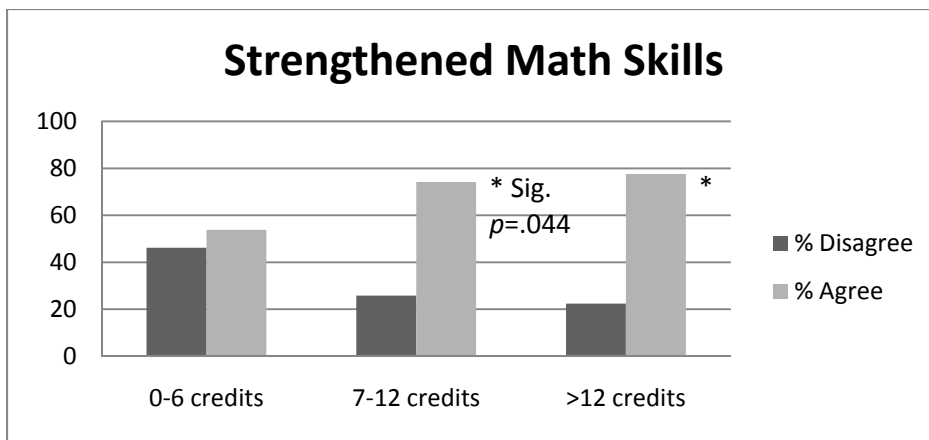


Figure 4. Student perceptions of strengthening math skills by number of credits earned.

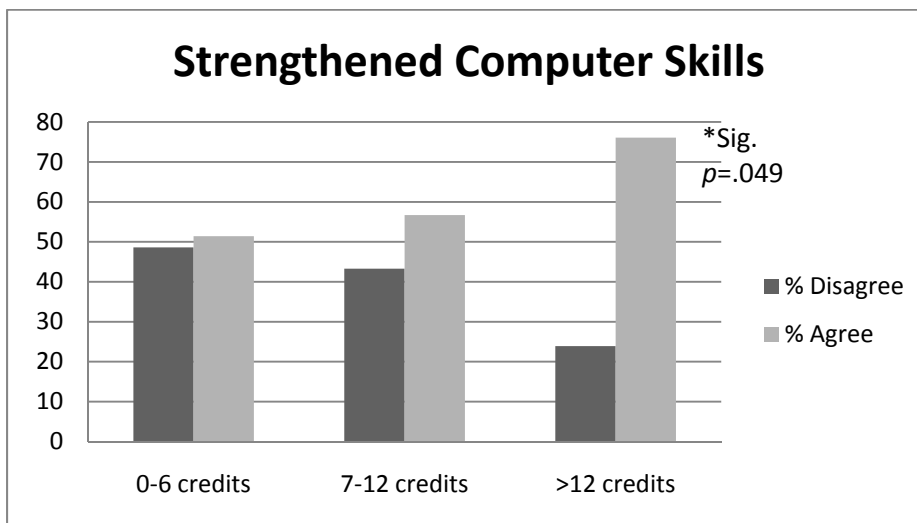
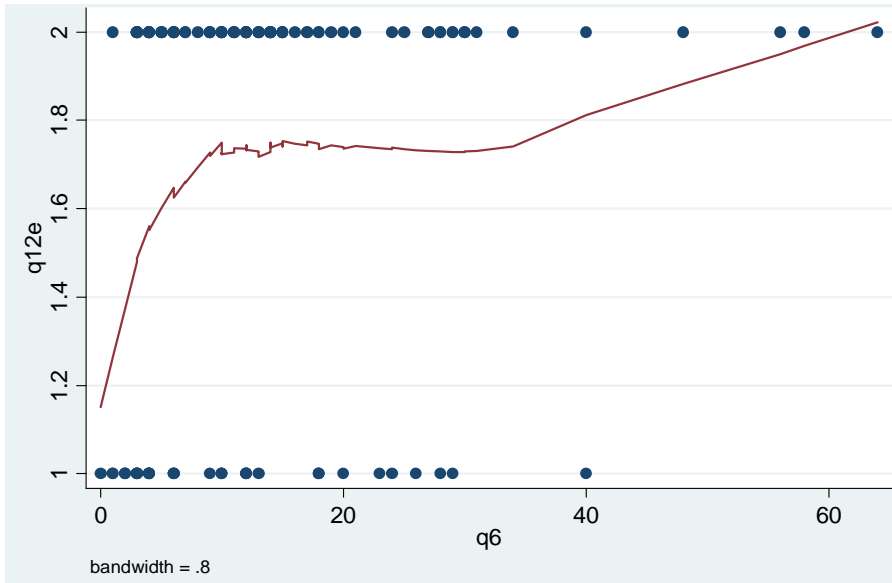


Figure 5. Student perceptions of strengthening computer skills by credits earned.

A logistic regression was run for the two significant chi-square tests using the scale value for credits earned (question 6). Figure 4 shows probability of students agreeing that dual enrollment strengthened math skills (question 12e). The S-curve exceeds 50% at approximately five credits.



Iteration 0: Log Likelihood = **-4.597281**

Logistic regression

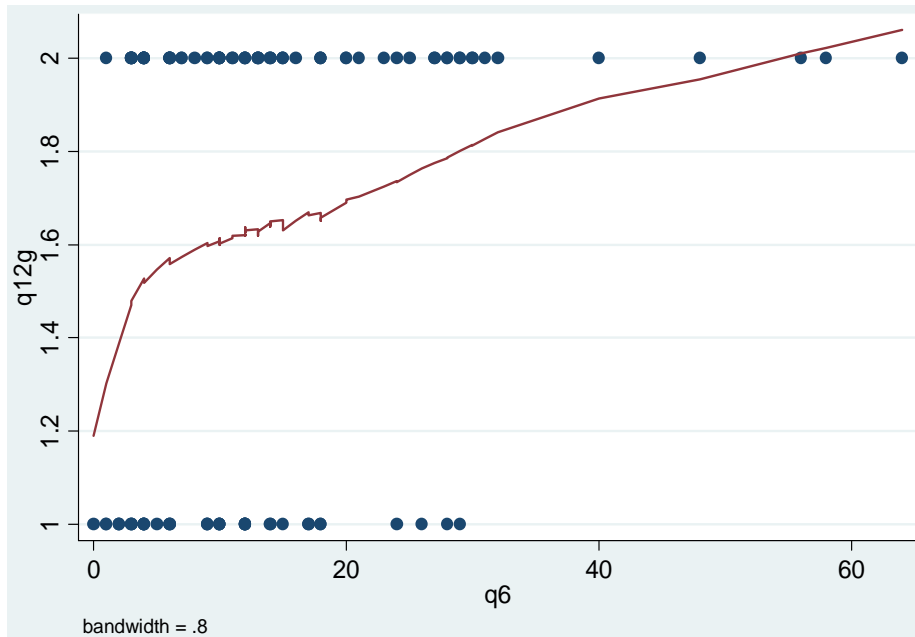
Number of obs = **37**  
 LR chi2(0) = **0.00**  
 Prob > chi2 = **.**  
 Pseudo R2 = **0.0000**

Log Likelihood = **-4.597281**

q6	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
_cons	<b>3.583519</b>	<b>1.013794</b>	<b>3.53</b>	<b>0.000</b>	<b>1.59652 5.570518</b>

Figure 6. Logistic regression for strengthened math skills vs. credit hours earned.

Figure 7 shows the probability of students agreeing that dual enrollment strengthened computer skills (q12g) based on the number of credits earned (q6). The S-curve crosses the 50% probability at approximately 5 credits.



Iteration 0: Log likelihood = **-4.7256692**

Logistic regression

Number of obs = **42**  
 LR chi2(0) = **-0.00**  
 Prob > chi2 = **.**  
 Pseudo R2 = **-0.0000**

Log likelihood = **-4.7256692**

q6	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
_cons	<b>3.713572</b>	<b>1.012122</b>	<b>3.67</b>	<b>0.000</b>	<b>1.72985 5.697294</b>

Figure 7. Logistic regression for strengthened computer skills vs. credit hours earned.

### *College Student Role Construct - Social/Personal Preparation*

H<sub>0</sub>2: Student perception of the college student role is not modified by (a) high school program of study, (b) location of dual enrollment courses, and (c) number of dual enrollment credits earned. The following results provide sufficient evidence for rejecting the null hypothesis at the .05 level for both (a) high school plan and (b) ACE location.

Five dependent variables were examined to investigate the construct of college student role preparation: (1) social/personal preparation, (2) academic advising, (3) relationships with other college students, (4) participation in college activities, and (5) interaction with college faculty. A chi-square analysis found ACE location (high school

campus only or college campus any) significantly modified three of the five social construct items. High school plan was found to have significantly modified one item. Bar graphs illustrate the significant relationships.

*High School Plan.* A chi-square analysis was performed to determine relationships between the social/personal construct variables and the students high school plan of study (college track or career/technical education track). Table 17 indicates a significant relationship was found between students on a college track plan and being better prepared socially/personally. Three-fourths of college track students agreed that dual enrollment better prepared them socially/personally for college versus just half of the CTE track students.

Table 17

*College Student Role Construct vs. High School Plan - Chi-square Test*

<i>High School Plan</i>	<i>College Track</i>	<i>CTE Track</i>			
Item	Agree %	Agree %	Chi-square	Df	Sig.
Better prepared socially/personally	76.8	50.0	4.241	1	.039*
Discussed goals with advisor	71.9	54.5	1.492	1	.222
Made college friends	66.0	66.7	.002	1	.963
Attended college activities	25.9	8.3	1.839	1	.157
Interacted with college faculty	34.5	25.0	.444	1	.505

\*Significant at  $p < .05$

Nearly 120 college track students agreed that dual enrollment better prepared them socially/personally for the role of college student. The bar graph in Figure 8 depicts student perceptions as categorized by high school plan.



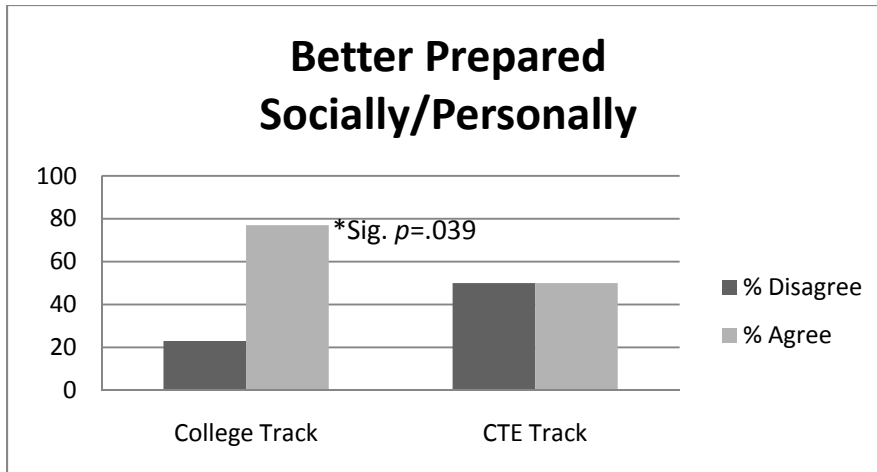


Figure 8. Student perceptions of better prepared socially/personally by high school plan.

*ACE Location.* A crosstab investigation of the relationships between the college student role variables and the location of where students took ACE courses (high school only or college campus any) yielded three significant results (see Table 18). Chi-square analysis found a positive relationship between students taking any classes on the college campus and the construct of better prepared socially/personally (80% vs. 64% agreement for high school location only). There also were positive relationships between ACE location and students making college friends and interacting with college faculty.

Table 18

<i>College Student Role Construct vs. ACE Location - Chi-square Test</i>					
<i>ACE Location</i>	<i>High School only</i>	<i>College Campus any</i>			
Item	Agree %	Agree %	Chi-square	Df	Sig.
Better prepared socially/personally	64.1	81.6	6.415	1	.011*
Discussed goals with advisor	68.3	72.3	.303	1	.582
Made college friends	52.4	76.5	10.265	1	.001*
Attended college activities	20.3	28.0	1.157	1	.282
Interacted with college faculty	23.3	41.0	5.188	1	.023*

\*Significant at  $p < .05$

Bar graphs of the three significant results illustrate the relationship between the social construct variables and the independent variable of ACE location. Students taking classes on the college campus had significantly higher agreement with three items as shown in Figures 9-11.

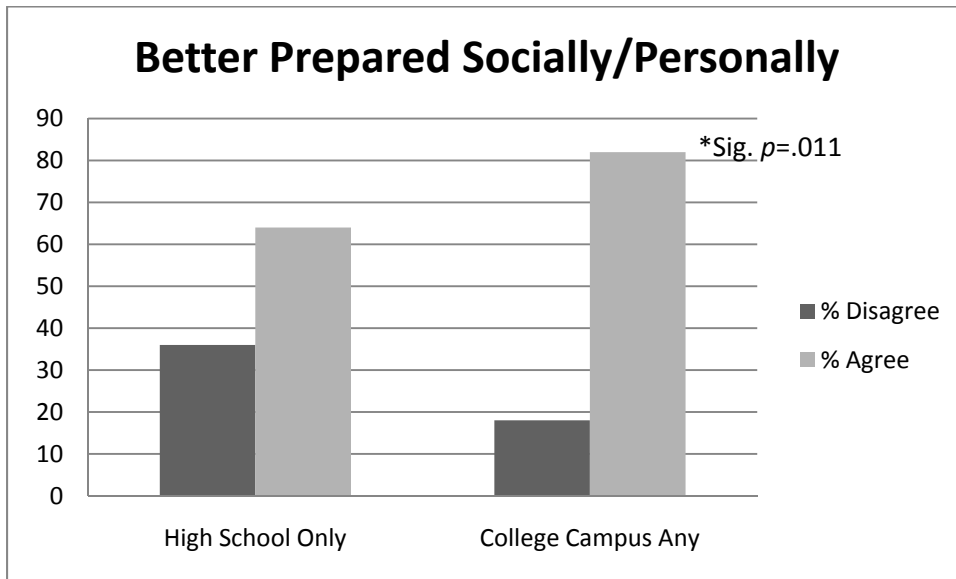


Figure 9. Student perceptions of better prepared socially/personally by ACE location.

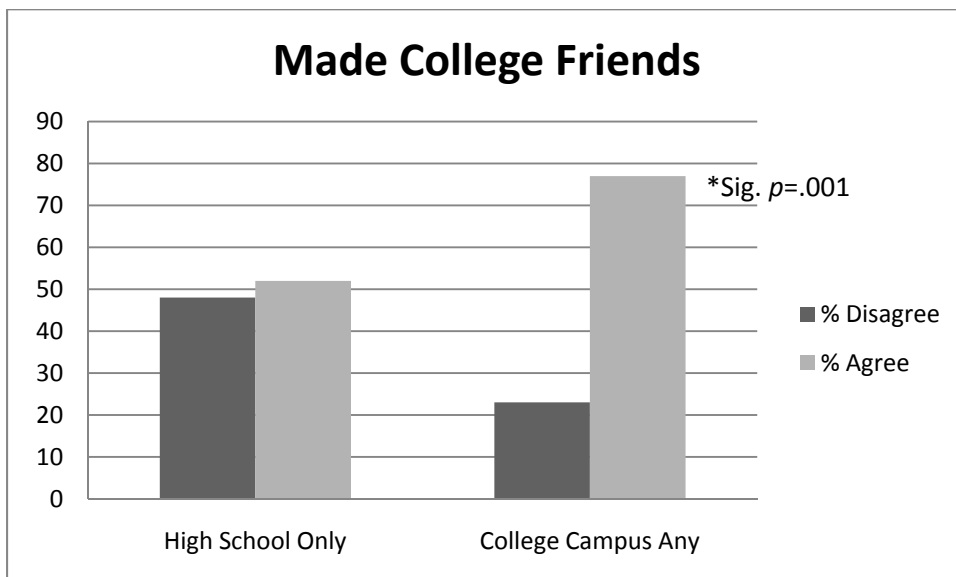


Figure 10. Student perceptions of having made college friends by ACE location.

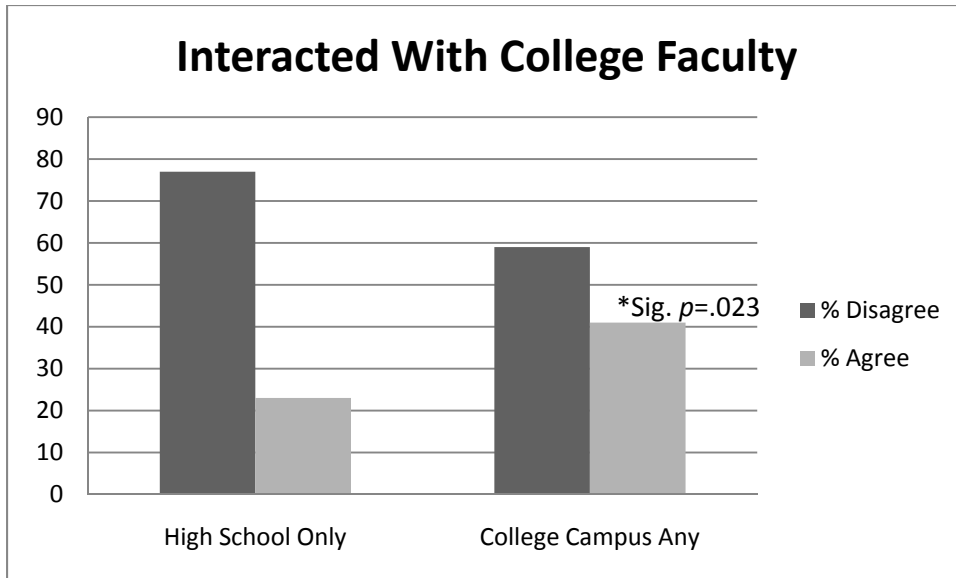


Figure 11. Student perceptions of interacting with college faculty by ACE location.

*Credit Category.* A crosstab of the social/personal construct variables and credit category (0-6, 7-12, >12) found no significant relationships; however, students earning more than 12 credits had a stronger relationship to making college friends than students in the other two categories ( $p=.074$ ) as indicated in Table 19.

Table 19

*College Student Role Construct vs. Credit Category - Chi-square Test*

<i>Credit Category</i>	0-6	7-12	>12			
Item	Agree %	Agree %	Agree %	Chi-square	Df	Sig.
Better prepared socially/personally	77.8	75.6	77.8	.077	2	.962
Discussed goals with advisor	72.1	70.0	74.1	.191	2	.909
Made college friends	66.7	55.0	77.4	5.202	2	.074
Attended college activities	26.2	15.0	30.0	2.850	2	.241
Interacted with college faculty	32.6	25.6	39.2	1.847	2	.397

\*Significant at  $p<.05$

*Transferability of Credit*

H<sub>03</sub>: Transferability of credit is not modified by (a) high school program of study, (b) location of dual enrollment courses, and (c) number of dual enrollment credits earned.

The following results provide sufficient evidence for rejecting the null hypothesis at the .05 level for both (a) and (c).

A crosstab investigation of the dependent variable transferability of credit and the independent variables identified two significant relationships (see Table 20). Students in a college track plan of study were nearly twice as likely (93%) to attempt transfer of credits than students in a career/technical plan (50%). A strong relationship also was evident between students who had earned seven or more credits and attempt to transfer credits.

Table 20

*Transferability of Credit vs. Independent Variables - Chi-square Test*

Item	Agree %	Agree %	Agree %	Chi-square	Df	Sig.
<i>High School Plan</i>	<i>College Track</i>	<i>CTE Track</i>				
Attempted transfer of ACE cr.	93.6	50.0		24.571	1	.000*
Some/All credits transferred	91.0	90.0		.011	1	.918
<i>ACE Location</i>	<i>High School only</i>	<i>College Campus any</i>				
Attempted transfer of ACE cr.	87.7	93.2		1.489	1	.222
Some/All credits transferred	89.2	92.1		.390	1	.532
<i>Credit Category</i>	<i>0-6 cr.</i>	<i>7-12 cr.</i>	<i>&gt;12 cr.</i>			
Attempted transfer of ACE cr.	76.1	100.0	96.3	17.992	2	.000*
Some/All credits transferred	88.9	95.1	92.5	1.160	2	.560

\*Significant at  $p < .05$

#### *Career/Major Decision*

H<sub>0</sub>4: Student perception of career decision is not modified by (a) high school program of study, (b) location of dual enrollment courses, and (c) number of dual enrollment credits earned. Given the following results, the researcher failed to reject the null hypothesis for all independent variables.

One survey item (question 11) explored student perceptions for dual enrollment helping decide a college major or career path. Chi-square analysis was performed, and no significant relationships were identified (see Table 21). However, students earning seven or more credits did indicate a stronger relationship with career decision than those earning fewer credits.

Table 21

*Career/Major Decision vs. Independent Variables - Chi-square Test*

Item	Agree %	Agree %	Agree %	Chi-square	Df	Sig.
<i>High School Plan</i>	<i>College Track</i>	<i>CTE Track</i>				
ACE helped decide major/career	39.7	41.7		.017	1	.896
<i>ACE Location</i>	<i>High School only</i>	<i>College Campus any</i>				
ACE helped decide major/career	38.5	40.8		.089	1	.765
<i>Credit Category</i>	<i>0-6</i>	<i>7-12</i>	<i>&gt;12</i>			
ACE helped decide major/career	29.8	48.8	51.9	5.587	2	.061

\*Significant at  $p < .05$

*Satisfaction with ACE Dual Enrollment Program*

H<sub>05</sub>: Student satisfaction is not modified by (a) high school program of study, (b) location of dual enrollment courses, and (c) number of dual enrollment credits earned.

The following results provide sufficient evidence to justify rejection of the null hypothesis at the .05 level for (c) number of dual enrollment credits earned.

Two survey items (questions 15-16) provided data on student satisfaction with the dual enrollment program. A crosstab investigation of overall student satisfaction and the independent variables found one significant relationship (see Tables 22-23). The second item (recommend ACE to others) received 100% yes responses; no statistics were computed as the variable was a constant.

Table 22

*Satisfaction with ACE Program vs. Credit Category - Crosstab (n=181)*

			Credit Category			
			0-6 Cr.	7-12 Cr.	>12 Cr.	Total
Overall Satisfaction	Poor	Count	2	0	1	3
		% within Credit Category	3.8%	.0%	1.8%	2.0%
	Good	Count	28	20	15	63
		% within Credit Category	53.8%	51.3%	26.3%	42.6%
	Excellent	Count	22	19	41	82
		% within Credit Category	42.3%	48.7%	71.9%	55.4%
Total		Count	52	39	57	148
		% within Credit Category	100.0%	100.0%	100.0%	100.0%

Table 23

*Satisfaction with ACE Program vs. Credit Category - Chi-square Test*

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	12.181 <sup>a</sup>	4	.016*
Likelihood Ratio	13.106	4	.011
Linear-by-Linear Association	9.472	1	.002
N of Valid Cases	148		

<sup>a</sup> 3 cells (33.3%) have expected count less than 5. The minimum expected count is .79.

\*Significant at  $p < .05$

Figure 12 illustrates satisfaction with the dual enrollment program by number of credit hours students earned. Students earning the most credits indicated excellent while students earning the least reported good. Only three students indicated a poor level of satisfaction.

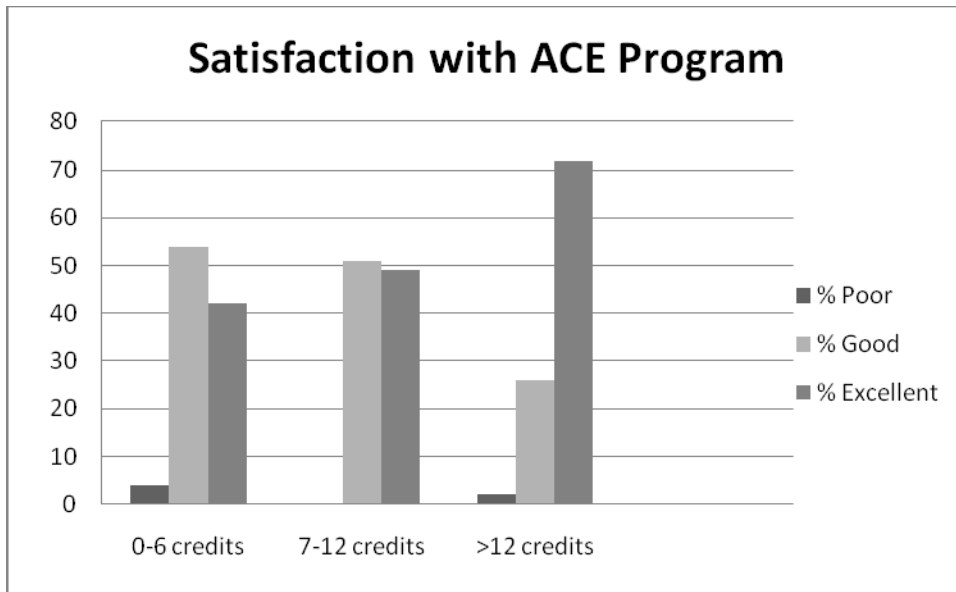


Figure 12. Student satisfaction with ACE dual enrollment program by credits earned.

### Summary

This study investigated student perceptions of dual enrollment participation at a mid-sized, western community college on: (1) academic preparation for college, (2) college student role preparation, (3) transferability of courses, (4) determination of a college major or career path, and (5) overall program satisfaction. Data from the *Central Wyoming Accelerated College Education Student Follow-up Survey* were analyzed using Pearson's Chi-square Test for Independence and logistic regression to examine relationships between independent and dependent variables.

In reference to Research Question 1, chi-square analysis of the eight academic construct items and the three independent variables found only two significant relationships. Academic preparation was significantly modified by the number of dual credits earned for items: (5) math skills, and (7) computer skills. Three-fourths of students completing at least seven dual credits indicated math skills were strengthened

while a credit level greater than 12 was necessary for the same level of agreement for computer skills being strengthened. The variables of high school plan (college track vs. CTE track) and location of dual enrollment classes (high school only vs. college campus any) produced no statistically significant relationships. Although few statistically significant results were found, the overall response from students was positive for dual enrollment strengthening their academic skills and better preparing them for college. Nearly 90% agreement was indicated for each analysis of item 1: better prepared academically.

An investigation of research Question 2 found ACE location significantly modified three of the five social construct items and high school plan modified one item. Credit hours produced no significant relationships. ACE location was significant for three items: (1) better prepared socially/personally, (3) made college friends, and (5) interacted with college faculty. High school plan was significant only for item 1. Overall, data analysis found students taking classes on the college campus indicated stronger agreement for all items than did students taking classes only at the high school.

In reference to Question 3, the investigation identified two highly significant independent variables: high school plan and credit hours earned. Students pursuing a college plan of study were almost twice as likely (93%) to attempt transferring credits than students in a CTE plan (50%). A significant relationship also was evident for students who had earned seven or more credits and the attempt to transfer credits. Location of dual enrollment classes was not significant for any item.

In reference to Question 4, dual enrollment did not help students decide a college major or career path. Chi-square analysis found the lowest level of agreement for this



item. The majority of students, regardless of high school plan, ACE location, or number of credits earned, disagreed with the statement that dual enrollment helped them with their career/major decision.

An investigation of research Question 5 found 100% of students would recommend the ACE program to others. A chi-square analysis identified a statistically significant relationship between credit category and overall student satisfaction. More than half of students earning 0-12 credits reported satisfaction as good while nearly three-fourths of students earning more than 12 credits reported their satisfaction as excellent (72%).

This study of a site specific dual enrollment program found significant relationships for each of the research questions. Data analysis revealed that dual enrollment helps prepare students for the challenges of college with respect to some academic skill areas and some social integration areas. Dual enrollment students on a college track plan who earned seven or more credits had a positive relationship for transferring credit; however, the dual enrollment program did not help students choose a college major or career path. And finally, data analysis determined that students were satisfied with their dual enrollment experience, in particular those who earned the most college credit.

A summation of this dual enrollment study is presented in Chapter Five. Analyses of the findings and conclusions are given followed by recommendation for further study.

## CHAPTER FIVE

### FINDINGS, CONCLUSIONS, AND IMPLICATIONS

*“The only source of knowledge is experience.”* (Albert Einstein)

Chapter Five concludes this dual enrollment study. This summation presents the following information: (1) overview of the study, (2) summary of the findings, (3) analysis of the findings, (4) conclusions, (5) implications and recommendations, (6) future research, and (7) summary.

#### Overview of the Study

Dual enrollment programs have become prominent in all 50 states with nearly three-fourths of U.S. high schools offering dual enrollment to students (Bragg et al., 2005; Waits et al., 2005). Several studies show positive outcomes for dual enrollment programs including increased high school completion, improved postsecondary persistence, and higher college degree completion, but all call for more research (Andrews, 2001; Karp et al., 2007; Swanson, 2008).

#### *Review of the Literature*

There is a growing discontent with U.S. public education and national concerns over student educational attainment and success. Critics and educators alike see room for improvement in high school completion rates, high school to college transitions, college student remediation, and postsecondary degree completion (Deil-Amen & Rosenbaum, 2002; Hoffman & Vargas, 2005; NCES, 2004). An initiative believed to offer solutions to these challenges is dual enrollment, which has been described by some as the largest revolution in secondary and postsecondary education at the beginning of the Twenty-First Century (Andrews, 2001; Cesta, 2003; Marshall & Andrews, 2002).

Conceptual underpinnings for this study included human capital theory, student integration theory, and sociological role theory. Human capital theory explains how investment in education provides a direct economic benefit to society, producing an annual estimated return of 20-30% (Krueger & Lindahl, 2001; McMahon, 2006; Wolfe & Haveman, 2003). Because educational attainment benefits both the individual and society, student persistence and success in college is of national importance. Tinto's (1997) student integration model says that persistence is greatly influenced by the extent to which students integrate socially and academically into college. To do that successfully, students must learn the norms (expected behaviors) of the college student role (Smith & Mackie, 2007; Stark, 2000). Research suggests dual enrollment may promote college persistence through role rehearsal (Karp, 2007).

#### *Purpose of the Study*

The subject college of this study has been offering dual enrollment to area high school students since 1992. It currently enrolls more than 800 students seeking to obtain some 5,000 college credits. This is the institution's first formal assessment of dual enrollment with respect to students' academic preparation for college, social/personal preparation for college, ability to transfer credits, and overall program satisfaction. Purpose of the research was to provide educators and policy makers with information useful for program improvement and National Alliance of Concurrent Enrollment Partnerships (NACEP) accreditation.

### *Research Questions*

Five research questions guided this study of dual enrollment participation.

1. Do students believe dual enrollment participation prepared them academically for the challenges of college?
2. Do students believe dual enrollment participation prepared them for the role of college student?
3. To what extent do dual enrollment students pursue transferring courses, and to what extent do dual enrollment courses transfer to their chosen transfer college or university?
4. Did dual enrollment participation help students choose a college major or career path?
5. To what extent do students rate and recommend dual enrollment to others?

### *Survey, Population, and Sample*

This research utilized data from the *Central Wyoming Accelerated College Education (ACE/BOCES) Student Follow-up Survey* administered by the Board of Cooperative Educational Services (BOCES) in July 2009. The study population included 948 students who had participated in the ACE dual enrollment program and graduated high school in 2007 and 2008. The study sample included 181 valid respondents, which produced a survey statistical accuracy of 95% +/- 6.56%.

### *Summary of the Findings*

A descriptive analysis of the study sample found respondents were predominantly White (97%), female (71%), and of moderate family income (74%) and had parents who

attended college (83%). Most indicated they did not participate in the free and reduced school lunch program (88%) and that they did not qualify for Pell grants (80%).

#### *Influencers for Dual Enrollment Participation*

Frequencies were computed for survey Question 5 to determine rankings for seven influencers of dual enrollment participation. In order of highest to lowest influence were: (1) opportunity to earn college credit while in high school, (2) free college classes, (3) parents and/or family members, (4) teachers/guidance counselors, (5) opportunity to take classes not offered at high school, (6) friends, and (7) opportunity to gain career skills. Overall, rankings were the same for both genders; however, males were more likely to be influenced by friends than females (27% vs. 18%), and a higher percentage of males (39% vs. 30%) indicated preference for the opportunity to take classes not offered at the high school.

#### *Frequency Analysis for Independent and Dependent Variables*

A frequency analysis of the independent variables found nearly 90% of students were on a college track high school plan, and 60% took some/all of their dual enrollment classes on the college campus. Students reported earning 0-64 college credits, and category percentages were: 0-6 credits, 35%; 7-12 credits, 27%; and more than 12 credits, 38%.

A frequency analysis of the dependent variables found that overall students agreed that dual enrollment prepared them academically for college. Nearly 90% thought dual enrollment had improved their critical thinking skills, and almost 75% of students agreed dual enrollment strengthened their study habits and writing ability. Students indicated a positive response for three of the five college student role construct items:

better prepared socially/personally for college (75%), discussed goals with advisor or counselor (71%), and made friends with college students (66%). Most students did not attend college activities or interact with college faculty. Students responded positively to having transferred dual enrollment credits: 91% attempted transfer of ACE credits and 91% indicated some or all did transfer to their current institution. Students were satisfied with the ACE program (95% good or excellent), and all said they would recommend it to current high school students.

#### *Null Hypotheses, Statistical Tests, and Results*

Five null hypotheses were tested utilizing chi-square statistical analysis at the traditional .05 alpha level for significance. These hypotheses examined how academic preparation, acclimation to the college student role, transferability of dual enrollment credit, assistance in career decision making, and overall student satisfaction with dual enrollment were affected by: (a) high school program of study, (b) location of dual enrollment courses, and (c) the total number of dual enrollment credits earned. Findings are as follows:

*H<sub>01</sub>*: Dual enrollment student perception of academic preparation is not modified by: (a) high school program of study, (b) location of dual enrollment courses, and (c) number of dual enrollment credits earned. Chi-square analysis of the seven academic preparation factors found no significant relationships with (a) high school plan or (b) ACE location. However, there was a significant relationship between (c) number of dual enrollment credits earned and the amount of improvement in mathematical ability and computer skills. These results were sufficient evidence to justify rejection of the null hypothesis at the .05 level for (c) number of dual enrollment credits earned. A logistic

regression was run for each of the significant factors and confirmed the chi-square results.

*H<sub>02</sub>*: Dual enrollment students' understanding of the college student role is not modified by (a) high school program of study, (b) location of dual enrollment courses, and (c) number of dual enrollment credits earned. Five dependent social construct variables were investigated through chi-square analysis; one significant result was found for (a) high school plan, and three significant results were determined for (b) ACE location. Credit hour attainment did not test significant for any of the social preparation factors. Null Hypothesis Two was rejected for both (a) high school plan and (b) ACE location. There was a positive relationship between high school plan and better prepared socially/personally. Students who took ACE courses at the college campus reported they were better prepared socially/personally, made college friends, and interacted more with college faculty than students who took classes only in their high schools.

*H<sub>03</sub>*: Transferability of dual enrollment credit is not modified by (a) high school program of study, (b) location of dual enrollment courses, and (c) number of dual enrollment credits earned. Chi-square analysis found that (a) high school plan and (c) credit category were statistically significant for transferability of dual enrollment credit. Students on a college track plan and students with seven or more credits were more likely to attempt transfer of dual credit than students on a CTE track and students with 0-6 credits. Null Hypothesis Three was rejected for both (a) and (c).

*H<sub>04</sub>*: Student perception of dual enrollment's assistance in career decision making is not modified by (a) high school program of study, (b) location of dual enrollment courses, and (c) number of dual enrollment credits earned. Chi-square analysis found no

statistically significant results; therefore, this research failed to reject Null Hypothesis Four for all independent variables.

*H<sub>05</sub>*: Overall student satisfaction with dual enrollment is not modified by (a) high school program of study, (b) location of dual enrollment courses, and (c) number of dual enrollment credits earned. Chi-square analysis found that (c) number of credits earned was statistically significant for modifying student satisfaction; however, no significance was found for (a) high school plan or (b) ACE location. Null Hypothesis Five was rejected for (c) number of dual enrollment credits. Student earning the most credits had a higher level of satisfaction.

#### Analysis of the Findings

Most existing studies assert that dual enrollment offers benefits for high schools, colleges/universities, and students. For high schools, dual enrollment is thought to alleviate senioritis, boredom of highly intelligent students, and elevated at-risk dropout rates. For postsecondary institutions, dual enrollment helps with the high school-to-college disconnect, time to degree, cost of degree, and the need for remedial education. This study examined a dual enrollment program at a mid-sized, open-admission community college to assess its impact on students.

#### *Analysis of Research Question 1 - Academic Preparation*

The need for better academic preparation of high school students for college has been a major impetus for dual enrollment expansion. Sixty percent of community college and 29% of four-year college freshmen take remedial coursework (Attewell, Lavin, Domina, & Levy, 2006). High rates of remediation are associated with higher rates of collegiate nonpersistence. Remediation costs students time and money and it also costs



institutions valuable resources (Deil-Amen & Rosenbaum, 2002). Students perceive that the ACE dual enrollment program does improve their academic preparation for college coursework.

Although this study did not ask if students were required to take a remedial course, the majority of survey respondents indicated that dual enrollment strengthened their study habits, writing skills, speaking skills, math skills, and critical thinking skills and better prepared them academically for the challenges of college. Self-reported college GPAs support this conclusion; nearly three-fourths indicated their GPA was 3.0-3.99 while only 18% reported earning less than a 3.0. Because this study did not control for preexisting student characteristics, grade achievement could be attributed to self-selection: described in the literature as one of the greatest problems in evaluating dual enrollment programs (Davis, 2001; Karp, 2007; McAllister, 1996).

#### *Analysis of Research Question 2 - College Role Preparation*

This study found the ACE dual enrollment program gave students the opportunity to try on the college student role better preparing them socially/personally for the challenges of college. Tinto (1997) claimed college student persistence is determined by both social and academic integration into institutions of higher learning; further, integration is influenced by student background, skills/abilities, and prior experiences. Karp (2007) purports student failure in postsecondary education may be due to inadequate understanding of college student norms. Student integration models and role theory offer partial explanation for the benefits of dual enrollment.

Data analysis determined that ACE location was statistically significant for three of the five college student role constructs: better prepared socially/personally, made

college friends, and interacted with college faculty. Taking classes on the college campus provides a higher level of social preparation. One strength of the ACE program is the flexibility it provides for students to take courses at their high school and/or at the community college. The study found 60% of students took at least one dual enrollment course on the college campus, which translated into students thinking they were better prepared for the role of college student.

### *Analysis of Research Question 3 - Course Transfer*

Problems with dual enrollment course transfer is one of the concerns found in the literature (Barnett, 2003; Hoffman & Vargas, 2005). The outcome of this research found 91% of students attempted transfer of their ACE credits, and 91% indicated that some or all credits transferred into their program of study. Students going directly to the community college of study (46%) reported credits were already in place; most students attending another college (45%) attempted transfer, while only 9% did not transfer credits. Further examination of the data found three reasons for not attempting transfer: (1) students were attending private, highly-selective institutions that do not accept dual credit; (2) individuals had entered the military; or (3) they were working.

Transferability of dual enrollment credit is significant since ACE students earned an average of 13 credits each—equivalent to one full-time semester. Thirty-four percent earned 0-6 credits, 28% earned 7-12 credits, and 38% earned more than 12 credits. One benefit that dual enrollment may offer is shortened time to college degree, which would provide financial savings and potential for increased earnings. According to the U.S. Department of Education (2009), the six-year bachelor's degree completion rate for full-time students at four-year institutions is approximately 58%. Adelman (2006) says first-

year students who earn less than 20 credits face degree completion challenges while those entering higher education with at least 12 credits are guaranteed momentum.

*Analysis of Research Question 4 - Career Path/College Major Decision*

This researcher had anticipated a direct relationship between dual enrollment and the commitment of respondents to their chosen college major or career path. This was not found to be the case. No statistically significant relationships existed between major/career decision and the independent variables.

*Analysis of Research Question 5 - Student Satisfaction*

Growth of the ACE dual enrollment program and past comments from students and parents have led administrators to believe the program is successful and valued by students. This research confirmed those beliefs. Ninety-eight percent of students rated their satisfaction with ACE as good or excellent, and only 2% rated it poor. No students gave the program a very poor rating. Student satisfaction was directly related to credit hours earned. Students who earned the most dual enrollment credits were the most satisfied. Seventy-two percent of students with more than 12 credits reported their satisfaction as excellent compared with 43% and 49% for credit categories 0-6 and 7-12 respectively. No students in the 7-12 credit range rated the program poor. A reasonable assumption is that 3-4 classes are enough to familiarize students with college, particularly in light of the fact that dual enrollment classes tend to be core requirements. A point of interest is that one student who earned more than 12 credits rated the program poor. A plausible reason is that the student's credits did not transfer into his/her major as expected. Although three students rated ACE program satisfaction as poor, 100% of respondents would recommend ACE to others. This overall positive response for the dual

enrollment program was important to quantify since ACE requires a large portion of the BOCES budget.

#### *Analysis of Research Question 6 - Influencers for Participation*

Seven influencers for participation were quantified to determine their importance to students. The opportunity to take college classes while in high school and to take them for free were the top influencers. Parents/family was third followed by teachers/guidance counselors, opportunity to take classes not available at the high school, friends, and opportunity to gain career skills. Overall rankings were the same for both genders, though there was some variation in male and female responses. Male respondents were 9% more likely to be influenced by friends and 6% more likely to cite teachers/guidance counselors than females. There also was a 9% higher response from males for the item opportunity to take classes not offered at high school. This may be attributed to the fact the community college offers many of its career and technical courses for dual enrollment credit, and a high proportion of these (welding, automotive technology, diesel power, etc.) are traditionally male dominated career paths.

#### Conclusions

The following conclusions were drawn from the data analysis findings of this dual enrollment study. Conclusions are limited to the Accelerated College Education program at the institution of study.

1. Dual enrollment participation prepared students academically for the challenges of college. Students' positive perceptions of academic preparation were reported after having completed one or two years of college work, which gave perspective to their answers. Some of the students (56%) were attending community college while others

were enrolled in a university. Two items that received highest agreement for academic preparation were overall preparation and critical thinking. The latter is particularly important as college instructors demand higher levels of cognition and expect students to analyze, synthesize, and evaluate information.

2. Dual enrollment participation prepared students for the role of college student. Higher levels of preparation were evident for those students taking dual enrollment courses on the college campus than those taking classes at the high school. Overall, students responded positively to three of the five college student role constructs. They were better prepared socially/personally for the challenges of college, discussed goals with an advisor/counselor, and made friends with college students. Most students did not attend college activities or interact with college faculty. Dual enrollment shows benefit for acculturating students to the mores and social norms of college life.

3. ACE students went through the process of transferring their dual enrollment courses, and some or all courses counted at the transfer institution. Transferability of dual enrollment credit is an important issue for students, ACE program administrators, community college faculty, and BOCES, which funds the program. The high school plan of study and the number of dual enrollment credits earned modified transferability. Students on a college track plan and students with at least seven college credits were most likely to transfer their courses. The location of ACE courses had little impact on transferability.

4. Dual enrollment participation did not help students decide a college major or career path. This study concluded that all categories of students responded in a similar

manner regardless of high school plan of study, ACE location, or number of credits earned.

5. Students were pleased with their dual enrollment experience and would recommend the program to others. Students' satisfaction levels increased as they earned more credits. Although not all students gave the program its highest ranking, all in fact said they would recommend the ACE program to others.

6. The opportunity to earn college credit while in high school and the prospect of getting that credit for free strongly influenced students to sign up for dual enrollment. To a lesser extent, students were motivated by parents/family members, teachers/counselors, and friends. Females were more independent in their decision-making, while males relied on friends and counselors to a greater degree. The prospect of gaining career skills had little impact on students' decisions to take dual enrollment. ACE administrators were interested in these findings and intend to use the information when crafting promotional messages for the ACE program.

#### Implications and Recommendations

Positive outcomes from this study of the ACE dual enrollment program provide justification for program expansion and development. Preparation for the rigor of college academics and acclimation to the college student role were evident from students' perceptions of the ACE program. Their opinions were informed by the completion of one or two years of college. Findings from this study have implications for the ACE program in particular and dual enrollment in general. Implications include: (1) dual enrollment improves academic preparation for college, (2) dual enrollment prepares students for the

role of college student, and (3) cost of dual enrollment impacts students' enrollment decisions.

1. Evidence of the ACE dual enrollment program preparing students academically for the challenges of college may encourage local educators to expand the program, especially to the underserved. This positive outcome may also provide higher education leaders and legislators with evidence for statewide application.

A common concern with dual enrollment programs is that college courses taught in the high school are not as rigorous as courses taught on the college campus. Students in this study felt they benefited academically from dual enrollment regardless of where the course was taken—high school or college campus. The implication is that students who participate in dual enrollment gain valuable academic skills necessary for college success and degree completion.

Increasing dual enrollment participation should be directed at those students missing out on early college exposure. The number of minority, low income and/or first-generation students who responded to the survey was low. Steps should be taken to enroll more students from these at-risk groups. Utilizing the federally-funded GEAR-Up program, which targets low income high school students for college preparation, is one recommendation for promoting dual enrollment to the underserved. Additionally, the ACE Advisory Board should consider revising its membership to include all stakeholders and work closely with high schools that have a higher percentage of at-risk students.

2. Evidence of dual enrollment on the college campus preparing participants for the role of college student has implications for program administrators and higher education leaders. What is socially acceptable in high school might be looked upon with

disfavor in a college environment. College students are expected to be self-directed adults who understand college terminology, policies, and procedures. High school students report gaining first-hand knowledge of these expectations through interactions with college students and college faculty and staff. ACE program administrators should consider this implication when reviewing or changing policies regarding course location. Two actions are recommended: (1) explore and expand avenues for providing the college campus experience to dual enrollment students at the high school, and (2) promote the benefits of taking dual enrollment on the college campus. Implementation strategies may include disseminating college terminology guides to dual enrollment students, conducting a college orientation for dual enrollment students and their parents, and promoting the college campus offerings through dual enrollment literature and registration materials.

3. Evidence that cost of dual enrollment matters has implications for ACE program administrators and local and state policy makers. Rising college costs are an impediment to expanding college access to all who can benefit. Generally, community college costs are significantly lower than what four-year colleges and universities charge; however, the expense still prevents some students from pursuing a college degree.

An important benefit of the ACE dual enrollment program is that high school students can earn college credit free of charge. This is especially valuable for reducing the overall cost of a college degree and increasing college participation of low socioeconomic students. Student enrollment would be negatively impacted should BOCES funds be withdrawn or limited and caps placed on the number of credits that ACE students can earn.



Cost has implications for dual enrollment programs everywhere. It is recommended that funding sources be identified to support dual enrollment programs. Higher education leaders and policy makers should examine the implications for keeping dual enrollment free or at a minimum affordable.

#### Future Research

Rapid growth of dual enrollment at the selected institution and at other colleges nationwide justifies scrutiny by stakeholders. Findings and conclusions associated with this study informed suggestions for future research. Local and national studies being recommended include:

- A duplication of this study during November 2010 is recommended to corroborate present findings. One weakness of the current research was a lower than desired statistical accuracy due to low survey response. By conducting the research six months after high school graduation rather than one or two years, students' permanent addresses are less likely to have changed resulting in a higher response. Student e-mail addresses should be collected in spring 2010 prior to high school graduation and added to the survey methodology, which also has potential to increase responses.
- Longitudinal research that follows dual enrollment students from high school to community college and/or university and examines purported program benefits and efficiencies while controlling for student characteristics is rare (Karp et al., 2007) and needed. Florida is the only state that maintains a high school to college student database that is a requirement for such research. A goal of the Wyoming P-16 Council and the state's education department is to develop a comprehensive

student database that includes high school and college results. This goal has a good chance of becoming reality in a state with only one university, seven community colleges, and 86 high schools. Once developed, a longitudinal study of Wyoming dual enrollment should be commenced as it would offer state and national implications for policy and practice.

- This is the first study within Wyoming that examined dual enrollment's potential for improving both academic and social preparation for college. Expanding this site-specific research to students from across Wyoming would provide policy makers with relevant state-wide data and inform their decisions on dual enrollment expansion and improvements, which currently are being discussed.
- Dual enrollment is touted to increase access and success in college for at-risk students such as minority students, first generation college students, and low income students. This study found low participation from these at-risk groups. Further research is needed to determine why participation is low, how it might be increased, and how dual enrollment impacts these students.
- Finally, additional research is needed if the ACE program is to achieve NACEP accreditation. Specifically, the following studies are required: guidance counselor impact, principal impact, teacher impact, and 4-5 year out study (NACEP, 2010).

### Summary

The proliferation of dual enrollment during the past decade is believed to have addressed multiple challenges facing secondary and postsecondary educators, yet outcomes are still being weighed. This study of one community college's dual enrollment program has provided insights into student outcomes for college preparation. Results

show that dual enrollment prepared students academically and socially for the challenges of college, that dual enrollment credits readily transferred, and that students were very satisfied with the overall program. These findings have informed local educators considering program improvements and accreditation.

More research about dual enrollment is needed at the local, state, and national levels. Economic studies have shown that investment in education provides a high rate of return for society and enables countries to be competitive in a global environment. Limited studies of dual enrollment indicate positive results, which suggests human and capital resources directed to this innovation are appropriate.

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APPENDIX A

**Central Wyoming Accelerated College Education (ACE/BOCES) Student Follow-up Survey**

Dual Enrollment Program powered by BOCES

This survey can be completed online at: [www.communitycollege.edu/boces/survey](http://www.communitycollege.edu/boces/survey)

Instructions: Please complete the entire survey by checking the appropriate boxes and filling in the blanks with your responses.

1. I am 18 years old (or older) and agree to allow the information provided in this survey to be used for research purposes that may be published. (Your name and all other personal identifying information will be removed.)  Yes  No
  
2. My High School was:
  - a.  Public (also indicate school)  Natrona County  Kelly Walsh  Roosevelt  Mid-West
  - b.  Private/Parochial
  - c.  Home School
  
3. My high school plan of study was:  
 College track  Career & Technical Education (CTE) track
  
4. I took ACE/BOCES (accelerated college) classes at the following locations (check only one):  
 High School campus only  
 Community College campus only  
 Both high school & Community College campus
  
5. What/who influenced your decision to enroll in college classes while in high school? (check all that apply):  
 Parents and/or family members  
 Opportunity to earn college credit while in high school  
 Friends  
 Free college classes  
 Teachers/Guidance Counselors  
 Opportunity to take classes not offered at high school  
 Opportunity to gain career skills
  
6. Total number of college credits you earned through the ACE Program: \_\_\_\_\_
  
7. I am currently:  
 Enrolled at a 2-Year College  
Name: \_\_\_\_\_ City and State: \_\_\_\_\_  
 Enrolled at a 4-Year College  
Name: \_\_\_\_\_ City and State: \_\_\_\_\_  
 Working full-time  
Employer location: City and State: \_\_\_\_\_  
 Other (explain): \_\_\_\_\_
  
8.  **Please check this box if you did NOT attend a college, university, professional school or any postsecondary training after high school and skip to question 15.**

9. Have you attempted to transfer the college credits you earned through the ACE Program to the college in which you are now enrolled? *(Check all that apply.)*

No, I did not need to request a transfer of my college credits because I am now enrolled at Community College.

Yes, I had my college transcript sent to the college in which I am now enrolled.

No, I did not even transfer my credits. *(Please explain why.)* \_\_\_\_\_

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10. How did the college credits earned through the ACE Program apply at the college in which you are now enrolled? *(Check all that apply.)*

I was exempted from a required course. *(For example, you did not need to take a required English composition course in college because you successfully completed an equivalent college writing course through Community College.)*

I was able to start in a more advanced course in college. *(For example, you were allowed to take Organic Chemistry earlier than normal because you had already successfully completed an introductory college Chemistry course through Community College.)*

I was allowed to count some or all of the Community College credits toward my college degree completion requirements. *(Counting either as electives, as meeting general education requirements, or as part of a major or minor.)*

I was not allowed to apply any of the credits to my college degree program. *(Please explain why.)*

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11. Did the ACE Program help you decide on a college major or career path?

Yes, my college classes helped me determine a college major or career path.

No, my college classes did not help me choose a career path or college major.

12. As a result of taking college courses through the ACE Program:

	Strongly Agree	Agree	Disagree	Strongly Disagree
a. I was better prepared academically for the challenges of college.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. I strengthened my study habits <i>(test-taking, time management, note-taking skills, etc.)</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. I strengthened my writing skills.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. I strengthened my speaking skills.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. I strengthened my math skills.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. I strengthened my technical skills.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. I strengthened my computer skills.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. I strengthened my critical thinking skills.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

13. As a result of taking college courses through the ACE Program:

	Strongly Agree	Agree	Disagree	Strongly Disagree
a. I was better prepared socially/personally for the challenges of college.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. I discussed my college goals with an advisor or counselor.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. I made friends with other college students.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. I attended college activities outside of class.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. I interacted with my college faculty outside of class.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

14. What is your current college/postsecondary cumulative GPA? \_\_\_\_\_ (4.0 pt. scale)

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15. Looking back, rate your overall experience satisfaction with the Accelerated College Education (ACE) Program.

Excellent Good Poor Very Poor

16. Would you recommend the Accelerated College Education (ACE) Program to current high school students?

Yes No

*The next few questions may seem personal. We ask these questions because governments and education-related agencies often want to know who is served by dual enrollment and/or concurrent enrollment programs.*

17. Did one or more of your parents attend College?

Yes No

18. Which income background would you consider your family to fall within?

Low Income (<\$33,000) Moderate or Middle Income High Income (>\$150,000)

19. If you attended a public high school, did you qualify for a free or reduced lunch plan?

Yes No

20. Were/are you eligible for a Pell grant? Yes No

21. Are you a: Female Male

22. Are you: *(Check only one.)*

- African-American/Black
- American Indian/Alaska Native
- Asian-American/Asian
- Caucasian
- Hispanic of any race
- Native Hawaiian/Pacific Islander
- Other: \_\_\_\_\_

23. Do you have any comments about your Accelerated College Education experience?

24. Do you have any suggestions for improvement of the ACE Program?

**Thank you for completing this survey!**

APPENDIX B

ACE Tables

Table B1

*2007-2008 ACE Enrollment by Grade and Achieved GPA*

Grade	# ACE Students	% Students in ACE program	Avg. H.S. GPA	Avg. College GPA
12	398	47.7%	3.18	3.04
11	293	33.9%	3.10	3.11
10	107	12.8%	2.96	3.20
9	46	5.5%	2.59	3.45
Total	834		3.09	3.10

Table B2

*2007-2008 ACE Credits Attempted and Passed for Whole Group and Individually*

Grade	ACE Group as a Whole			Individually	
	Total Credits Attempted	Total Credits Passed	% Credits Passed	Avg. Credits Attempted	Avg. % Passed
12	3040.50	2531.2	83%	7.83	81%
11	1242.80	1081.27	87%	4.62	88%
10	418.00	341.00	82%	4.2	80%
9	138.00	126.00	91%	3.1	92%
Total	4846.25	4086.5	84%	6.0	84%

APPENDIX C

Research Approval Letters

May 13, 2009

Ms. Janet Hoyt  
BOCES Program Specialist  
Natrona County School District/Casper College  
Casper, WY 82601

Dear Ms. Hoyt:

Institutional Approval Granted: 5-13-2009

TITLE: Central Wyoming Accelerated College Education (ACE) Student Follow-up Survey conducted by the Central Wyoming Board of Cooperative Educational Services

This letter is to officially notify you of the approval of your project to survey Casper College dual enrollment students concerning their ACE/BOCES experience. This project fits with the assessment goals of our institution and will assist in program improvement. The study should be conducted in accordance with U.S. Department of Education's regulations for the Protection of Human Subjects, which provides adequate safeguards for the rights and welfare of the participants in this study. Your proposal meets the criteria for classification as exempt.

If you have any questions or encounter any unanticipated problems involving risks to the participants or others, please contact my office at 307-268-2458.

Sincerely,

Walter H. Nolte, President

June 2, 2009

Ms. Joanna Anderson  
Vice President for Student Services  
Casper College  
Casper, WY 82601

Dear Ms. Anderson:

TITLE: Central Wyoming Accelerated College Education (ACE) Student Follow-up Survey conducted by the Central Wyoming Board of Cooperative Educational Services

This letter is both approval and support of your request to use archival data collected by the Central Wyoming Board of Cooperative Educational Services for your dissertation study of dual enrollment. As College President, I approved BOCES' request to conduct the project as it fits with the assessment goals of our institution and has potential to assist in program improvement. The study was conducted in accordance with U.S. Department of Education's regulations for the Protection of Human Subjects.

The archival data you requested will not include any personal identifying information of the survey participants. Results of your study should be reported to the Casper College assessment office. If you have any questions please contact my office at 307-268-2458.

Sincerely,

Walter H. Nolte, President



## VITA

### JOANNA J. ANDERSON

Joanna J. Anderson is Vice President for Student Services at Casper College in Wyoming, a community college of nearly 5,000 students. After attending public elementary and secondary schools in Missouri, she received the following degrees: A.A. from North Central Missouri College in Trenton; B.S. in agricultural journalism from the University of Missouri in Columbia; M.Ed. from William Woods University in Fulton, Missouri.

Ms. Anderson has been a leader in community college student services for 23 years. Her experience encompasses one-stop student services, comprehensive student life services, intercollegiate athletics, campus security systems, program assessment, and most recently capital construction. She has presented professionally on the topic of student retention and college student success.

Ms. Anderson is an active member of the following professional organizations: Student Affairs Administrators in Higher Education (NASPA), American Association of Community Colleges (AACCC), American College Personnel Association (ACPA), and the Casper Chamber of Commerce Board of Directors. She was honored in 2009 by the University of Missouri and the Missouri Community College Association as a distinguished alumnus.