

**Degree completion and acceleration rates of  
Iowa community colleges' concurrent enrollment students**

by

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## TABLE OF CONTENTS

LIST OF TABLES.....	v
LIST OF FIGURES .....	vii
ACKNOWLEDGEMENTS.....	viii
ABSTRACT.....	ix
CHAPTER 1. INTRODUCTION .....	1
Background and Significance.....	1
Statement of the Problem.....	7
Purpose and Research Questions .....	10
Theoretical Perspectives and Conceptual Frameworks .....	12
Definitions of Terms .....	22
CHAPTER 2. REVIEW OF THE LITERATURE .....	29
Introduction .....	29
The Historical Perspective of Dual Credit Programs .....	32
Dual Enrollment: Four Models.....	33
Linking Secondary Education with Collegiate Education.....	35
Program Criteria, Recommendations for Implementing Programs and Iowa’s Status .....	38
Characteristics of High Quality Credit Based Transition Programs .....	42
Addressing the Rigor and Quality of Concurrent Enrollment Programs in Iowa ..	44
Concurrent Enrollment Best Practices .....	44
Maintaining Program Support and Success: A Focus on Quality .....	47
The Iowa Plan for Concurrent Enrollment Programs.....	49
Economic Impact of Concurrent Enrollment Programs in Iowa .....	54
Retention and Graduation .....	56
Research Studies on Concurrent Enrollment Students .....	58
Academic Performance .....	58
Student Satisfaction.....	59
Graduation Rates .....	59
CHAPTER 3. METHODOLOGY OF THE STUDY .....	64
Overview .....	64
Hypotheses .....	65
Methodological Approach.....	66
Population and Sample .....	68

Data Sources and Collection.....	69
Matching Data – Selection of Population.....	69
Extracting Data.....	73
Data Access and Security.....	74
Data Analysis.....	75
Research Question 1.....	76
Research Question 2.....	77
Research Question 3.....	79
Research Question 4.....	80
Logistic Regression.....	80
Research Question 5.....	83
Multiple Regression.....	84
Variables in the Study.....	87
Independent Variables.....	87
 CHAPTER 4. RESULTS.....	 95
Demographics of Concurrent Enrollment Students.....	95
Gender.....	98
Race/Ethnicity.....	98
Earned Credit Hours.....	98
Served with Support Services.....	99
Intent/Goal of Student at Registration.....	99
Program Major.....	100
Demographics of Concurrent Enrollment Students by Program Major.....	101
Program Major by Gender.....	101
Ethnicity by Program Major.....	102
Iowa Career Clusters (Program Majors).....	103
Degree Completers by Program Major.....	105
Degree Completers by State Clusters (Program Majors).....	107
Analysis of Concurrent Enrollment Student Degree Completers by Award Type.....	108
Concurrent Enrollment Student Completers by Gender and Ethnicity.....	110
Gender.....	110
Ethnicity.....	111
Concurrent Enrollment Students Completing a Degree.....	112
Regression Analysis.....	112
Predicting Concurrent Enrollment Students' Time to Degree.....	116
Multiple Regression Analysis.....	116
 CHAPTER 5. DISCUSSION, CONCLUSIONS AND IMPLICATIONS.....	 120
Background Characteristics of Concurrent Enrollment Students.....	120
Gender.....	121

Race/Ethnicity .....	121
Credit Hours .....	123
Program Major .....	124
Concurrent Enrollment Student Degree Completers by Award Type .....	125
Background Characteristics of Concurrent Enrollment Student	
Degree Completers.....	126
Concurrent Enrollment Students' Completing a Degree and Time to Degree ...	127
Limitations of the Study .....	128
Delimitations.....	130
Recommendations for Future Research .....	131
Implications for Practice and Policy .....	132
APPENDIX A .....	135
Pearson Correlation Matrix of Selected Variables for Degree Completion.....	136
APPENDIX B .....	137
Summary of Regression Analysis for Variables Predicting Concurrent	
Enrollment Students' Time to Degree .....	138
APPENDIX C .....	139
Copy of Approved Institutional Review Board Application – October 2008 .....	140
APPENDIX D .....	146
Copy of Approved Institutional Review Board Application – October 2010 .....	147
REFERENCES .....	153

## LIST OF TABLES

Table 1.1.	Iowa Community College Fiscal Year 2002 to 2008 Concurrent Enrollment .....	5
Table 2.1.	Key Features, Scope, and Influence of Three Selected Academic Pathways.....	36
Table 2.2.	Addressing Access and Quality Recommendations .....	40
Table 3.1.	Coding of the Independent Variables in the Logistic Regression Model...82	
Table 3.2.	Variables for Sequential Multiple Regression of Time to Degree .....	87
Table 3.3.	Coding of Independent Variables .....	91
Table 4.1.	Frequency (Percentages) of Concurrent Enrollment Students' Demographics .....	96
Table 4.2.	Frequency (Percentages) of Concurrent Enrollment Students' Gender and Ethnicity by Program Major.....	103
Table 4.3.	Frequency (Percentages) of Concurrent Enrollment Students Enrolled by Iowa Career Clusters (Program Majors) .....	105
Table 4.4.	Frequency (Percentages) of Concurrent Enrollment Student Degree Completers by Program Major.....	107
Table 4.5.	Frequency (Percentages) of Concurrent Enrollment Student Degree Completers by State Cluster (Program Major) .....	108
Table 4.6.	Frequency (Percentages) of Concurrent Enrollment Students' Completion by Award Type .....	110
Table 4.7.	Frequency (Percentages) of Concurrent Enrollment Student Completers by Gender/Ethnicity .....	111
Table 4.8.	Odds Ratios for the Independent Variables Associated with Students Enrolled in Concurrent Enrollment Programs Completing a Degree.....	115
Table 4.9.	Summary of Regression Analysis for Variables Predicting Time to Degree for Concurrent Enrolled Students.....	119

Appendix A. Pearson Correlation Matrix of Selected Variables for Degree Completion .....	136
Appendix B. Summary of Regression Analysis for Variables Predicting Concurrent Enrollment Students' Time to Degree .....	138

**LIST OF FIGURES**

Figure 1.1.	Conceptual Framework .....	16
Figure 1.2.	Predictive Model of Degree Attainment .....	21
Figure 2.1.	Credit Based Transition Programs for High Schools Students .....	32
Figure 2.2.	Ten Program Criteria of Dual Enrollment Programs .....	39
Figure 3.1.	Phase One and Two: Matching Data.....	71
Figure 3.2.	Phase Three: Matching Data.....	72
Figure 3.3.	Extracting Data .....	74
Figure 3.4.	Conceptual Model for Concurrent Enrollment Students' Likelihood of Degree Attainment.....	83

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## **ABSTRACT**

The appeal of concurrent enrollment programs is widespread in Iowa and throughout the United States. The fifteen Community Colleges in Iowa provide extensive opportunities for high school students to enroll in and successfully complete college credit courses while in high school. Accountability in all educational programs is increasing, concurrent enrollment (dual credit) programs must meet the challenge and be able to stand up to scrutiny. Any program that does not have data to support progress and academic gain is in jeopardy of being phased out and dual enrollment programs are not exempt from this scrutiny (Burns & Lewis, 2000). The significance of this study lies in the fact that despite the increase in concurrent enrollment programs and the attention that has been given to them in the state of Iowa, virtually no research has been undertaken to examine the impact of participation in these programs on college persistence, degree completion and acceleration rates.

This study focused on two benefits to participating in concurrent enrollment programs that of degree attainment and accelerated progress towards the degree. The purpose of this quantitative study was to: (1) develop a profile of the demographic characteristics of Iowa's concurrent enrollment students; (2) develop a profile of the demographic characteristics of concurrent enrollment students who complete a degree, diploma or certificate at an Iowa community college; (3) determine the effects of gender, ethnicity, and student status (arts and sciences versus career and technical) and student intent/goal at registration (transfer to college or university or prepare to enter the job market) on degree completion and

acceleration towards a degree, and (4) contribute to the existing body of knowledge related to concurrent enrollment/dual enrollment.

In this study, degree completion rates were highest for female, white concurrent enrollment students enrolled in college parallel programs and for the male, white student enrolled in career and technical programs. Degree completion rates were lowest for male, non-white students enrolled in arts and sciences programs.

Of the student background characteristics in this study, gender appeared to play the largest role in degree completion and acceleration rate. Females had significantly higher graduation and acceleration rates than males.

Ethnicity had no impact on any of the regression models. However, there were very small numbers of ethnic minorities enrolled in concurrent enrollment programs for fiscal 2002.

For students' intent/goal (transfer to a college or university or prepare to enter the job market) these variables had a positive influence on degree completion and a negative influence on acceleration (time to degree). The findings in this study revealed 79.1 percent of the concurrent enrollment students were enrolled in college parallel programs in fiscal year 2002, the balance of the concurrent enrollment students were enrolled in career and technical programs (19.8 percent). The results of this study revealed that 23.9 percent of the concurrent enrollment students enrolled in college credit courses for fiscal 2002 completed a degree in fiscal years 2002, 2003, 2004 or 2005.

## CHAPTER 1. INTRODUCTION

### Background and Significance

The far-reaching implications of dual credit are phenomenal and are heralded by school districts and community colleges alike as an innovation that will “blaze a trail” for successful educational partnerships into the 21<sup>st</sup> century (Fincher-Ford, 1997). Increasing focus on the need for high academic standards, coupled with the growing importance of attaining a postsecondary education, has led to the growth of programs – called dual enrollment or dual credit in most areas – that allow high school students to take college-level classes and earn college credit while still in high school (Community College Resource Center April, 2002). A 2001 report by the Education Commission of the States reported that all but three states have some sort of dual enrollment program, though the comprehensiveness and institutional arrangements promoting the programs vary widely. Overall, approximately 813,000 high school students took college-level courses through postsecondary institutions, either within or outside of dual enrollment programs, during the 2002-03 12-month academic year (U.S. Department of Education, 2004). Approximately 680,000 high school students took courses for college credit within dual enrollment programs (Kleiner & Lewis, 2005). Despite the growing popularity of dual enrollment programs, little rigorous research has been conducted on their effectiveness (U.S. Department of Education, 2005).

By providing a pathway for students to move seamlessly between K-12 and postsecondary systems, dual enrollment is thought to promote greater support for students’ college aspirations and greater collaboration between high schools and

colleges (Bailey & Karp 2003; Clark 2001). Proponents, including the National Commission on the High School Senior Year and the Bill and Melinda Gates Foundation, see dual enrollment programs as meeting a myriad of needs, including: promoting rigorous high school academics; increasing student motivation and making the senior year of high school more meaningful; expanding the curriculum for advanced and vocational students; socializing students into the role of a college student; and lowering the costs of postsecondary education for students and their families (Community College Resource Center April, 2003). Dual enrollment can also fit with other federal goals, such as improved career guidance in high school and the more effective assessments sought by the No Child Left Behind (NCLB) strategy (U.S. Department of Education, 2000).

The national research shows that dual enrollment programs are very successful in providing a much needed academic stimulus for junior and senior secondary school students (Andrews, 2001). By providing advanced courses to high school students, community colleges are effectively working to reduce the social and economic costs brought about by “senior slump” (Peterson, 2003). This type of community college involvement is especially important in districts where high schools are unable to offer advanced courses due to staffing and financial restraints (Robertson, Chapman & Gaskin, 2001). There is evidence that students enjoy their participation in dual enrollment programs, find it useful and motivating, and are generally satisfied with their experience (Orr, 2002; see also Robertson, Chapman & Gaskin, 2001). However, much of the research that is available has been conducted by the programs themselves, and therefore has a tendency to be “cheerleading”

emphasizing positive outcomes rather than objectively reporting student impacts (Bailey, Hughes & Karp, 2002).

Even with the broad support for and growing number of dual enrollment programs, a number of concerns are cited:

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

Throughout the United States and in Iowa, concurrent enrollment courses have become an essential part of high school programs and a new market for the community colleges. The fifteen Community Colleges in Iowa provide extensive opportunities for high school students to enroll in and successfully complete college credit courses while in high school. The partnerships between the Iowa Community Colleges and their local school districts show a strong commitment to student learning and student success. Iowa's Community Colleges are working in

collaboration with their area high schools and the four-year colleges and universities to assure that high school graduates enter into the workforce and higher education as fully prepared as possible.

In Iowa, high school students enroll in community college credit in a variety of ways including through Postsecondary Enrollment Options (PSEO) courses, college credit courses offered through a contract between a local school district and a community college, and enrollment in a college course independently as a tuition paying student (Iowa Department of Education Joint Enrollment Report, 2008). The community college programs in Iowa have been referred to as “dual credit”, “concurrent enrollment”, and “joint enrollment”, by the Iowa Department of Education. In 2008, the Iowa legislature consolidated and standardized all high school credit enrollment programs under the rubric of Senior Year Plus. The existing programs involving college credit opportunities for high school students including Postsecondary Enrollment Options (PSEO) courses, concurrent enrollment (which entails supplementary weighting for local school districts), career and regional academies, and advanced placement all fall under Senior Year Plus.

In the state of Iowa for fiscal year 2008, the 15 public community colleges reported an unduplicated enrollment of 31,450 concurrent enrolled students. Nearly 70 percent of the students were enrolled in arts and sciences programs, while more than 27% were enrolled in career and technical programs. Since the Iowa Department of Education began tracking concurrent enrollment students in 2002 the growth has been significant. As shown in Table 1.1, concurrent enrollment at Iowa’s Community Colleges has grown 101.2% over the past seven fiscal years. In many

states, including Iowa we have judged our concurrent enrollment programs as being successful due to the large increases in enrollment in the past few years and the increase in the number of courses being offered by the community colleges for college credit.

**Table 1.1**

**Iowa Community College Fiscal Year 2002 to 2008 Concurrent Enrollment**

College	Fiscal Year							%Δ 02-07
	2002	2003	2004	2005	2006	2007	2008	
Northeast Iowa	1,000	1,504	1,791	1,905	2,230	2,277	2,409	140.90%
North Iowa Area	560	650	721	945	944	1,059	1,262	125.36%
Iowa Lakes	1,121	1,189	1,226	1,215	1,279	970	1,582	41.12%
Northwest Iowa	426	377	445	459	574	671	608	42.72%
Iowa Central	2,045	2,145	2,314	2,606	2,707	2,928	3,026	47.97%
Iowa Valley	554	640	671	750	782	1,035	1,033	86.46%
Hawkeye	519	782	836	802	1,019	1,436	1,598	207.90%
Eastern Iowa	765	829	964	1,434	810	2,372	2,081	172.03%
Kirkwood	1,248	1,508	1,701	1,601	1,766	2,275	2,527	102.48%
Des Moines Area	3,029	3,634	5,007	6,071	7,736	8,646	9,249	205.35%
Western Iowa	1,819	1,875	2,486	2,025	2,135	2,350	1,882	3.46%
Iowa Western	1,238	1,320	1,278	1,416	1,598	1,925	1,733	39.98%
Southwestern	372	410	430	448	493	528	632	69.89%
Indian Hills	573	518	623	616	691	884	1,061	85.17%
Southeastern	364	452	557	612	814	743	767	110.71%
Total	15,633	17,833	21,050	22,905	25,578	30,099	31,450	101.18%

% Δ = Percent Change

Source: Iowa Department of Education, Bureau of Community Colleges and Workforce Preparation, Community College MIS, Joint Enrollment Report (2008).

The U.S. Department of Education in conjunction with the U.S. Secretary of Education's High School Leadership Summit (2005) maintains that more information is needed on: 1) How many and what types of students participate in dual enrollment; 2) What program features are most common; 3) Whether these efforts support the transition and persistence of students in postsecondary education; and

4) How state policies influence program structures and practices. These are questions that deserve answers through further examination of Iowa's community college high school students enrolled in concurrent enrollment programs/courses.

Accountability in all educational programs is increasing; concurrent enrollment (dual credit) programs must meet the challenge and be able to stand up to scrutiny. Any program that does not have data to support progress and academic gain is in jeopardy of being phased out and dual enrollment programs are not exempt from this scrutiny (Burns & Lewis, 2000). The significance of this study lies in the fact that despite the increase in enrollment in concurrent enrollment programs and the attention that has been given to dual enrollment programs, virtually no research has been undertaken to examine the impact of participation in these programs on college persistence, degree completion and acceleration rates.

Clearly a more complete understanding of the effect of participating in concurrent enrollment programs on educational attainment is essential and will be beneficial for both community college and school district administrators, legislative leaders and state policymakers. The information from this study could be used by secondary and postsecondary schools when making decisions to continue, expand, decrease or discontinue concurrent enrollment (dual credit) programs. State policymakers are interested in ensuring that state funds are invested wisely. Successfully decreasing the time-to-degree or certification for students can and does result in savings of public dollars and can also provide a real cost savings to Iowa families. At the state level, the information will aid in making legislative and funding decisions regarding concurrent enrollment programs. Further, concerns have been

raised about access to concurrent enrollment programs for low income and minority students who traditionally have not participated in education at the college level. For these populations, funding can be a road block to participation in concurrent enrollment programs. More research, innovation and commitment will be needed to address these issues. The goal of this dissertation is to fill some of the voids in the concurrent enrollment/joint enrollment literature and to offer new approaches to understanding the demographics of the students that participate in concurrent enrollment (dual credit) programs and the effect of participating in these programs on degree attainment and acceleration.

#### Statement of the Problem

The academic experiences of high school dual credit students have been documented by Kim, (2006); Hoffman, (2005); Elmers & Mullen, (2003); Spurling & Gabriner, (2002); Nitzke, (2002); Richardson, (1999); Catron, (1998); Puyear, (1998); Johnson & Kiger, (1997); Windham, (1996). The studies found that relative to non-participants in dual credit, dual credit students are better prepared for college, show lower remedial credit hours earned, demonstrate superior academic performance in college, earn more college credits, and excel in the return rate for the second year of college. Bailey & Karp (2003) conducted a thorough literature review including 45 articles and reports on dual credit courses. They concluded few studies offer rigorous evidence of the impact of dual credit or concurrent enrollment on students' outcomes.

Bragg's (2006) article, *Transitions to College: Academic Pathways from High School to the Community College*, examines dual credit and dual enrollment, tech prep and career pathways, and middle and early college high school models. Although the study identified key features, scope and potential impact on students, and the role of the community college, the findings did not present an in-depth view showing the influence of these models on student outcomes. Bragg recommends community colleges can and should play a larger and more influential role in conducting research that tracks students from high school to the community college. The research should examine the students' participation in the community college curriculum and their completion of certificates and degrees, their transfer to and completion of four-year college and university studies, and their progression into the workplace (Bragg, 2006). Follow-up and longitudinal studies that document student participation and outcomes in the various academic pathways (dual credit or dual enrollment, tech prep and middle college or early college high schools) are needed (Social Science Research Council, 2005). Studies examining the impact of participation in academic pathways on college performance, persistence, completion, and placement in employment are needed, with careful attention paid to conducting studies that are sensitive to the needs, goals, and characteristics of underserved students (Bragg, 2006).

Supporters of dual credit programs contend that high school students who participate in these programs improve graduation and college continuation rates as well as make the transition from high school to college easier. They also suggest that the program decreases the number of years it takes to earn a degree; thus,

financing a college education becomes less costly. Bogert (as stated in Burns & Lewis, 2000) declared that the benefits of the dual enrollment system are potentially endless. He explained that dual enrollment systems can be used to enhance academic performance and to bridge gaps in race relations. The lack of research that documents the impact of student participation and outcomes in concurrent enrollment programs, makes it difficult to conclude whether, in fact, the programs do what their proponents claim them to do. In Iowa, virtually little research has been undertaken to investigate the impact of participation in concurrent enrollment (joint enrollment) programs on college persistence, degree completion and acceleration rates.

Previous studies have focused on the number of students participating, grade point averages, standardized tests scores, and grades earned in college courses compared to the regular student enrollment. This study seeks to go beyond the research on comparing grades earned by concurrent enrollment students to the grades of regular full-time college students. The study will address how many of the concurrent enrollment students in Iowa continue their education at the community college and complete a degree, diploma or certificate. The research will further document the demographic characteristics of the students participating in concurrent enrollment programs. Optimally, each state's concurrent enrollment programs should consider the needs of all student groups such that state's goals and resources are used strategically to enhance opportunities for more students to access a college education.

### Purpose and Research Questions

The purpose of this study was to examine the persistence, degree completion, and acceleration rates of Iowa's concurrent enrollment students in fiscal year 2002 (07/01/01—06/30/02). Specifically, the study was designed to assess the impact of concurrent enrollment participation on college graduation and acceleration. The unit analysis is the population of students who enrolled in concurrent enrollment programs in fiscal year 2002. The research focuses on two goals that are typically offered by dual-credit programs (Clark, 2001), degree completion and acceleration. According to Clark (2001), high school students who earn early college credit are more likely than traditionally-enrolled students to complete college degrees. In addition, proponents of concurrent enrollment programs argue that an important effect of concurrent enrollment is acceleration, since the dual credit programs "accelerate" student's educational progress in college; in other words, dual-credit programs purportedly provide students with a "jump start." In evaluating persistence and graduation the research addressed how many of the concurrent enrollment students continued their education at the community college and completed a degree, diploma or certificate.

Further, another objective of the study was to examine the differences in degree attainment by student status (arts and sciences versus career and technical), gender, and racial/ethnic background and educational goals of the students. The examination of these variables were also included in the study in an attempt to determine if any variable studied was more of a predictor of degree completion and the time it takes to obtain a degree than any other. The predictor variables were

based on the literature research about the educational progress and attainment of students at four-year institutions, not on the “largely ignored student constituency” of the community college (Pascarella, 1999, p. 13). Extensive research has established the correlation between student achievement and various variables such as race-ethnicity, income, parent education, gender, age, and family structure (Desimone, 1999; Hurtado, Inketas, Briggs, & Rhei, 1997). A significant body of literature has also examined the input of precollege traits on student persistence. Characteristics such as gender, race, high school GPA, and scores on college entrance exams have been analyzed to determine the influence of these traits on student persistence (Reason, 2001).

The ultimate goal of this study is to move beyond the previous research on concurrent enrollment/joint enrollment in an effort to establish new methods, concepts and frameworks to better understand the impact of participation in concurrent enrollment programs on persistence, acceleration, and degree completion. This study will specifically examine a cohort of students to analyze their transition to the community college including the completion of a degree, diploma or certificate. Finally, the study will contribute to the body of knowledge relating to studies on access to concurrent enrollment programs for underserved students, in particular for minority students.

Based on the objectives stated, this study attempted to address the following research questions:

- 1) What are the background characteristics of the students enrolled in concurrent enrollment programs in fiscal year 2002 (07/01/01-06/30/02)?

- 2) How do concurrent enrollment students differ in their enrollment by program major? Specifically, to what extent are there differences in terms of enrollment in career and technical programs and the arts and sciences programs by gender and racial/ethnic background?
- 3) How many of the students in a concurrent enrollment program in 2002 completed a program of study at the community college? How do concurrent enrollment students differ in their degree completion by student status (career and technical versus arts and sciences)? Specifically, to what extent are there differences in terms of degree completion by gender and racial/ethnic background?
- 4) To what extent do students' demographics (gender and ethnicity), student academic status (career and technical versus arts and sciences), and educational goals (transfer to a college/university or enter job market) relate to the likelihood of a concurrent enrollment student completing a degree?
- 5) To what extent do differences in background characteristics (gender and ethnicity), student academic status (career and technical versus arts and sciences), and educational goals (transfer to a college/university or enter job market) predict the time it takes the concurrent enrollment students to obtain a degree?

### Theoretical Perspectives and Conceptual Frameworks

Several epistemological assumptions guide quantitative research. First, the assumption of quantitative methodology is that numbers for a large sample of

individuals can be analyzed and used to make generalizations where warranted about the larger population from which the sample was taken (Creswell, 2003). In this study a dataset from the Iowa Department of Education was used to analyze the data on students enrolled in concurrent enrollment programs for one academic year. The dataset includes the population of all concurrent enrollment students enrolled in college courses at Iowa Community Colleges in fiscal year 2002. Second, quantitative research seeks to establish universal generalizations that are context free (McMillian & Schumacker, 1997). For the sake of this study, the 2002 concurrent enrollment population will be treated as a sample to make generalizations about a larger population of concurrent enrollment students enrolled in other academic years. Third, quantitative research uses an established set of procedures and steps to guide the researcher and relies upon research design to reduce selectivity. The second and third assumptions relate that appropriate research design and methods can be used to guide researchers in making decisions regarding hypotheses. Fourth, the purpose of quantitative research is to establish relationships or explain causes of changes in social reality. Stage (1990) explained that quantitative researchers attempt to explain the world through the notion of causation and that quantitative research techniques provide, “an estimate of our attempts at such explanation” (P. 431). To clarify, Creswell (2003) suggests hypotheses are predictions the researcher holds about the relationship among variables. Using a deductive approach, this study hypothesizes themes or patterns before data collection and searches the data to support or challenge the proposed model. Similar to other quantitative studies, the deductive design of the study uses

data to test the hypothesized relationships among the variables of interest (Krathwol, 1998). By grounding this research in various theoretical and conceptual models, this study offers new ways to test hypothesized relationships among several variables that have been demonstrated to influence degree completion and acceleration.

One of the primary purposes of this study was to determine the impact of participating in concurrent enrollment (joint enrollment) programs on earning a degree at the community college. In addition, this study was conducted to address the effect of student academic status (arts and sciences vs. career and technical), background characteristics, and educational goals on attaining a degree and predicting the time it takes to complete the degree. Thus, it is important to review existing frameworks that can be applied to this study to identify common themes of practices and models related to the impact of concurrent enrollment (joint enrollment) on degree completion and acceleration.

This research study is based on several theoretical perspectives that seek to connect multiple models into an explanation of degree attainment and acceleration rates for students participating in concurrent enrollment programs. Dual credit benefits and goals for the students participating in concurrent enrollment programs, and sociological and economic theory created the frameworks for this study. Two principles from these conceptual frameworks guided this study. The first principle is that participation in concurrent enrollment (dual credit) improves college graduation and continuation rates and decreases the number of years it takes to earn a degree. The second principle that guided this study asserts that a student's background, ability, and contextual factors, including the high school background of dual

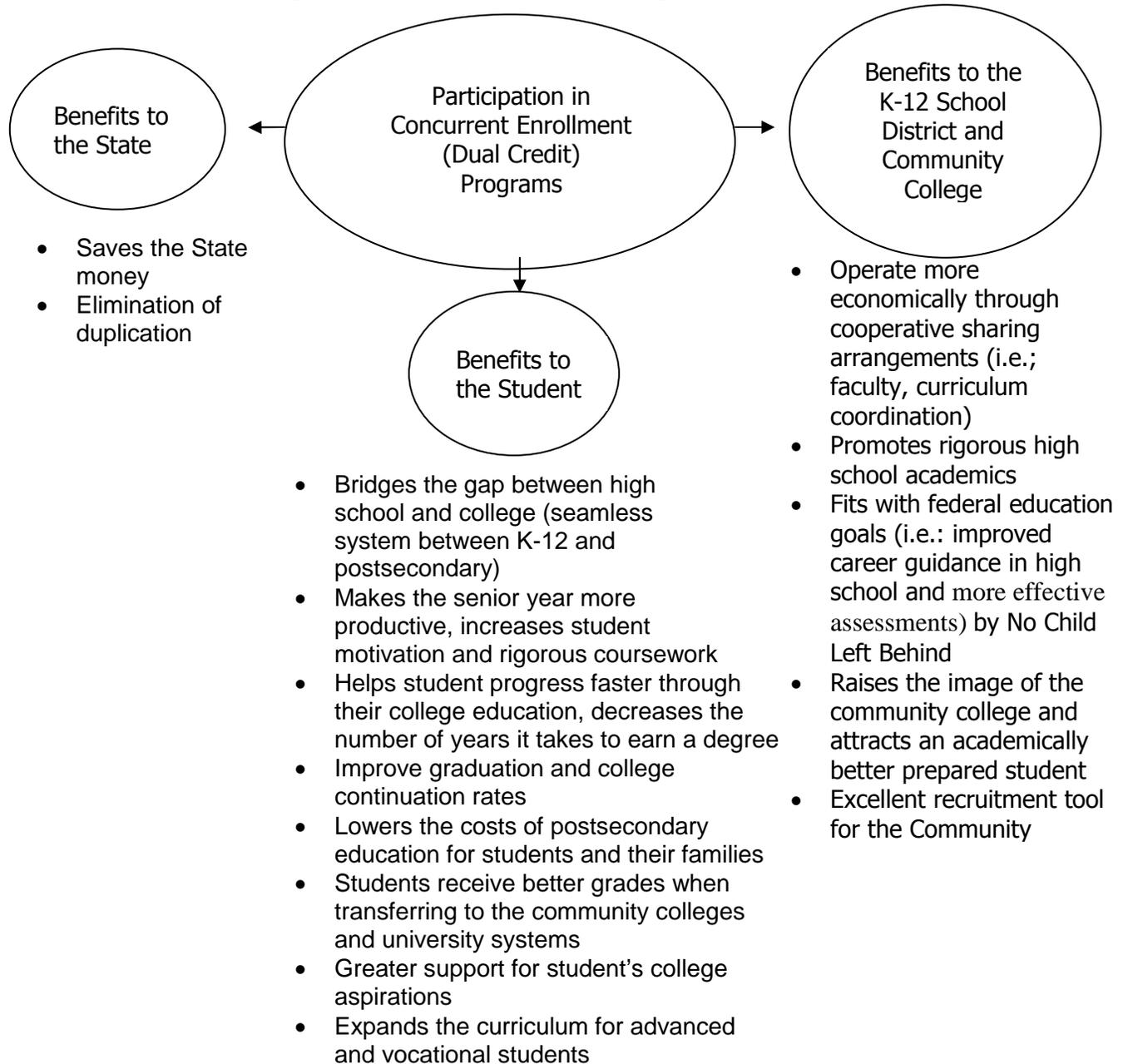
enrollment are correlated with the formation of educational aspirations (Gorg, Kauppi, Lewko, & Urajnik, 2002; Paulsen, 1990). Educational aspirations is defined by Paulsen (1990) as the earliest stages of the college choice process during which the desire to continue education beyond the secondary level is formed.

In formulating conceptual models for studying the impact of concurrent enrollment programs (dual credit) on degree completion and acceleration rates, the benefits and goals of the programs provide useful prototype. Thus, it is important to review the existing benefits of concurrent enrollment programs for all parties involved in the process. By determining the benefits and goals to students participating in concurrent enrollment (dual credit) programs we can better understand student experiences and outcomes. The benefits to participation in concurrent enrollment programs (dual credit) for students serve as a conceptual framework for this study. Figure 1.1 illustrates the benefits to all constituents including the K-12 school district, the community college, the state of Iowa and the students participating in concurrent enrollment programs.

The creation of dual-credit enrollment partnerships provides postsecondary enrollment options to high school students that may (a) ease transition to college, (b) reduce college costs by accelerating time to degree completion, and (c) provide a highly- trained workforce that can compete in a global marketplace (Boswell, 2001). More specifically, these partnership programs are helping high school students to obtain higher-level job skills, get a head start on college coursework and make the most out of their senior year in high school (Kronholz, 1999; Marshall & Andrews, 1991). Students benefit by completing college in less time, spending less money,

**Figure 1.1****Conceptual Framework**

## Benefits to Participating in Concurrent Enrollment Programs



and becoming prepared for the demands of postsecondary education while still in high school (Hanson, 2001). According to Boswell (2001) positive outcomes may also include lower college costs for students and their families, accelerated progress toward a college degree, expanded postsecondary opportunities for nontraditional populations, and closer ties between community colleges and local school districts. Further, Catron (1998) agreed that students derive great benefits from dual enrollment. These benefits result from doing advanced coursework and from knowledge that they can be successful in doing college-level work. Bailey, Hughes, & Karp (2002) found in their review of existing literature that the overwhelming majority of dual enrollment students proceed to college and enjoy more academic success there than the typical high school student.

Hugo (2001) found in her research that dual/concurrent enrollment provides “an opportunity for minority and first-generation students to learn about colleges and improve their study skills, and it gives them more information about the process of attending college (p. 72). Other benefits for these targeted groups included an opportunity to experience college level courses within subject areas that are not available at the high school (Hugo, 2001). By participating in college credit classes, students will develop a clear idea about the skills that they will need to succeed in college. Many students are bored in class or do not see the relevance of their high school coursework for their future success (Lords, 2000). It is hoped that student motivation will increase by expanding opportunities to take interesting classes.

Policymakers praise concurrent enrollment programs for providing more academically challenging and rigorous coursework to high school students and for

increasing student aspirations to attend college (Boswell, 2001). According to Adelman (1999) the strongest predictor of a bachelor's degree completion is the intensity and quality of student's high school curriculum, this is an important benefit.

In addition to the benefits that students receive from engaging in rigorous courses, these programs can also benefit students financially. Total college tuition costs can be reduced for students in these programs in two ways: (1) by accelerating progress towards an undergraduate degree, and (2) in many states, by providing totally or partially subsidized tuition costs for the college courses (Boswell, 2001; Carr & Young, 1999). The ability of students to accumulate college credit prior to entering college allows them to both shorten the time it takes to earn their degree and save significantly on the overall cost of their college education.

The political and economic benefits for the higher education sector (Boswell, 2001) include tuition costs, improved collaboration between secondary and collegiate faculty, expanded opportunities for students in rural communities and closer ties between the colleges and the communities in which they are located. Twenty-seven states allow both the K-12 school district and the community college to count concurrent students toward their enrollment numbers for state financial support (Boswell, 2001). Programs allowing high school students to take community college-level courses can also raise the image of a college's community service orientation, can serve as an excellent admissions recruitment tool, and can aid community colleges in attracting better-prepared students (Chapman, 2001; Lieberman, 1998).

Sociology creates another conceptual framework for this study. Sociological theory (Alexander & Eckland, 1975; Blau & Duncan, 1967; Coleman, 1976; Eckland & Alexander, 1980; Parsons, 1959; Sewell & Shah, 1967; Sewell & Hauser, 1975; Thomas, Alexander, & Eckland, 1979; Tseng, 1971; Trent & Medskar, 1968; Wolfle, 1985) suggests that background, family, academic ability, and aspiration variables should be included in any research on student persistence (Cofer & Somers, 1997). Extensive research has established the correlation between student achievement and various variables such as race-ethnicity, income, parent education, gender, age, and family structure (Desimone, 1999; Hurtado, Inketas, Briggs, & Rhei, 1997). Paulsen (1990) concluded in his study that the formation of basic college aspirations is strongly related to student background and ability factors. The present study builds on the findings of Paulsen, Garg, Kauppi, Lewko & Urajnik, Cofer and Somers, Desimone, Hurtado, Inekas, Briggs & Rhei concerning background factors, and aspiration variables and their effect on student persistence and degree attainment.

From economic theory (Becker, 1964; Denison, 1964; McPherson, 1982; Okun, Ruehlman, & Karoly, 1991; Rusbult, 1980; Schultz, 1960) comes the notion that students invest in their education. Student aid and demand studies (Corrazini, Dugan, & Grabowski, 1972; Hoenack & Weiler, 1975; Hopkins, 1974; Stafford, Lindstedt & Lynn, 1984; Tannen, 1978) indicate that students “purchase” more education when prices are lower and less when prices are higher (Cofer & Somers, 1997). The second conceptual framework for this study creates a research model

that combines sociology and economics which includes the factors of background, aspirations, achievement, college experiences, and prices.

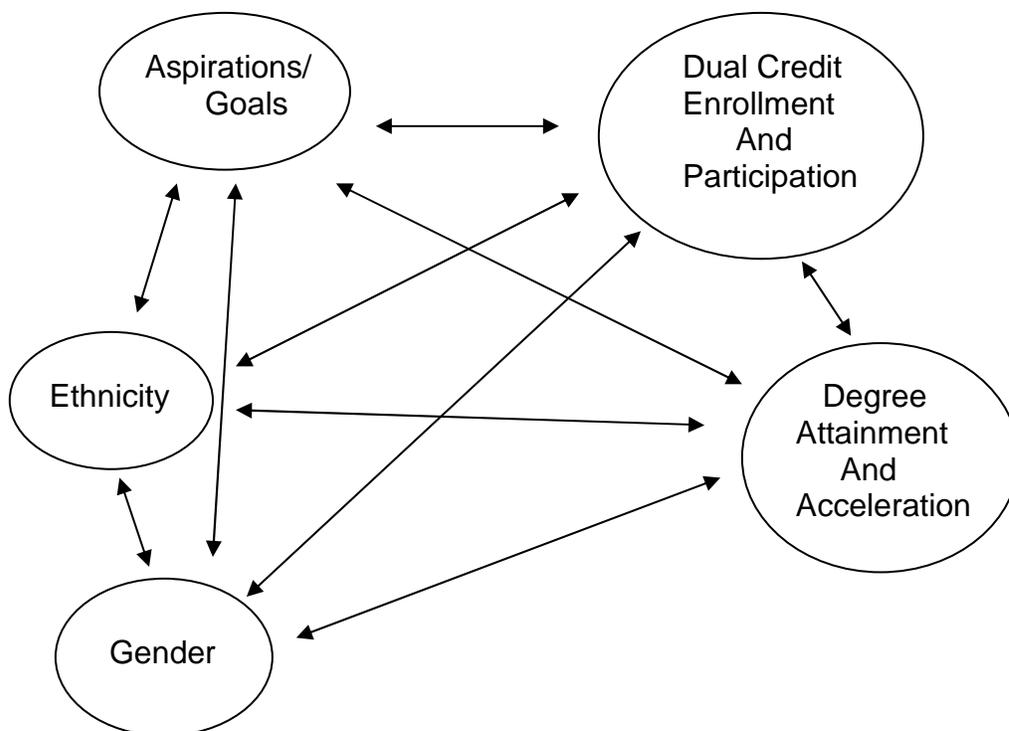
This research study deals with degree completion and acceleration rates of Iowa's concurrent enrollment students. As stated previously, the research focuses on two goals that are typically offered by dual-credit programs (Clark, 2001), degree completion and acceleration. In addition, this study is being conducted to address underserved students and their participation in concurrent enrollment programs. Concerns have been raised about access to concurrent enrollment programs for low income and minority students who traditionally have not participated in education at the college level. For this study these issues will be addressed: 1) to what extent are there gender and racial/ethnic differences in the concurrent enrollment students enrolled in career and technical programs and the arts and sciences degree programs; 2) the effect of gender and racial/ethnic differences on matriculation to the community college and degree completion; and 3) what is the unique effect of student academic status, (career and technical versus arts and sciences), demographics (gender and ethnicity) and educational goals (transfer to a college/university or prepare to enter the job market) in predicting degree completion and the time it takes to obtain a degree. Figure 1.2 provides a diagram depicting the predictive model of degree attainment which helps to guide the conceptual framework for analyzing this part of the study. It is helpful to consider how the predictive model of degree attainment relates to the research questions of this study. Specifically, the variables of gender, ethnicity, student status, and educational goals

(aspirations) are considered in this predictive model to control for their effect on persistence, degree attainment and acceleration.

The conceptual framework models, benefits to participating in concurrent enrollment programs for students and the predictive model of degree attainment serve as the theoretical and conceptual frameworks to inform and direct this study. Currently, research studies are lacking in the expansion of these models to include the high school environment influence of dual-credit enrollment (availability, participation, and location) on educational aspirations. Educational aspirations are important because a higher degree of educational attainment will result in increased economic, community, and civic benefits – as can be validated by the Measuring Up initiative through the National Center for Public Policy (Callan, 2005).

**Figure 1.2**

**Predictive Model of Degree Attainment**



## Definitions of Terms

### Articulation:

The process of mutually agreeing upon courses and programs earned at a sending institution for credit or advanced placement at a receiving institution. Often courses and programs are transferable either from secondary to postsecondary institutions or between postsecondary institutions.

### Arts and Sciences:

Credit courses contained in the two-year associate degrees transfer program (College Parallel/Liberal General Studies/College Transfer) and College Parallel/Career Option programs.

### Arts and Sciences Courses:

Credit courses in College Parallel/Liberal General Studies/College Transfer, which are transferable to four-year institutions for completion of a baccalaureate degree and those that are included in career/technical curriculums that are applicable for employment on completion of curriculum.

### Associate in Applied Arts Degree (AAA):

The degree awarded for satisfying the curriculum requirements and demonstrated competence for employment in the occupational field for which the program was designed. Typically, these degrees apply to occupations requiring significant amounts of applied scientific and mathematical knowledge. These degrees require a minimum of 60 semester credit hours (90 quarter hours) in length with a minimum of 12 semester credit hours (18 quarter hours) of general education. Programs awarding these degrees shall not exceed 19 semester credit hours per term (28.5

quarter hours) and shall not exceed 86 semester credit hours (129 quarters hours) in length. (281 Iowa Administrative Code 21.2(10) (b).)

Associate in Applied Science Degree (AAS):

The degree awarded for satisfying the curriculum requirements and demonstrated competence for employment in the occupational field for which the program was designed. Typically, these degrees apply to occupations requiring significant amounts of applied scientific and mathematical knowledge. These degrees require a minimum of 60 semester credit hours (90 quarter hours) in length with a minimum of 12 semester credit hours (18 quarter hours) of general education. Programs awarding these degrees shall not exceed 19 semester credit hours per term (28.5 quarter hours) and shall not exceed 86 semester credit hours (129 quarters hours) in length. (281 Iowa Administrative Code 21.2(10) (b).)

Associate in Arts Degree (AA):

The degree awarded for satisfying the curriculum requirements of arts and sciences courses designed as college parallel programs transferable as the first two years of a baccalaureate degree. These programs are referred as college parallel/liberal general studies/college transfer. They include a minimum of 60 semester credit hours (90 quarter hours) of credit courses designed and acceptable for transfer with the understanding that 16 semester hours (24 quarter hours) of career/technical courses could be included in the total. (281 Iowa Administrative Code 21.2(10) (a).)

Associate in General Studies Degree (AGS):

The degree awarded for satisfying the curriculum requirements of a two-year program other than set forth in 281 Iowa Administrative code 21.2(10) associate of arts or science. The degree requirements are flexible for individual students, not intended for transfer, and include a minimum of 60 semester credit hours (90 quarter hours). (281 Iowa Administrative Code 21.2(10)(c).)

Associate in Science Degree (AS):

The degree awarded for satisfying the curriculum requirements of arts and sciences courses designed as college parallel programs transferable as the first two years of a baccalaureate degree. These programs are referred as college parallel/liberal general studies/college transfer. They include a minimum of 60 semester credit hours (90 quarter hours) of credit courses designed and acceptable for transfer with the understanding that 16 semester hours (24 quarter hours) of career/technical courses could be included in the total. (281 Iowa Administrative Code 21.2(10)(a).)

Award Date:

The year, month, and day that the award was granted. Use the ending date of the term the award was granted, if appropriate.

Career Academy:

An associate degree, or above, program which combines a minimum of two years of secondary education and at least two years of postsecondary education.

Career and Technical Education:

The organized educational activities that offer a sequence of courses that include academic and technical knowledge and skills needed for current employment or further education.

Career/Technical Programs – Preparatory:

Credit programs designed to provide the specific skills and knowledge essential for successful entry into a specific or related occupation, requiring less than a baccalaureate degree, or for further education.

Certificate:

The award for satisfying the curriculum requirements of an activity, course, and/or program other than one that is intended for a diploma or a degree. (281 Iowa Administrative Code 21.2(10) (e).)

CIP Number:

The number used to identify a program and/or an activity based on the emphasis it provides. The CIP number usually is directly related to the student's major and therefore is used in the MIS for reporting such. Program and activity numbers have been developed for state and federal reporting.

College Parallel/Career Option Program (CP/CO):

AS or AA degree programs designed as the first two years of transfer credit toward a baccalaureate degree in a specific occupational area which includes a minimum number of skill development courses for immediate employment. Students have a choice of articulating their program to a four-year institution for completion of a

baccalaureate degree or seeking employment in curriculum designed occupation or a related field.

Completer:

An individual who received a degree, certificate, or diploma from an Iowa Community College. Completers do not include program or goal completers defined by Perkins accountability measures.

Concurrent Enrollment:

A student who is enrolled in a secondary school and a postsecondary institution at the same time. The credits earned are often applicable for fulfilling the graduation requirements at both levels.

Diploma:

The award granted for satisfying the curriculum requirements of a program that consist of a minimum of 15 semester credit hours (22 quarter hours) with the general education component consisting of a minimum of 3 semester hours (4 quarter hours). (281 Iowa Administrative Code 21.2(10) (d).)

Dual Credit:

College credit secondary educational opportunities may be offered via the Postsecondary Enrollment Options Act, or through a jointly administered agreement or contract between the local high school district and a community college in Iowa. The college credit course may be taught in the high school or at the college site. The college provides the college credit courses, curriculum guidelines and the instructors.

Joint Enrollment:

A student who is enrolled in a secondary school and a postsecondary institution at the same time. The credits earned are often applicable for fulfilling the graduation requirements at both levels. Courses offered for joint enrollment are disaggregated into the following categories:

*Contracted courses* are college credit courses offered to secondary school students through contractual arrangements. These courses often generate supplementary weighting for the local district. Courses generating supplementary weighting are defined as “concurrent enrollment.”

*Postsecondary Enrollment Options (PSEO) courses* are college credit courses offered to secondary school students through the PSEO program.

*Tuition courses* are college credit courses taken by secondary school students independently.

Jointly Administered Program:

A program entered into by two or more educational institutions to provide instructional or administrative services jointly, to the mutual advantage of the constituents of each institution.

Major:

The program identifier that describes a student’s concentration of courses and/or declared program completion goal.

Postsecondary Enrollment Options Act (PSEO):

Designed to promote rigorous academic pursuits and to provide wider variety of options to high school students. Eleventh and twelfth graders and gifted and

talented ninth and tenth graders have an opportunity to enroll part-time in nonsectarian postsecondary credit courses in eligible postsecondary institutions of higher learning in Iowa. Participation is approved by the usually financed by the secondary education institution where they are enrolled. (Admin. Rule 281-22.1-6 (IA Code 261C.1).

Program Completer:

A student who has completed the entire sequence of courses (arts and sciences and/or career and technical) in the program, with or without fulfilling all the necessary graduate requirements of the college.

Tech Prep Postsecondary Student:

A student who has completed the courses required at the secondary level (both academic and technical courses) and is enrolled in the postsecondary portion of the same 2 plus 2 program.

Tech Prep Program:

A program that combines at least two years of secondary education and two years of postsecondary education in a non duplicate sequential course of study, integrates academic and career/technical courses, and leads to an associate degree and/or an occupational certification in a high skill, high wage occupation or further education.

Source: Definitions taken from the Management Information Systems (MIS) Fiscal Year 2008 Data Dictionary, and Iowa Department of Education, Bureau of Community Colleges and Workforce Preparation, The Annual Condition of Iowa's Community Colleges (2008 & 2009).

## CHAPTER 2. REVIEW OF THE LITERATURE

### Introduction

This chapter presents a review of the literature and highlights the background and history of concurrent enrollment/dual credit programs offered by the American Community Colleges and specifically Iowa's Community Colleges. The literature provides evidence of the benefits of concurrent enrollment programs, which includes providing high school students with an opportunity to accelerate their college education. Dual credit/concurrent enrollment program criteria, policies, practices, and Iowa's status related to concurrent enrollment access and quality recommendations are discussed. The characteristics of high quality credit based transition programs are reviewed along with addressing the best practices of concurrent enrollment programs in Iowa. A synthesis of related research studies specifically focusing on the impact of concurrent enrollment programs on students' outcomes and college graduation are summarized.

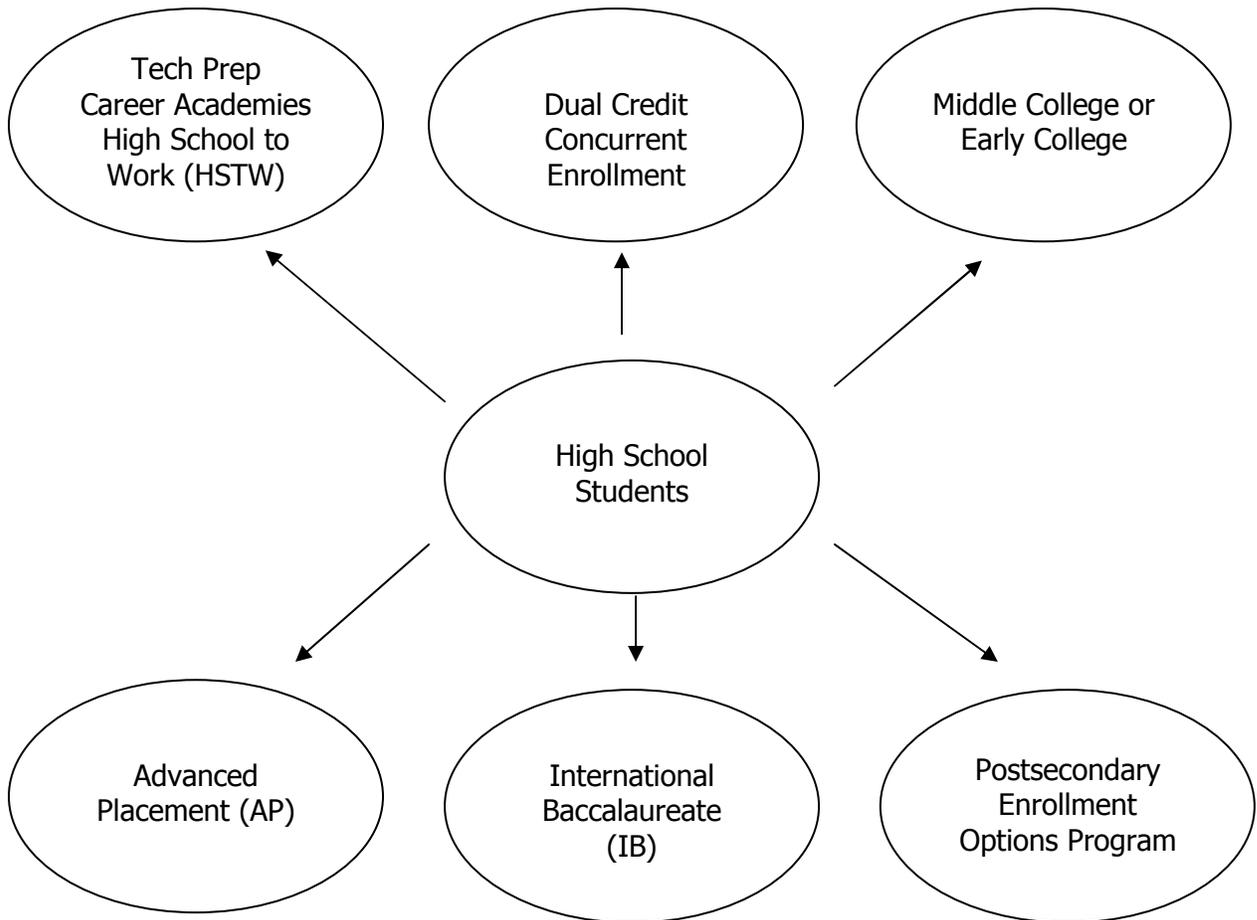
The appeal of concurrent enrollment programs is widespread in Iowa and throughout the United States. Many state initiatives have targeted concurrent enrollment /dual credit programs to enable high school students to earn college credit in course work offered by the community college at the high school or community college. Dual credit programs have the potential to address a number of the following critical educational issues: 1.) Providing an exceptional option to secondary schools to offer challenging programs to honor students and to students who need to obtain technical and vocational background for the work force, 2.) Increasing access to a wider array of course options, college instructors, and

facilities, especially important to small, rural schools, 3.) Accelerating student progress toward degree completion, 4.) Reducing college costs for families and the state, 5.) Providing an opportunity for a smoother transition from high school to college, a “seamless” transition, and 6.) Increasing students’ ability to visualize themselves as “college material” (Fincher-Ford, 1997).

In a joint report published in November 2007 by the National Center for Public Policy and Higher Education and The National Center for Higher Education Management Systems the authors offer examples of strategies, programs, and practices that can raise educational productivity in the United States. One of the strategies cited is to improve productivity in the educational pipeline by providing more students with a rigorous high school curriculum. Another approach is to improve college readiness by identifying gaps in preparation for high school students so they can address academic deficiencies while in high school. A third approach to improve preparation for college involves enhancing teacher quality, particularly as it relates to college readiness. A fourth strategy is acceleration, increasing preparation for college and encouraging students who are ready and motivated to enroll in college-level courses and thereby earn college credit while in high school. Advanced Placement (AP), sponsored by the College Board, has been the best-known and most common strategy for encouraging students to take college-level coursework in high school. Dual enrollment, which enables students to enroll in credit bearing college courses while in high school represents another approach to college acceleration and has been growing in popularity.

Given the prominence of community colleges within the U.S. higher education system, coupled with their role in increasing student access to higher education, it is important to examine high school to college transition models that accentuate the relationship between high schools and community colleges, and consider their scope, predominant features, and potential impact on students (Bragg, 2006). Models that strengthen relationships between secondary schools and community colleges, postsecondary institutions that are often taken for granted or overlooked altogether, are growing in importance as a first access point to higher education (Kazis, Vargas, & Hoffman, 2004). Figure 2.1 illustrates the credit based transition programs for high school students to participate in while in high school. Community colleges are involved in a variety of these programs that provide opportunities and incentives for high school students to engage in academically rigorous coursework. Dual enrollment (concurrent enrollment) programs are one of the models accelerating the transition to college.

Dual enrollment programs differ from other credit based transition strategies. One important distinction is that dual enrollment programs are shaped by state policies and legislation and thus may differ considerably from state to state (U.S. Department of Education, 2006). Advanced Placement (AP) is a College Board program and Tech Prep is supported by federal legislation. Dual Enrollment programs share a set of common features, but great variation exists within each feature.

**Figure 2.1****Credit Based Transition Programs for High Schools Students****The Historical Perspective of Dual Credit Programs**

When and where the first dual credit/concurrent enrollment program started is not clear. Dr. Donald E. Puyalar, executive director of the State Board of Directors for Community Colleges of Arizona, writes that St. Louis University in Missouri offered a program in 1959, and that Connecticut educators boasted of a program as early as 1955 (Finken, 2003). A review of the literature suggests that dual-credit programs

have operated since the early 1970's. The Sputnik crisis in the fall of 1957 resulted in governmental programs that sought the integration of secondary and postsecondary studies (Fincher-Ford, 1997). The launching of Sputnik I created open criticism of the American education system. The integration of programs began immediately. The first true dual-credit partnership between secondary and postsecondary did not develop until Syracuse University's Project Advance in the early 1970's. This was the first configuration of a secondary and postsecondary dual credit partnership (Gaines & Wilbur, 1985). In response to the report, *A Nation at Risk* (National Commission of Excellence in Education, 1983), many states implemented a plan to raise the performance of students. Dual credit was one of the program options implemented in school districts throughout the country at this time (Gardner et al., 1983). In some states, dual credit was an offshoot of Tech Prep (1991-1992) and 2 + 2 programs (Catron, 1998). Of the statewide programs, Minnesota's Postsecondary Enrollment Options is often cited as the first such efforts (Andrews, 2000, Boswell, 2001; Puyear et al., 2001, Nitzke, 2002). State statutes mandate that schools must provide students with dual enrollment opportunities.

#### Dual Enrollment: Four Models

In a study concluded by Bailey, Hughes & Karp (2002) particular attention was paid to New York City's College Now program and Wisconsin's Youth Option program. College Now uses a modified curriculum focusing on academic subjects and preparing students for college level work. The study suggested that compared with other City University of New York freshmen, College Now graduates earned

more college credit and were more likely to graduate from college on time. The Youth Options program focuses on providing students with expanded curricular choice, particularly in vocational coursework. The cost of providing a wide range of courses, combined with the state's focus on academic standards and testing, has led many schools, particularly smaller ones, to eliminate elective and vocational coursework (Rafn, 2002). Youth Options allows high school juniors and seniors in Wisconsin to enroll in technical colleges and public and private universities to take courses that are not available in their high schools (Rafn, 2002). It was concluded that both delivery models have the potential to improve preparation for college (Bailey, Hughes, & Karp, 2002).

A third model, Washington's Running Start program reaches about 10% of the state's high school juniors and seniors. Running Start students who transfer their credits to four-year institutions complete bachelor's degrees with an average of 33 fewer state-supported credits than students who enter four-year institutions as freshmen, resulting in lower net costs for both the student and the state (Callam, Ewell, Finney & Jones, 2007). Once in college, Running Start students also appear to perform as well as, and in some cases better than, other college students.

The Early College High School (ECHS) Initiative, sponsored by the Bill & Melinda Gates Foundation and coordinated by Jobs for the Future, is a fourth model for preparing students for college. This program is helping to establish over 250 Early College High Schools by 2008 that will allow students to earn a high school diploma and an associate's degree (or up to two years of college credit) in five years (Boston, MA: Jobs for the Future, May 2006). One of the best known schools in the

Early College High School Initiative is the Middle College Charter High School (MCHS) located on the LaGuardia Community College campus. MCHS, which was founded as an alternative high school for “at-risk urban youth with college potential” in 1974 and preceded the ECHS Initiative, was redesigned as a middle college-early college in 2002. A recent study concluded that early college high schools deliver a greater return on investment than comparable traditional high schools, that states benefit from their investments in early college high schools as long as the cost structure is not significantly different, and that students and families benefit from the schools.

#### Linking Secondary Education with Collegiate Education

An expanded range of learning opportunities and initiatives has been developed to link secondary education with collegiate education. They include 1) Advanced Placement, 2) Dual Credit Programs, 3) Postsecondary Enrollment Options, and 4) Tech Prep or 2 + 2 programs. All were designed as links to the next level of education or training for high school students. Tech Prep (late 1980’s) was more specifically targeted at workforce training, and Advanced Placement (1950’s) and Postsecondary Enrollment Options (1970’s) and dual enrollment (1980’s) were developed as opportunities for students to earn college credit while in high school (Nitzke, 2002). Many of these initiatives have been judged successful because they have seen a growth in levels of participation.

Bragg (2006) examined three academic pathways (dual credit or dual enrollment, Tech Prep and Career Pathway Models, and Middle College or Early

College High Schools) that show a strong emphasis on the role community colleges play in accomplishing the goal of increasing opportunities for K-12 students to transition to college. Table 2.1 summarizes the three academic pathways including definitions, key features, and selected findings on the influences of the programs.

**Table 2.1**

**Key Features, Scope, and Influence of Three Selected Academic Pathways**

Academic Pathway	Definitions and Key Features	Selected Findings on Scope and Influence
Dual Credit or Dual Enrollment	<p><i>Dual credit</i> – high school students take college-level course work and secure credit at both the high school and college level simultaneously.</p> <p><i>Dual enrollment</i> – students take course work at the high school and college level while they are still actively enrolled in high school.</p> <p><i>Community college partner</i> – collaborate with high schools to develop and deliver dual credit and dual enrollment opportunities.</p>	<ul style="list-style-type: none"> <li>• 71% of U.S. public high schools offer dual credit courses. An estimated 1.2 million enrollments in courses for dual credit (Waits, Setzer &amp; Lewis, 2005).</li> <li>• 98% of public 2-year institutions enroll high school students in college courses. In 13 states, 2-year colleges are the primary providers of dual credit or dual enrollment (Kleiner &amp; Lewis, 2005).</li> <li>• Nearly all states have definitions or administrative guidelines, with about 50% having a legislative mandate to provide access to high school students.</li> <li>• Limited and mixed research evidence exists on the impact of dual credit or dual enrollment on student outcomes.</li> </ul>

**Table 2.1 (continued)****Key Features, Scope, and Influence of Three Selected Academic Pathways**

<p><i>Tech Prep and Career Pathway Models</i></p>	<p><i>Tech prep and career pathway programs</i> – including High Schools To Work (HSTW) and career academies – are developed, implemented, and maintained through formal articulation agreements among secondary and postsecondary education, employer, labor and community organizations. Essential elements of these approaches include core sequential academic and Career &amp; Technical Education (CTE) curriculum extending from the 9<sup>th</sup> or 11<sup>th</sup> grade through the 14<sup>th</sup> or more advanced grade leading to an associate degree or 2-year certificate or apprenticeship. Contextual or applied instructional strategies are emphasized to connect academic instruction to career preparation. Dual credit and related accelerated credit-earning courses are sometimes offered, including college placement tests for high school students. Career academies use a small learning community or cohort approaches.</p>	<p>An estimated 47% of high schools in the U.S. implement some aspect of tech prep. The number of high school students identified as enrolled in tech prep rose from about 173,000 to about 1.26 million or approximately 10% of all U.S. high school students by FY 2001. Virtually all 2-year colleges in the U.S. engage in some aspect of tech prep, with 65% of local consortia administered by 2-year colleges.</p> <ul style="list-style-type: none"> <li>• HSTW is an educational reform of the Southern Regional Educational Board (SREB) that is being implemented in 31 states, in over 1,000 sites at both secondary and middle schools. Of the 50 states interviewed as part of the APASS study, 13 states volunteered that HSTW is viewed as an academic pathway linking high school to college, and, of these, 7 states view HSTW as a pathway that makes special efforts for underserved students.</li> <li>• 23 states indicated they offer career academies, with some specifying they pay special attention to access for low-academic achieving students, low-income students, and racial/ethnic minority students.</li> </ul>
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**Table 2.1 (continued)****Key Features, Scope, and Influence of Three Selected Academic Pathways**

<p>Middle College or Early College High Schools</p>	<p><i>Middle college and early college high school models</i> emphasize small classes and peer mentoring, along with academic and support services such as counseling to enable students to access high school and college-level courses and move from high school through the 2-year associate degree at an accelerated pace.</p> <p>Features that pervade middle college and early college high schools are:</p> <ul style="list-style-type: none"> <li>• Students enroll in college-level courses by demonstrating they have adequate competence to do so.</li> <li>• Students earn the equivalent of 2 years of college credit toward an associate's degree or baccalaureate degree while still in high school.</li> <li>• Students receive special services and attention to encourage their academic preparation and awareness of college.</li> </ul>	<ul style="list-style-type: none"> <li>• 22 states identified the middle college or early college high school pathway model as one that is being implemented.</li> <li>• Special efforts to reach underserved students were identified by state officials in 19 states. Low-achieving and at-risk youth, and racial and ethnic minority students were identified by the majority of states reporting having middle college or early college high schools, with low income students being identified as a target population by nearly half the states.</li> <li>• Financial support is being provided mainly by external funding supplied by foundations and private sponsors, supplemented by public funding that supports K-12 schools. Fourteen state agencies report some dedicated oversight or funding for this pathway, with a few more states being in an initial discussion stage.</li> </ul>
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Source: Transitions to College: Academic Pathways from High School to the Community College (Bragg, 2006)

Program Criteria, Recommendations for Implementing Programs and Iowa's Status

The U. S. Department of Education: Office of Vocational and Adult Education conducted an extensive analysis of state policies related to "dual enrollment" of high school students in college courses, the report was titled State Dual Enrollment Policies: Addressing Access and Quality (2004). The authors identified ten features of dual enrollment programs see (Figure 2.2: Ten Program Criteria). The results

from the study revealed that none of the fifty states have policies that address all ten features. Twelve states have no policies related to dual enrollment.

**Figure 2.2:**

**Ten Program Criteria of Dual Enrollment Programs**

Criteria	Definition
Target Population	Does state policy mandate or encourage programs to target a specific type of student, and, if so, which type?
Admissions Requirements	Does state policy regulate how students are admitted into dual enrollment programs or outline criteria they must meet to be eligible for participation? If so, what are these criteria?
Location	Do state policies specify whether dual enrollment may be offered at the high school, or the college or both locations?
Student Mix	Are there policies addressing whether high school students may, may not, or must be in dual enrollment courses with regularly matriculated college students?
Instructor	Do policies specify the credentials that dual enrollment teachers must hold?
Course Content	How do states ensure that dual enrollment courses are college-level? Are there any regulations governing the content and student evaluation methods of dual enrollment courses?
Method of Credit-Earning	How do dual enrollment students earn credit? Is this regulated by the state, and if so, what do such policies say?
Program Intensity	Does state policy encourage or mandate singleton, comprehensive or enhanced comprehensive programs?
Funding	How are dual enrollment programs funded? Does state policy address the responsibility for payment of student tuition and fees? What happens to Full Time Enrollment (FTE) and Average Daily Attendance (ADA) funding for dual enrollment students?

**Figure 2.2 (continued)****Ten Program Criteria of Dual Enrollment Programs**

Criteria	Definition
Mandatory Nature of	Are dual enrollment programs required by state policy, or the policy simply permitted at an individual institution's discretion?

The report also states, "Other attempts to help students enter and succeed in college are based on a body of research demonstrating that postsecondary success is predicated on both rigorous academic preparation and a clear understanding of the expectations in college (cf. Venezia, Kirst, & Antonio, 2003).

The authors conclude the report by listing six recommendations to consider when implementing dual enrollment programs. *Table 2.2 Addressing Access and Quality Recommendations* provides these recommendations with a commentary on Iowa's status regarding each recommendation.

**Table 2.2****Addressing Access and Quality Recommendations**

Recommendation	Iowa's Status
<p><i>Clarify program goals</i> This deals with what the state aims for with these programs. Some states limit the program to include only gifted or advanced students or only college transfer courses, etc.</p>	<p>Iowa Code indicates that partnership efforts should increase to enhance educational opportunities for high school students without compromising educational rigor.</p>

**Table 2.2 (continued)****Addressing Access and Quality Recommendations**

<p><i>Identify funding mechanisms</i> This deals with finding the most effective way to meet the needs of all stakeholders including the students, the high schools and the colleges.</p>	<p>Funding mechanisms presently exist via 28E contracts and the PSEO (Postsecondary Enrollment Options) stipulations. The local flexibility of such contracts appears to be a strength verses policies found in other states that earmark funds.</p>
<p><i>Think through the implications of both minimal and detailed dual enrollment policies</i> This refers to the extent of formal regulation for dual enrollment programs. It is critical that there be a balance between local control and state oversight.</p>	<p>At this point one would classify Iowa as having 'minimal' enrollment policies, and it appears that this is working effectively. The current policy allows local control over the educational programming without compromising accountability. Iowa seems to have found an excellent blend of local control and policy oversight for accountability.</p>
<p><i>Develop ways to ensure the rigor of dual enrollment courses</i> This is a critical aspect of excellent programs and state regulations, per se, may not be the entire solution.</p>	<p>Iowa's current legislation does an excellent job in defining key issues relating to rigor. Presently, processes for assuring academic rigor are judiciously practiced at each college. When comparing Iowa practices to the information found in the national report, Iowa is again at the forefront of awareness and action.</p>
<p><i>Consider the needs of students beyond academic course taking</i> This refers to the importance of providing a complete collegiate experience whereby students have access to academic success and planning resources at the college.</p>	<p>This is a definite strength throughout Iowa as each community college includes a variety of services beyond the classes themselves. It is common for the community colleges to provide academic skills assessment, student orientation, career planning, and academic advising when needed as core components of their work.</p>
<p><i>Meet the needs of students invested in technical courses as well as academic courses</i> This refers to providing higher education opportunities beyond the liberal arts, transfer courses to include career and technical education.</p>	<p>Again this is a definite strength of the practices throughout Iowa as evidenced by the plethora of college transfer, general education courses and career and technical programs and courses.</p>

Source: U.S. Department of Education: Office of Vocational and Adult Education, State Dual Enrollment Policies: Addressing Access and Quality Report, 2004.

### Characteristics of High Quality Credit Based Transition Programs

The U.S. Department of Education completed a study of credit based transition programs (CBTP's). The report was titled *The Accelerating Student Success Project* (2004). The purpose of the study was to investigate the ways in which CBTP's may support the transition of middle-to-low-achieving students from secondary to postsecondary institutions. In the study, credit based transition programs were defined as programs that allow high school students to take college-level classes and earn college credit while in high school. These programs include: Tech Prep, Dual/Concurrent Enrollment, Advanced Placement, International Baccalaureate (IB) and Middle Colleges. The findings were organized into three areas: characteristics of high quality programs, how programs can support middle-low achieving students, and data collection for outcomes measurement.

The report identified the following essential characteristics for a high quality CBTP program:

- Outstanding faculty, and professional development for faculty
- A strong curriculum – including using college-level textbooks and assignments similar to those as regularly matriculated college students and should be graded by the same standards
- An emphasis on non-academic factors – examples of the non-academic support services provided are college visits, assistance with college applications, counseling, and mentoring.

- Communication between the high school and the college – there must be collaboration between, and commitment and buy-in from, all educational partners.
- Thorough dissemination of information about the program to students and parents.

The elements that are essential to programs targeting middle-and-low-achieving students include:

- A sequential developmental curriculum for which students should be able to see a structured, progressive pathway leading to college enrollment. Students in technically oriented programs should also understand the ways that their activities prepare them for employment.
- Individualized attention for low achieving students, students with learning disabilities, or students who are disengaged from school because of family problems.
- The provision of general information about college for middle-and-low achieving students in their transition to college by teaching about their postsecondary options and how to apply to college.

Findings on Data Collection for Outcomes Measurement include:

- Program staff tend to focus on immediate indicators of success rather than long-term outcomes. Program staff are primarily concerned with retaining and graduating their students from high school and the program did not focus on long-term outcomes such as postsecondary enrollment, retention, and graduation.

- Data are not regularly or systematically collected.
- Participants in the study understood the need for data collection and additional funding for outcomes research would be helpful to the participants.

This study found that credit based transition programs (CBTP's) have a great deal of variation, but it is also the case that the programs share common elements that can be identified and studied. From this study the researchers concluded it is not clear which of these elements most contributes to student success, and further research aims to isolate the elements that are the most promising.

#### Addressing the Rigor and Quality of Concurrent Enrollment Programs in Iowa

During the Iowa Association of Community College President's (IACCP) meeting in May, 2003, a committee was appointed to review the concurrent enrollment programs offered by the community colleges in the State of Iowa. The initial charge to the team was to determine how each community college was structuring their concurrent enrollment programs and address statewide best practices (Charge to the Concurrent Enrollment Team, June 2003).

#### Concurrent Enrollment Best Practices

The following Best Practices were identified during the statewide Concurrent Enrollment meeting on June 25, 2003:

- Concurrent enrollment course instructors attend orientation sessions and designated staff development workshops.
- Faculty teaching college credit courses are in compliance with the Higher Learning Commission (HLC) requirements.

- Assessment of the course and instructor are conducted on an annual basis. A college designee observes classroom instruction and completes a written evaluation of the instructor and administers student evaluations.
- Mandatory assessment of all students. Mandatory placement for all math and English courses is based on ASSET, COMPASS, American College Testing (ACT) scores and Iowa Tests of Educational Development (ITED's) scores.
- Concurrent Enrollment course instructors sign an instructor agreement form for each academic year.
- The Health Sciences, Business, and Industrial Technology departments require all college students to attend competition days. The events are used to assess student skills and knowledge level.
- Personal visits to each school site to conduct conferences with the Superintendent, High School Principal, Counselor(s), and Instructor(s).
- Provide weekly progress report on each student, (i.e. attendance and grade reports).
- Issue a student I.D. to each concurrent enrollment student.
- Orientation sessions provided for students before course begins.
- Provide itemized billing to each school district so they are completely aware of all charges. This helps to build trust. (Concurrent Enrollment Meeting Summary, June 2003).

The Iowa Community College President's appointed the Iowa Postsecondary/28E Quality Committee in 2005, to conduct an analysis of the quality and rigor of concurrent enrollment programs offered by Iowa's fifteen community colleges. The

committee developed a report titled, *The Community College Presidents' Report on Dual Enrollment Opportunities for High School Students* (2006). The report provides an overview of the principles of good practice subscribed to by the fifteen community colleges to assure quality and academic rigor in all concurrent enrollment courses. The report also addresses the importance of conducting outcomes assessment studies to assess and analyze student performance in concurrent enrollment courses to assure that students are indeed achieving the learning outcomes within the courses. Examples of current assessment activities found at the fifteen Community Colleges are as follows (Note: activities and practices vary from college to college):

- Mathematics departments have developed post-test process in College Algebra and Calculus I. The calculus post-test will be administered to all sections of Calculus I. A post-test for College Algebra has been in use for a number of years. Similar post-tests are being developed for General Psychology and Western Civilization courses.
- Student evaluation data of the learning experience is collected and analyzed each term just as with other courses.
- Students have verbally reported back to their high school counselors that their course credits were accepted by four-year universities and they are succeeding in their college coursework.
- Mathematics faculty members have developed a series of final exam questions related to core learning objectives to include in all final exams for comparison. This process allows individual faculty members to have some

variation of the final exam while including common test items for measuring student achievement.

- Outcomes assessment studies are conducted with specific courses (Communications Skills, General Psychology, Criminal Law, Business Statistics and Introduction to Statistics) to assess and analyze student performance.
- Student retention studies have been completed to assess the persistence of career and technical students regarding completion of postsecondary education in fields of study begun via Tech-Prep agreements.
- Evaluation of grade distribution in concurrent enrollment courses indicates very similar patterns to those found in ‘regular’ college sections.
- Analysis of transfer of college credits to four-year institutions indicates a high percentage of the college credits do successfully apply to a student’s university experience – many times this transfer of credit occurs as the student enrolls immediately in the 4-year institution upon exiting high school. (*Community College Presidents’ Report on Dual Enrollment Opportunities for High School Students*, 2006).

#### Maintaining Program Support and Success: A Focus on Quality

As concurrent enrollment/dual credit programs continue to expand between community colleges and secondary schools, some important procedures need to be in place to create quality concurrent enrollment/dual credit programs. The following

are several suggestions of procedures to have in place from my experience as coordinator of a community college concurrent enrollment program:

- Agreements between community colleges and secondary schools need to be jointly administered.
- Faculty utilized in the concurrent enrollment program need to be of the highest quality and meet the hiring requirements of the community college: mandatory use of college syllabus, and college textbooks.
- The community college must develop and maintain procedures for concurrent enrollment course evaluation and assessment.
- The community college should maintain close alignment between the concurrent enrollment courses taught in the high school setting and corresponding courses taught on college campuses by ensuring that concurrent enrollment assignments and grading criteria are identical to, or of comparable design, quality, and rigor to, the equivalent campus-based course.
- The community college should establish procedures for the selection, training, evaluation, and mentoring of concurrent enrollment instructors.
- Advisors at both the secondary school and community college need to work together to assure students and parents of proper placement into the college courses. The high school and community college personnel should work cooperatively to ensure that students enrolled in concurrent enrollment courses meet minimum qualifications.

- The community college should provide students and parents with information on how the concurrent enrollment courses articulate to the community colleges' and university/private colleges' degree programs.

### The Iowa Plan for Concurrent Enrollment Programs

In Iowa the opportunity for students to enroll in concurrent enrollment courses while still attending high school is mandated by Iowa Code section 260C. Students can also enroll in courses through the Post-Secondary Enrollment Option (PSEO) program as authorized by Iowa Code Chapter 22. They may also take college credit courses and career and technical educational offerings provided through a variety of mechanisms supported by 28E agreements between a K-12 school district and a community college. Students with disabilities and first generation college students have additional educational opportunities through TRIO (Upward Bound, Student Support Services and Talent Search) and VESS (Vocational Education for Special Students) programs.

During the Spring 2008 Legislative session, the Senior Year Plus Program was created. The Senior Year Plus Program in code (261.E) increases access to college credit or advanced placement coursework for high school students. The bill consolidates a number of existing programs into this new section. The Program elements include:

- Advanced placement courses
- Community College credit courses

- Postsecondary enrollment options for courses through colleges and universities
- Regional and career academy college credit courses
- Internet-based college credit courses through the Iowa Learning Online Initiative

The Senior Year Plus Program permits a school district to offer year-round availability for Senior Year Plus programming. The following guidelines were established:

Student Eligibility. Specifies that an eligible student will:

- Meet enrollment requirements of the postsecondary institution providing the course.
- Meet or exceed the minimum academic performance standards required by that institution.
- Take the required prerequisite courses.
- Receive approval from the school board or its designee and the eligible postsecondary institution to register for the course.
- Demonstrate proficiency in reading, mathematics and science.

Teacher and Instructor Eligibility. Specifies that an eligible teacher (K-12) or instructor (college) will:

- Have the appropriate license to teach the subject and meet other standards and requirements for the postsecondary academic department employing the teacher or instructor.

- Collaborate with other secondary and postsecondary faculty in the subject area.
- Provide ongoing communication about course expectations, including a content syllabus, teaching strategies, performance measures, resource materials, and academic progress feedback to the students and minor students' parents or guardians.
- Provide college-level curriculum and instruction as determined by the postsecondary institution.
- Use valid and reliable performance assessments, as available.
- Pass a background investigation if the instruction is provided at a school district facility or at a facility not owned or operated by an institution.

Requires that the teacher or instructor:

- Be provided appropriate orientation and training.
- Have access to the postsecondary institution's departmental activities, instructional resources, and support.
- Receive adequate notice to prepare for the college-level course.
- Not have his or her educational license suspended or revoked.

Institutional Eligibility. Specifies that a postsecondary institution shall:

- Provide students and minor students' parents or guardians with appropriate course orientation and information, including a summary of policies, transcript establishment, dropping courses policy, student handbook, student responsibilities, and credit transfer.
- Provide access to student support services.

- Ensure proper enrollment in college credit courses.
- Ensure proper orientation of teachers and instructors.
- Ensure the courses provide the same learning outcomes as similar college courses.
- Review courses for continuous improvement, utilize student feedback, and share gathered information with other stakeholders.
- Certify the course does not supplant a course provided by the school district. This is the responsibility of the school district.
- Not establish a minimum or maximum number of postsecondary credits that the students can earn through the Program or place restrictions on the Senior Year Plus Program beyond those specified in statute or administrative rule.
- Include the K-12 student identification number in the institution's student data management system and cooperate with the Department of Education (DE) on data requests. The institutions will provide data on the proportion of females and minorities enrolled in science, technology, engineering, and mathematics (STEM) programming.
- Have background investigations by school districts that are paid for by the school district. The district may charge the instructor or teacher a fee not to exceed the actual cost of the background investigation.

The Department of Education created a Postsecondary Course Audit Committee to audit Senior Year Plus courses. The committee includes members from the K-12 education community, Community Colleges, and Regents universities. Iowa Code specifies audit sampling, identifies minimum factors to

be examined, and requires the Committee to establish standards for the review. Audit findings are to be submitted to the institutions providing classes and posted on the Department of Education (DE) website. Courses not meeting standards are not eligible for future supplementary weighting. Eligibility for weighting may be reinstated with appropriate changes to the unacceptable course.

Other changes in the Senior Year Plus Program Code (261.E), includes the supplementary weighting for school district-to-Community College sharing that was at 0.48 times the percentage of the student's school day attending class at the Community College goes to 0.70 for career and technical courses and 0.46 for liberal arts and sciences courses. Iowa Code specifies that courses may be offered in a high school attendance center and that student work and assessment will meet college-level expectations. Permits nonpublic school students participating in the Senior Year Plus Program to be counted as shared time students for the school district to receive the associated supplementary weighting.

The following requirements shall be met for the purposes of assigning an additional weighting for classes offered through a sharing agreement between a school district and community college:

1. Course must supplement, not supplant, high school courses. "Supplant" includes replacing an identical course that was offered at the high school in the preceding year or the second preceding year, or if the community college offers a course required by the school district in order to meet the minimum accreditation standards in Iowa Code section 256.11.

2. Course must be included in the community college catalog or an amendment or addendum to the catalog.
3. Course must be open to all registered community college students, not just high school students.
4. Course must be for college credit and the credit must apply toward an associate of arts or associate of science degree, or toward an associate of applied arts or associate of applied science degree, or toward completion of a college diploma program.
5. Course must be taught by a teacher meeting community college licensing requirements.
6. Course must be taught utilizing the community college course syllabus.
7. Course must be of the same quality as a course offered on a community college campus.

#### Economic Impact of Concurrent Enrollment Programs in Iowa

A report was prepared for the Iowa Association of Community College Trustees and the Iowa Association of Community College Presidents by Harvey Siegelman and Daniel Otto on the strategic economic impact of concurrent enrollment programs (2008). Their analysis of data for the 2005 school year indicates that:

- 27,331 students participated in early college opportunity programs at Iowa community colleges
- They earned 142,140 credits in college-level courses

- That is the equivalent of 4,738 full-time students for a year
- The cost to the State of Iowa was about \$9.8 million

As a result of concurrent enrollment programs, estimated that the students:

- Saved the State the equivalent of \$21.7 million in future assistance at more costly educational institutions
- Saved their families the equivalent of \$30.7 million in future college-related expenses
- Generated a 535% return on the program's investment ( $\$21.7 \text{ million} + \$30.7 \text{ million} = \$52.4 \text{ million} \div \$9.8 \text{ million} = 5.3469$ )

As a result of the concurrent enrollment program, Siegelman and Otto estimated that the savings impacted the economy of Iowa by:

- increasing our consumer spending by \$57.8 million
- increasing our personal income by \$12.7 million
- increasing the State gross domestic product (the value of our production) by \$24.2 million
- increasing employment by 470 jobs
- increasing state tax receipts by \$2.2 million as a result of the additional economic activity that the savings generated

This study showed that decreasing the time-to-degree can and does result in a substantial savings of public dollars. The study also revealed that decreasing the time-to-degree can also provide a real cost savings to Iowa families. State policymakers are interested in ensuring that state funds are invested wisely,

successfully decreasing the time-to-degree for college students is one way of achieving this goal in a cost effective manner (Siegelman & Otto, 2008).

### Retention and Graduation

A significant amount of research has been conducted to determine factors that lead to student persistence and graduation. Most of these studies focus on student attributes such as academic and social skills, motivation, and commitment (Tinto, 1993). This study reviewed research literature on retention and graduation rates to be used when examining the impact of participating in dual credit/concurrent enrollment programs on graduation and acceleration rates. To provide a richer context and understanding of this research problem, this section includes a review of relevant literature and research studies related to retention and graduation.

Retention and graduation rates are two measures that frequently have been employed to evaluate efficiency and productivity (Burke, 1998). Retention rates are important as they predict the ability of an institution to keep the students who choose to attend their institution. In studies of retention, first-year retention rates commonly are used because students are most likely to drop out in the first year. As a result, an institution's first-year retention rate provides insight into its ability to retain students (Tinto, 1993).

Most students who enroll in a four-year institution do so with the intent of completing an undergraduate degree (The Chronicle of Higher Education, 2002). Completion of a baccalaureate degree is related to both personal and societal benefits such as more job opportunities, greater income potential, and higher degree

of civic involvement (Underwood & Rieck, 1999). Graduation rates are important indicators of how well institutions are helping students and society achieve these benefits. Graduation rates are critical in that they signify the completion of a specific goal that is shared by institutions and students.

A significant body of literature has examined the impact of precollege traits on student persistence. Characteristics such as gender, race, high school GPA, and scores on college entrance exams have been analyzed to determine the influence of these traits on student persistence (Reason, 2001). Astin, et.al. (1987) conducted a comprehensive study of 8,000 students to examine characteristics that predicted retention and graduation. The authors found that SAT scores and high school GPA were correlated with retention and graduation rates. Sixty-eight percent of the students with an SAT above 1300 were likely to have a bachelor's degree after four years compared to 10% of students who had an SAT below 700. Students with an "A" average in high school were more likely to graduate than their peers with a "C" average in high school (Astin, et.al.).

Tinto's (1993) interactionist theory of student departure examined the relationship between a student and his/her environment and its impact on student persistence. Tinto ascertained that student's perceptions of their acceptance and involvement in their environment were just as influential as their actual involvement. Astin's (1984) theory of student involvement illustrated similar conclusions although Astin primarily analyzed student behaviors rather than student perceptions. Astin suggested that the more students are involved with their college environment, either

through class work or extracurricular activities, the more likely students are to persist.

### Research Studies on Concurrent Enrollment Students

This section synthesizes the related research of students participating in dual credit/concurrent enrollment programs. A number of studies have been conducted to examine the impact of dual credit/concurrent enrollment programs on student outcomes. A variety of research questions have been posed and investigated.

#### *Academic Performance*

Several studies have concluded that relative to non-participants in dual credit, dual credit students are better prepared for college, show lower remedial credit hours earned, demonstrate superior academic performance in college, earn more credits, and excel in the return rate for the second year of college (Spurling & Gabriner, 2002; Richardson, 1999; Windham, 1996). According to a study conducted at the University of Arizona (1999), students who participated in either AP or dual enrollment (or both) experienced lower drops in their grade point averages during their freshman year when compared with other University of Arizona freshmen.

Studies pertaining to dual credit and advanced placement have examined the relationship between the students and their college's academic performance and first year retention (Elmers & Mullen, 2003). The authors found holding ability indicators constant, students entering college with AP tend to get higher first-year GPA's than those students with dual credit only or than those students entering

college with no college credit. However, students who entered with AP or dual credit both returned for their second year at a higher rate than students who entered with no college credit. Furthermore, Delicath (1999) found that dual credit and AP credit was positively correlated with time-to-graduation and graduating within five years.

### *Student Satisfaction*

Statewide studies conducted in Arizona (Richardson, 1999), the University of Utah's Department of Educational Leadership and Policy Studies (Salt Lake Community College, 1999) and Illinois (Marshall & Andrews, 1991 and 2000) found that high school students are very satisfied with dual enrollment and concurrent enrollment classes, compared with regular high school classes. High school graduates described the program as meaningful and helpful in preparing them for future college level work (Marshall & Andrews, 1991).

### *Graduation Rates*

The Florida Community Colleges and Workforce Education study (2004), found high performing dual enrollment students graduated from community colleges at higher rates than similar students who did not participate in dual enrollment. They also found the difference in graduation rate between the dual and non-dual students implies that the dual enrollment program is serving those students it was intended to serve, i.e., high achievers who can benefit from the opportunity of exposure to college-level courses while still in high school (Horne & Armstrong Jr., 2004). The students in the study were tracked for four years (1993-94 through 1997-98) using the Florida Division of Community Colleges student data base to determine graduation rates and hours earned for a degree. High performing students were

defined as high school students with a 3.0 G.P.A. or above and had passed all three sections of the entry-level placement test. The Florida study found for each of the 1994 to 1998 cohorts, the graduation rate for dual enrollment students was consistently higher than the non-dual enrollment students.

Porter, (2003) in her dissertation conducted a study of students attending Tennessee Board of Regents Universities who participated in high school dual enrollment programs. She found that students who participated in dual/joint enrollment programs had more academic success and a higher retention and graduation rate than those students who did not participate in such programs. She also found that dual credit hours had a significant influence on time to completing a degree.

Mullen, (1997) conducted a follow-up study on students who had taken courses through the Minnesota Postsecondary Enrollment Options Program (PSEO). Of the 500 students targeted, 479 students responded. He found that 92% of the PSEO students continued their postsecondary education. It was anticipated that 96% of those would complete a degree (Mullen, 1997).

Cellini, (2006) raised questions on the effect of Tech Prep programs on educational attainment. Using data from six rounds of the 1997 National Longitudinal Survey of Youth (NLSY) the sample included 7,211 students. He found that Tech Prep programs help participants complete high school and encourage enrollment in two-year colleges. On the other hand the research showed the gains come at the expense of four-year college enrollment, suggesting that Tech Prep programs may divert students from four-year to two-year colleges in the years

immediately following high school. Further, while Tech Prep programs appear to increase overall educational attainment, they may be falling short of their goal of promoting college enrollment of among the middle majority. Cellini, (2006) concluded more time and research is needed before we can adequately assess the long-term impacts of Tech Prep and know definitively which educational innovations work for the middle majority and more importantly why.

Morrison, (2008) investigated the impact of acceleration (dual enrollment) on college graduation. Over 9,200 student records from 1996 to 2006 at North Iowa Area Community College were analyzed in a logistic regression model. He found holding all other independent variables constant the odds that an accelerated (dual enrollment) student graduates compared to a non-accelerated student is 1.61 times (about 61 percent greater than) the odds of a non-accelerated student graduating. Acceleration improves graduation probabilities (total effects) and marginal effects for students across entire quartile ranges. In addition, Morrison found that for accelerated upper quartile females their estimated graduation probability is nearly 78 percent. Further, male student outcomes do not equal female graduation outcomes but acceleration improves male student graduation probabilities. The effect of other covariates (high school GPA, first term credits, first term GPA & gender) on college graduation was also examined. The data suggested "gender" is an important predictor of degree attainment. With all other predictors held constant, the estimated odds that a female will graduate is about 34 percent greater than the odds of a male student graduating.

To understand the influence of participating in dual credit courses on success in college and graduation rates, O'Brien & Nelson (2004) examined a sample of high school students in Texas enrolled in dual credit courses. They found that students in the state who concurrently enrolled in postsecondary courses experience greater success in college. The findings found that students enrolled in dual credit courses are twice as likely to graduate from college in four years as those who did not enroll in dual credit program. Among Hispanics who enrolled in postsecondary institutions in Fall 2000, 77 percent who had taken dual credit courses were still enrolled in Fall 2001, compared with 62 percent who were not. Further, 32 percent of Hispanics who took dual credit courses graduated with Baccalaureate degrees versus 11 percent who did not take dual credit courses in high school. They also found the data was almost identical for African-Americans. Among those who enrolled in postsecondary institutions in Fall 2000, 78 percent who had taken dual credit courses were still enrolled in Fall 2001, as opposed to 59 percent who were not. Further, 34 percent of African-Americans who took dual credit graduated with Baccalaureate degrees compared with 11 percent who did not take dual credit courses in high school.

The research literature provides evidence of the benefits of concurrent enrollment/dual credit programs, which provide high school students with an opportunity to accelerate their college education. The literature regarding the academic and postsecondary transition outcomes of participants in dual enrollment programs is unfortunately sparse (Orr, 2002). A follow-up study should be performed at the end of the first semester to measure previously designated success

indicators (Chapman, 2001). Among these indicators may be course completion rates, course success rates, and grade point averages (Chapman, 2001). Less research has been conducted on longer-term outcomes, such as the time it takes for participants to earn their college degree, as compared to other students (Bailey, Hughes & Karp, 2002). More research is needed on concurrent enrollment/dual credit programs and similar programs that aim to smooth the transition to college. The findings from this study will assist in understanding the impact concurrent enrollment/dual credit programs have on student's educational attainment.

### CHAPTER 3. METHODOLOGY OF THE STUDY

#### Overview

The purpose of this study was to examine the impact of participation in concurrent enrollment programs on degree completion and acceleration (time to receiving a degree). Specifically, the study was designed to investigate the relationship between student demographic characteristics (gender and ethnicity), student academic status (arts and sciences versus career and technical), and student's educational goals (transfer to a college/university/or enter job market) to determine variables that predict degree completion and acceleration. In order to address the research questions posed the researcher tracked students' progress from their initial enrollment as a concurrent enrolled student, to their degree completion at the community college. This chapter provides an overview of the methodology that guides this study. The chapter includes the research questions and hypotheses, population and sample, data sources and data collection, a description of the variables that were analyzed, and data analysis procedures.

Based on the objectives of this study, the following research questions were addressed:

- 1) What are the background characteristics of the students enrolled in concurrent enrollment programs in fiscal year 2002 (07/01/01-06/30/02)?
- 2) How do concurrent enrollment students differ in their enrollment by program major? Specifically, to what extent are there differences in terms of enrollment in career and technical programs and the arts and sciences programs by gender and racial/ethnic background?

- 3) How many of the students in a concurrent enrollment program in 2002 completed a program of study at the community college? How do concurrent enrollment students differ in their degree completion by student status (career and technical versus arts and sciences)? Specifically, to what extent are there differences in terms of degree completion by gender and racial/ethnic background?
- 4) To what extent do students' demographics (gender and ethnicity), student academic status (career and technical versus arts and sciences), and educational goals (transfer to a college/university or enter job market) relate to the likelihood of a concurrent enrollment student completing a degree?
- 5) To what extent do differences in background characteristics (gender and ethnicity), student academic status (career and technical versus arts and sciences), and educational goals (transfer to a college/university or enter job market) predict the time it takes the concurrent enrollment students to obtain a degree?

### Hypotheses

A hypothesis is offered for research question four and five in this study. According to Creswell (2003), hypotheses are predictions about the outcomes of the results, and they may be written as alternative or null forms. The alternative hypothesis is written specifying the exact results to be expected (more or less, higher or lower of something). The null hypothesis makes a prediction that no relationship or difference exists between groups on a dependent variable. The

hypotheses for this study will be written in the traditional null form. Questions one, two and three do not require hypotheses because each is descriptive in nature.

**Hypothesis for Research Question Four:** There is no significant difference between concurrent enrollment students' demographics (gender and ethnicity), student academic status (career and technical versus arts and sciences), and educational goals (transfer to a college/university or enter the job market) in terms of the likelihood of completing a degree at the community college.

**Hypothesis for Research Question Five:** There is no relationship between concurrent enrollment students' background characteristics (gender and ethnicity), students' academic status (career and technical versus arts and sciences), and educational goals (transfer to a college/university or enter the job market) and the time it takes to obtain a degree at the community college.

#### Methodological Approach

This study, with its emphasis on quantitative data collection and analysis methods, assumed a positivistic approach to research. Characteristics of a positivistic paradigm include: a) a detached, objective role played by the researcher, b) generalization of results to similar phenomenon, c) a focus on measurement and quantification, and d) use of procedures to correlate and predict phenomena (LeCompte & Priessle, 1993; McMillan & Schumacher, 1997). The researcher should determine the data to be used and the decision should be based on his or her perception of the quality and relevancy of the data to the problem addressed (Gall, Borg & Gall, 1996). Secondary analysis, using data retrieved from the Iowa

Department of Education Management Information System (MIS, fiscal 2002) was used to conduct the study. It seemed that the study would have more validity if the data were extracted from college records rather than from a survey form (Lang & Hiess, 1997). Analysis of existing data, such as students' records, is referred to as secondary analysis (Kiecolt & Nathan, 1985). The advantages of using this collection procedure included the reliability of the information obtained and the researcher's benefit of not having to depend on the return of the survey forms. One disadvantage included obtaining access to the Iowa Department of Education Management Information System (MIS) dataset through Iowa State University. The data for this study could only be accessed at a single location (i.e.; the licensed site) in one office located at Lagomarcino Hall on the Iowa State University campus. Another disadvantage for this researcher was creating a program that would extract the data needed for the study. A graduate student at Iowa State University assisted the researcher with extracting the data needed for the study. There was no interaction between the researcher and the 15 Iowa Community Colleges who provided the data to the Iowa Department of Education Management Information staff.

The assumption of quantitative methodology is that numbers for a large sample of individuals can be analyzed and used to make generalizations where warranted about the larger populations from which the sample was taken (Creswell, 2003). For this study, a large dataset was used in the analysis of quantitative data about concurrent enrollment students in the State of Iowa for one academic year. The dataset includes the population of all 2002 concurrent enrollment students from

the 15 Iowa community colleges. For this study, the 2002 concurrent enrollment population was treated as a sample for the purpose of generalizing about a larger population of other cohorts of Iowa concurrent enrollment students. To achieve this goal all the variables were quantified. Data were collected and analyzed through quantitative databases and statistical procedures. This study employed a sequential logistic regression analysis and a multiple regression analysis. The results of the statistical analyses were used to make generalizations about concurrent enrollment students enrolled in other academic years.

#### Population and Sample

The target population for this study included all concurrent enrollment students who were enrolled at one of Iowa's 15 Community Colleges for the 2001-2002 academic year. The population was identified from the Iowa Department of Education Management Information System (MIS) dataset for fiscal year 2002. The researcher accessed the data sources as a part of a funded research project from the Iowa Department of Education, Division of Community Colleges and Workforce Preparation. Human Subjects research approval was sought from the Institutional Review Board (IRB) at Iowa State University, and granted which gave the researcher access to the data pertaining to concurrent enrollment students for fiscal year 2002. The initial data match was based on approximately 14,765 concurrent enrollment students for fiscal year 2002. To address research questions three, four and five, the data were delimited to 445 career and technical students and 1042 arts and sciences students who matriculated to one of Iowa's 15 community colleges as

regular students and further completed a degree, diploma or certificate at an Iowa community college. Degree completers are defined as those who obtained an Associate of Arts (AA), Associate of Science (AS), Associate of Applied Science (AAS), Associate of Applied Arts (AAA), Associate of General Studies (AGS), diploma, or certificate for fiscal years 2002, 2003, 2004, or 2005. This is a study of the population of concurrent enrollment students, and the unit of analysis is the student.

### Data Sources and Collection

#### *Matching Data – Selection of Population*

This study uses data from two sources in order to gain an understanding of the background characteristics of concurrent enrollment students and the impact of participation in concurrent enrollment/dual credit programs on college graduation and acceleration. First, the Iowa Department of Education Management Information System (MIS) year end credit student demographics and educational information file for fiscal year 2002 (07/01/01-06/30/02) data were used as a source of information on enrollment and student background characteristics. This file includes information on gender, race/ethnicity, and major program of study. The community colleges report student demographic data at the end of the academic year for all enrolled students for that year. The current study only uses data for students enrolled in concurrent enrollment programs for fiscal 2002. Second, the Iowa Department of Education (MIS) credit student award files for fiscal year 2002, 2003, 2004 and

2005. provided information on students who completed degrees, diplomas and certificates at the 15 Iowa community colleges.

The first phase of data collection entailed identifying the concurrent enrollment students enrolled at one of Iowa's 15 community colleges during fiscal year 2002. The second phase consisted of stratifying the concurrent enrollment student population into eight groups according to the Iowa Career clusters. Career clusters are the major programs in which students enroll, as defined by the Iowa Department of Education MIS data system based on Classification of Instructional Program (CIP) codes. The Iowa career cluster groupings were used for this study to identify the students' initial enrollment in a program. This sample was further analyzed by gender and ethnicity for each program enrollee. The third phase involved further stratifying the concurrent enrolled student by identifying those students who completed a degree, diploma or certificate at the community college. The fiscal 2002 MIS student demographic and educational file data with the students' social security number was matched with the award files for fiscal year 2002, 2003, 2004 and 2005 to identify those students who completed a degree, diploma or certificate at the community college. Additionally, this subsample was analyzed by gender and race/ethnicity. Figures 3.1 and 3.2 illustrate the three phases of matching the data for this study.

Figure 3.1

Phase One & Two: Matching Data

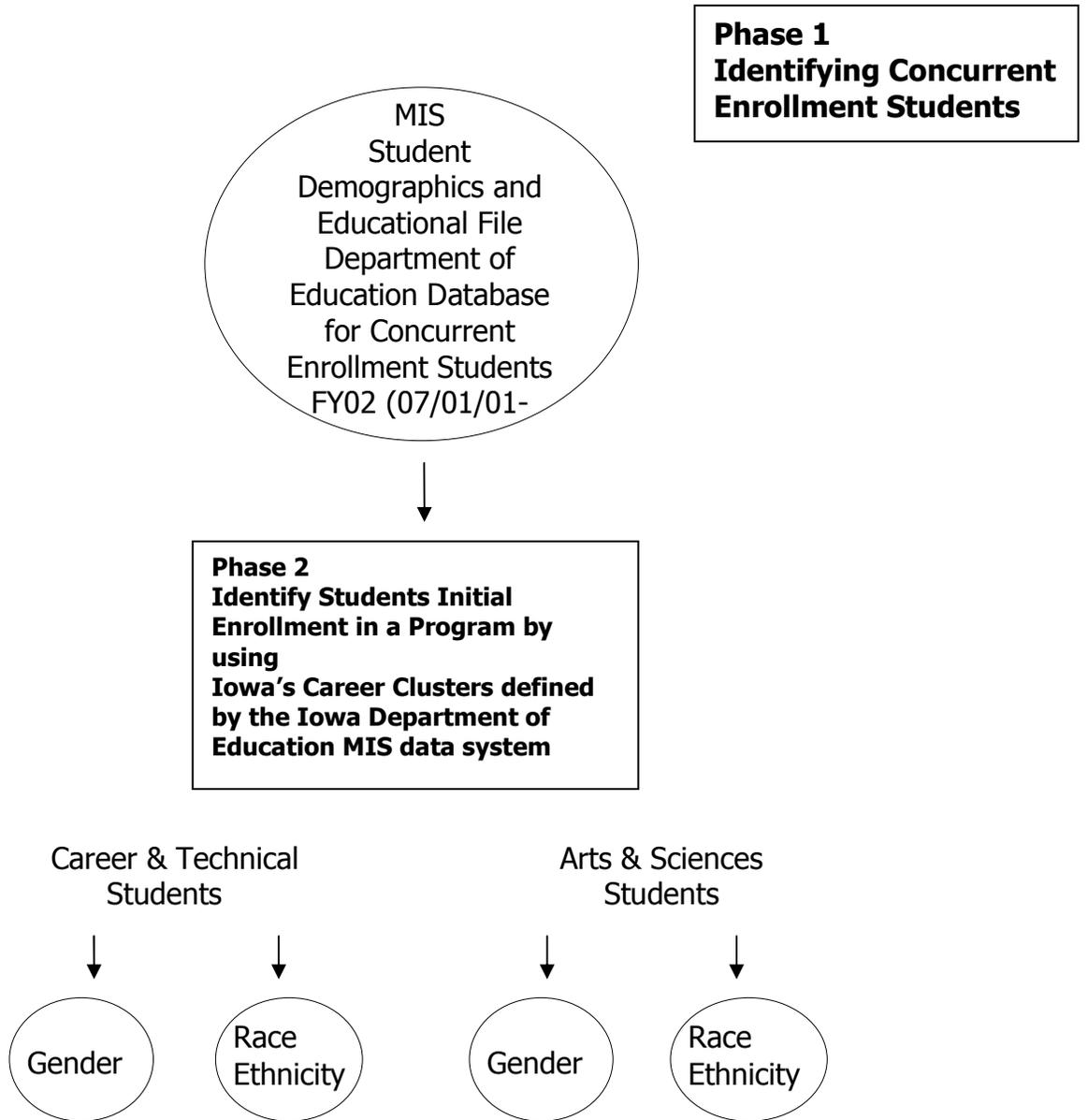
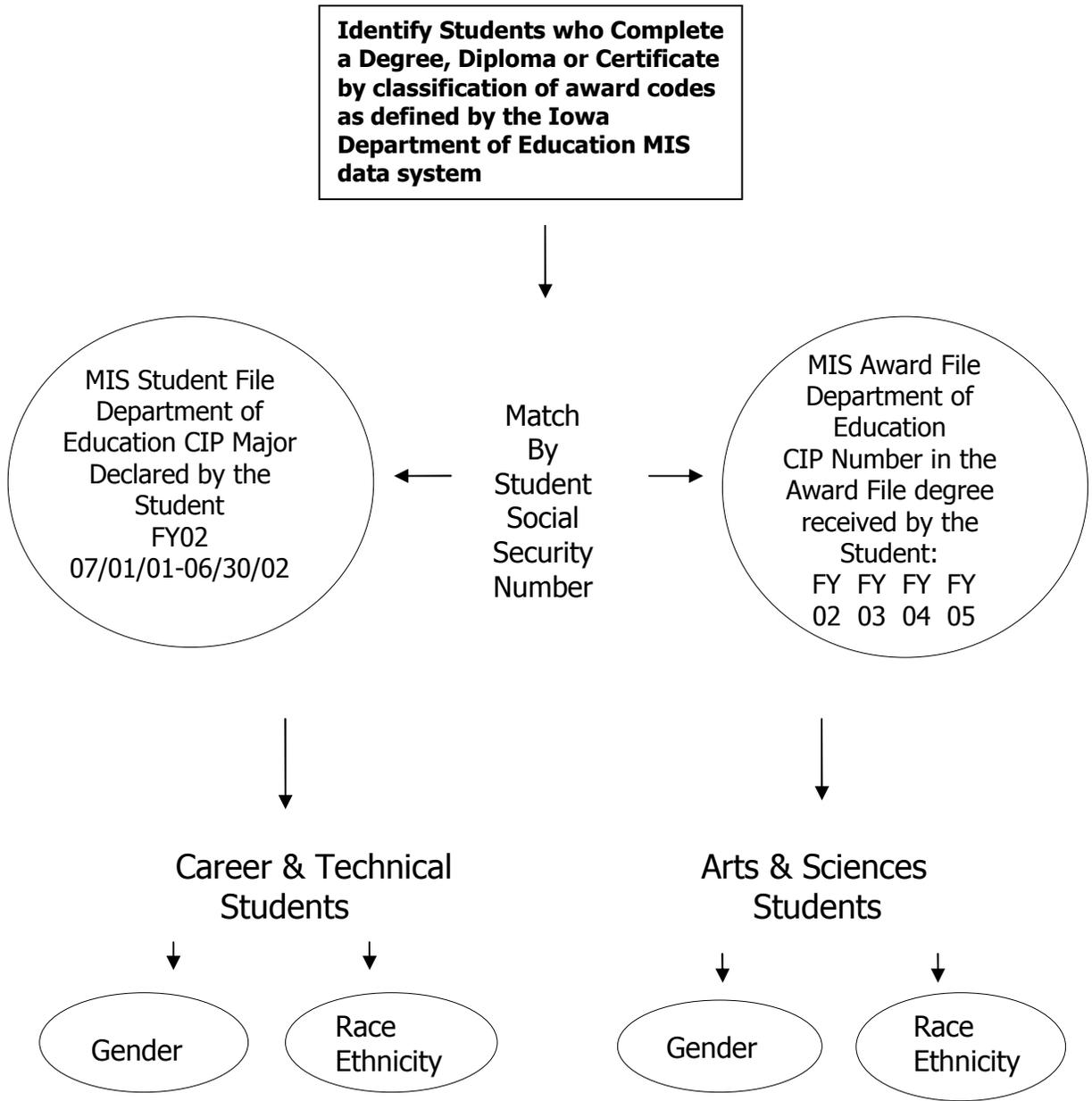


Figure 3.2

Phase Three: Matching Data

Phase 3



### *Extracting Data*

As mentioned previously, a graduate student at Iowa State University assisted the researcher with extracting the data needed for the study from the Iowa Department of Education MIS files. The graduate student also assisted in organizing the information into fields, so it would be accessible for a variety of uses. The items of information are called fields. The fields were given names. Related fields were grouped together into segments. The data for one or more segments become a file. The following information was extracted:

1. All students enrolled in a concurrent enrollment program for fiscal year 2002 by social security number.
2. Gender
3. Race/ethnicity
4. Student Status (Arts and Sciences versus Career and Technical)
5. Earned Credit Hours
6. Students Served with Support Services
7. Student Intent/Goal
8. Program Major (using Iowa Career Clusters groupings)
9. Award Code
10. Award Date

Figure 3.3 illustrates further the process of extracting data from the Iowa Department of Education Management Information System (MIS) database.

**Figure 3.3**  
**Extracting Data**

Matched Student Social Security Number in the student data file from Department of Education Management Information System (MIS FY02) with the (MIS) Award Files for (FY02, FY03, FY04, and FY05) degree received by the student. When the social security numbers are the same in both files, this group of students were my sample for questions three, four, and five.

**Domain of Students:**

Fiscal Year 2002 (07/01/01-06/30/02)  
Data from 15 Community Colleges  
Career & Technical Cohort: N=2,931  
Arts & Sciences Cohort: N=11,674

**Definitions:**

"Completer" (obtained an AA, AS, AAS, AAA, AGS, Diploma or Certificate)

STUDENT SS/ID#	FY02 Initial Degree Declared (CIP by the Student)	AWARD CIP (Actual Degree or Diploma Received)				CIP (Initial Degree) FY02 = CIP Award for "02" "03" "04" "05"
		02	03	04	05	
A	A.A. Degree	0	0	0	X	Y
B	A.A. Degree	0	0	0	0	N
C	Diploma	0	X	0	0	Y
D	A.S. Degree	0	0	X	0	Y
E	A.S. Degree	0	0	0	0	N

Data Access and Security

This research study required access to the restricted-use data provided by the Iowa Department of Education, Division of Community Colleges and Workforce Preparation to Iowa State University as a part of a funded research project. Dr. Frankie Santos Laanan, the principal investigator for the research at Iowa State University and the administrator of the Iowa Department of Education signed a data security plan. An affidavit of nondisclosure to have access to the Department of Education Management Information System (MIS) data was signed by the

researcher for this study. The Human subjects research approval was sought for this research study from Iowa State University. The Institutional Review Board (IRB) granted approval for this study as part of the approval process for a larger study. The approved IRB forms are provided in Appendix C and D. The current study is one of several studies conducted on the data by researchers at Iowa State University.

The principal investigator at Iowa State University serves as the System Security Officer (SSO) and is responsible for maintaining the day-to-day security of the licensed data. The data files were kept in a locked office on a stand-alone, password protected computer in compliance with the requirements of the data security plan. Since the data included Social Security numbers, strict regulations regarding appropriate use of this data were maintained.

### Data Analysis

Descriptive and inferential statistics were compiled to answer the research questions. The Statistical Package for Social Science SPSS (version 15.0) for Windows was the computer software program used to execute the statistical analysis for the study. Descriptive statistics were conducted to provide a profile of the Iowa concurrent enrollment students, their program of study and the degree, diploma or certificate each enrollee completed. Frequencies and crosstabulations were employed to examine their academic status, gender and ethnicity differences. This study employed a sequential logistic regression analysis and a multiple

regression analysis. For the regression analyses, listwise deletion was employed, omitting cases with missing data on the variables studied.

#### Research Question 1

The first research question for this study is: *What are the background characteristics of the students enrolled in concurrent enrollment programs in fiscal year 2002 (07/01/01-06/30/02)?*

To examine the first research question regarding the background characteristics of the concurrent enrollment students, the Iowa Department of Education MIS fiscal year 2002 student demographics and educational file was used. The MIS credit student information file identified the students who were enrolled in a college credit course for fiscal year 2002 (07/01/01—06/30/02). The cohort domain consisted of students with a valid Social Security Number (SSN). In addition, the file was used to further extract information on gender, racial/ethnic background, earned credit hours (total credit hours posted to student transcript at the time of enrollment in a college credit course), intent/goal of the student at time of registration for a college credit course, and the students' program major. The two broad categories of program majors are Arts and Sciences students enrolled in college parallel programs or students enrolled in Career and Technical (CT) programs. A descriptive statistical analysis including frequency counts and crosstabulations were used to address this research question.

Question one's purpose was to determine a profile of the concurrent enrollment students for the 2002 fiscal year. There has been little research

conducted on this group of students. Not having specific information about concurrent enrollment students could result in missing the opportunity to address their unique needs. The data gathered from this question could determine if the policies and procedures developed by the 15 Iowa Community Colleges are appropriate for concurrent enrollment students, or whether policies should be changed and/or new ones introduced. This group of concurrent enrollment students are very often either ignored or lumped in with all other students within the processes of career counseling, recruiting and retention strategies. The 15 Iowa Community Colleges administration, faculty, and staff could use this information about concurrent enrollment students to implement policies that could enhance the educational opportunities for this group of students.

#### Research Question 2

The second research question for this study is: *How do concurrent enrollment students differ in their enrollment by program major? Specifically, to what extent are there differences in terms of enrollment in career and technical programs and the arts and sciences programs by gender and racial/ethnic background?*

To address the second research question regarding enrollment by program major and the demographics of the student enrollees, the Iowa career clusters groupings were used to identify the students initial enrollment in a program. The Iowa career clusters are groupings of similar occupations and industries that were developed in collaboration between the Office of Vocational and Adult Education (OVAE) in the U.S. Department of Education, the National Association of State

Directors of Career and Technical Education Consortium (NASDCTEC), and other Career & Technical Education organizations (State's Career Clusters, 2007). The Iowa career clusters groupings include: Business Information, Management, and Marketing; Agriculture and Natural Resources; Arts and Communications; Engineering, Industrial Technological Sciences; Family and Human Services; Health Services; College Parallel; and Multi-Occupational. This variable is defined in the Iowa Department of Education MIS data system based on the Classification of Instructional Programs (CIP) codes. The concurrent enrollment students were further analyzed by gender and ethnicity for each program enrollee.

Question two was developed primarily to determine if concurrent enrollment programs are meeting the goal of enhancing access to college for diverse student populations. Dual credit, tech prep, and middle and early colleges are academic pathways offered to encourage students who are likely to face barriers to college entry and attendance to engage in advanced learning at the K-12 level. Waits, Setzer & Lewis (2005) found that student enrollment in dual credit was more available for students attending medium to large high schools (500 or more enrollees) than small high schools, and to students enrolled in towns or suburban areas rather than rural locations. Further, students attending high schools with the highest minority enrollment were less likely to have access to dual credit courses than students attending less diverse schools. The APASS inventory of the 50 states, along with research by Karp, (2004) corroborates the wide-spread yet uneven existence of dual credit and dual enrollment in the U.S. Nearly all states indicate they allow for high school students' involvement in concurrent

enrollment/dual credit programs, but the level of support and financial provision for local programs varies widely, as does the student population served. One of the goals of this research study was to document the incidence that underserved student groups are associated with concurrent enrollment/dual credit programs.

### Research Question 3

The third research question for this study is: *How many of the students in a concurrent enrollment program in 2002 completed a program of study at the community college? How do concurrent enrollment students differ in their degree completion by student status (career and technical versus arts and sciences)? Specifically, to what extent are there differences in terms of degree completion by gender and racial/ethnic background?*

In order to address this research question, the fiscal 2002 MIS student demographic and educational file data with the students social security number was matched with the MIS award files for fiscal 2002, 2003, 2004 and 2005. This sample included concurrent enrollment students who completed a degree, diploma or certificate in fiscal years 2002, 2003, 2004 or 2005. The students who completed a degree, diploma or certificate were further analyzed based on the award type they received. The award types included: Associate of Arts (AA) Degree, Associate of Science (AS) Degree, Associate of Applied Science (AAS) Degree, Associate of Applied Arts (AAA) Degree, Associate of General Studies (AGS) Degree, Diploma, and Certificate. Degree completers will be considered those who complete an AA, AS, AAS, AAA, or AGS degree, diploma or certificate. As stated earlier, the award

dates that were considered for this study were for the fiscal 2002 (2001-2002 academic year), fiscal 2003 (2002-2003 academic year), fiscal 2004 (2003-2004 academic year), and fiscal 2005 (2004-2005 academic year). Additionally, this subsample was analyzed by gender and race/ethnicity.

The purpose of this question was to examine the persistence and degree completion rates of Iowa's concurrent enrollment students. As stated in the literature review two benefits to students' participation in concurrent enrollment/dual credit programs are improved graduation and college continuation rates. There has been virtually no research conducted in Iowa on the impact of participation in concurrent enrollment/dual credit programs on college persistence and degree completion. This research question will address the impact of concurrent enrollment programs on educational attainment and could support the sustainability of these programs in the future.

#### Research Question 4

The fourth research question for this study is: *To what extent do students' demographics (gender and ethnicity), student academic status (career and technical versus arts and sciences), and educational goals (transfer to a college/university or enter the job market) relate to the likelihood of a concurrent enrollment student completing a degree?*

#### *Logistic Regression*

The fourth research question explored the relationship of several independent variables and the likelihood of graduation occurring by applying logistic regression

analysis. Logistic regression is “the most important model for categorical response data” (Agresti, 2002). Logistic regression is well suited for describing and testing hypotheses about a relationship between a categorical outcome variable and one or more categorical or continuous predictor variables. In this study, the dependent variable, graduation, is a binary categorical variable. The study controlled for important variables that impact the odds of college graduation. Logistic regression applies maximum likelihood estimation after transforming the dependent variable into a logit variable (the natural log of the odds of the dependent variable, graduation, occurring or not). In this way, logistic regression estimates the probability of graduation occurring, controlling for other important predictor variables.

The specified logit model has six predictors of community college graduation:

1. Gender
2. Ethnicity
3. Arts and Sciences Student
4. Career and Technical Student
5. Transfer to a College/University
6. Enter Job Market

To answer question four, the dependent variable graduation was recoded to a dichotomous variable using 1 as completed degree requirements and 0 as did not complete degree requirements. This was supported by the literature review which revealed concurrent enrollment students improve graduation and college continuation rates when participating in concurrent enrollment/dual credit programs. A sequential logistic regression analysis focused on the independent effects of the

following variables on the recoded dependent variable graduation: gender, ethnicity, student status (arts and sciences or career and technical), student intent/goal at registration (transfer to another college or university or prepare to enter the job market). Variables were added to the regression equation in three controlled blocks allowing for more accurate comparisons of the unique effects of the independent variables in determining the likelihood of students enrolled in concurrent enrollment programs completing a degree at the community college. These independent variables were supported by the literature review which revealed that gender, race/ethnicity and college aspirations were strongly related to student persistence and degree attainment. Table 3.1 provides the coding and scaling of the independent variables in the logistic regression model.

**Table 3.1**

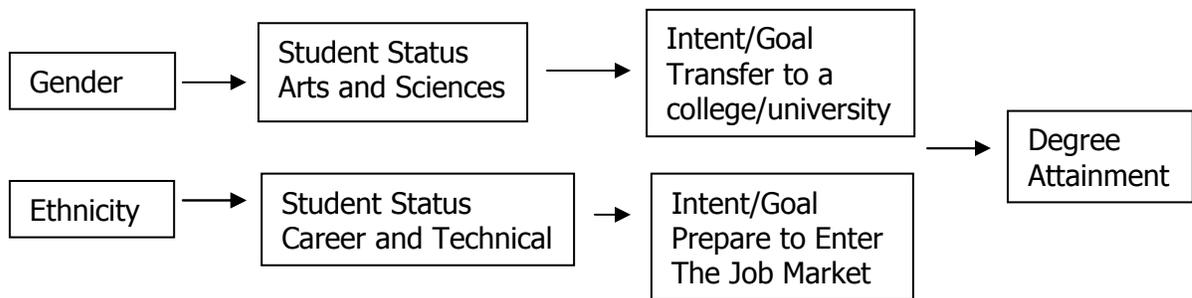
**Coding of the Independent Variables in the Logistic Regression Model**

<b>Independent Variables</b>	<b>Coding/Scale</b>
Block 1: Background Characteristics	
Gender	Dichotomous 1 = Male; 2 = Female
Ethnicity	Dichotomous 1 = White; 2 = Non-white
Block 2: Student Status	
Arts and Sciences	Dichotomous 1 = Arts and Sciences
Career and Technical	Student; 2 = Career and Technical Student
Block 3: Student Intent Goal at Enrollment	
Transfer to another college/university	Dichotomous 1 = Transfer to another college/university; 2 = Prepare to enter the job market
Prepare to enter the job Market	

A conceptual drawing of the sequential logistic regression model is displayed in Figure 3.4. The independent variables of gender, ethnicity, student status and educational goals (aspirations) were established based on the principles of the predictive model of degree attainment. Based on this framework, background characteristics (i.e., gender and ethnicity) were included in block one, student status (i.e., arts and sciences and career and technical) were added in block two, and student intent/goal (i.e., transfer to a college/university and prepare to enter the job market) were added in block three. The researcher hypothesized that these independent variables would relate to the likelihood of a concurrent enrollment student completing a degree.

**Figure 3.4**

**Conceptual Model for Concurrent Enrollment Students' Likelihood of Degree Attainment**



**Research Question 5**

The fifth research question for this study is: *To what extent do differences in background characteristics (gender and ethnicity), student academic status (career and technical versus arts and sciences), and educational goals (transfer to a*

*college/university or enter the job market) predict the time it takes the concurrent enrollment student to obtain a degree?*

### *Multiple Regression*

In order to address this research question, standard multiple regression analysis was used. Multiple regression, a frequently used method in studies analyzing prediction, was an appropriate regression method to use since the independent variables and the dependent variable (time to award) were quantitative (Mertler & Vannatta, 2001). The Statistical Package for Social Sciences (SPSS) was used to pre-screen the samples for missing data and perform multiple regression.

To apply multiple regression methods correctly, three general assumptions must be met: a) normality, b) linearity and c) homoscedasticity (Mertler & Vannatta, 2001). The assumption of normality in multiple regression is the “extent to which all observations in the sample for all combinations of variables are distributed normally” (Mertler & Vannatta, p. 30). Because this is difficult to assess (see Stevens, 1996), this study utilized a procedure recommended by Mertler and Vannatta: each variable was tested for normality through the use of histograms (i.e., gender, ethnicity, student intent/goals, etc.). When it was assessed that each variable had a normal distribution, scatter plots for each pair of variables (i.e., gender, ethnicity and student intent/goals) were run to assess normality.

The assumption of linearity posits that a straight-line relationship exists between two variables or a combination of variables (Tabachnick & Fidell, 1983).

Homoscedasticity is the assumption that the “variability in scores on one variable is roughly the same for all values of the other variables” (Tabachnick & Fidell, 1983 p. 81). Although several methods could be used to test these assumptions, this study evaluated linearity and homoscedasticity by running scatter plots of residuals for each data set (Tabachnick & Fidell, 1983).

Several types of multiple regression methods exist, but this study employed standard multiple regression techniques. In standard multiple regression all independent variables simultaneously are entered into the model and their influence on the dependent variables is calculated (Tabachnick & Fidell, 1983). This method is appropriate for a study such as this one that is exploratory in nature and is trying to “simply assess relationships among variables and answer the basic question of multiple regression” (Tabachnick & Fidell, 1983 p. 105). Standard multiple regression was conducted to determine the extent to which the independent variables predicted the dependent variable and to assess which, if any, of these variables are most influential in predicting time to award. An alpha of .05 was chosen as the level of significance. Research studies in education and behavioral sciences commonly use either significance levels of .05 or .01. Since the sample for this study was relatively large, .05 was an acceptable significance level (Stevens, 1996). Any values of .05 level or lower resulted in rejection of the null hypothesis (Mertler & Vannatta, 2001).

To test the null hypotheses, four measures associated with multiple regression were analyzed: the F-test,  $R^2$ ,  $R^2_{adj}$  and  $\beta$ . The F-test examined the extent to which the relationship between the independent and dependent variable

were linear. An F-test that is significant ( $p \leq .05$ ) demonstrates that participation in concurrent enrollment programs had a significant effect on acceleration rates.

The  $R^2$  statistic, also called coefficient of determination, is the proportion of the variance in the dependent variable (acceleration rates) that can be explained by the independent variables.  $R^2_{adj}$ , is similar to  $R^2$  but also takes into account the sample size and number of independent variables. The higher the  $R^2$  and  $R^2_{adj}$ , the more influence participating in concurrent enrollment programs have on predicting acceleration rates (Mendenhall & Sincinch, 1996). Finally,  $\beta$  or standardized regression coefficients, illustrate the amount of influence each individual independent variable has on predicting the dependent variable. T-tests were conducted on each standardized regression coefficient. It was concluded that variables with significance level of  $p \leq .05$  significantly contributed to the dependent variable (acceleration rates) (Mendenhall & Sincinch, 1996).

Table 3.2 displays the proposed model for the sequential multiple regression. The first block of variables included background characteristics: gender and race/ethnicity. The second block represents the student's status: arts and sciences or career and technical. The third block represents the student's most recently stated goal for enrollment in a concurrent enrollment course/program. The two goals are transfer to a college/university or prepare to enter the workforce. The dependent variable for research question five is time to degree.

**Table 3.2:****Variables for Sequential Multiple Regression of Time to Degree**

<b>Block 1: Background Characteristics</b>	<b>Block 2: Student Status</b>	<b>Block 3: Student Intent/Goals</b>
Gender	Arts and Sciences	Enter Workforce
Ethnicity (White or Non-White)	Career and Technical	Prepare to Transfer to a College/University

## Variables in the Study

Independent Variables

The independent variables (see Table 3.3) used in this study were obtained from the Iowa Department of Education Management Systems (MIS) data files. The variables measured in this study were extracted from the year end credit student information file for fiscal 2002 and the credit student awards files for fiscal 2002, 2003, 2004 and 2005. A description of each variable follows as they are introduced into the analysis of each question. A number of variables were recoded and several others constructed. The logistic regression and multiple regression analyses test the variables (gender and ethnicity), student academic status (arts and sciences versus career and technical) and student intent/goals (transfer to a college/university or enter the job market) to determine if any variable studied was more of a predictor of degree completion and acceleration.

*Socioeconomic Background.* Gender is divided into two groups: male or female. Race is divided into American Indian or Alaskan Native, Asian or Pacific Islander, Black, Hispanic, and White for descriptive analyses. Race/ethnicity has

been aggregated into the categories of White and Non-White for inferential analyses due to the small numbers for non-white students in the study. Extensive research has established the correlation between student achievement and various demographic variables such as race-ethnicity, income, parent education, gender, age, and family structure (Desimone, 1999; Hurtado, Inkelas, Briggs, & Rhee, 1997). Specifically, the variables of gender and ethnicity are considered in this study to control for their effect on enrollment in a program of study, on degree completion and acceleration.

*Earned Credit Hours.* The total credit hours posted to student transcript at time of report.

*Served With Support Services.* Individuals who are members of one or more special populations who received supplemental assistance beyond what is provided other students in order to succeed in their program.

*Student Intent/Goal.* The variable student intent/goal refers to the student's most recently stated reason for enrolling at the community college as provided at the time the student registered for a course (Iowa Department of Education, 2008). Students were asked to indicate their intent/goal from a series of statements on the admission application. The following responses are permitted for this field:

1 = Transfer to another college/university

2 = Prepare to enter job market

3 = Explore courses to decide on career

4 = Self-improvement/improve basic skills

5 = Take courses for personal interest

6 = Improve skills for present job

7 = Prepare to change careers

8 = Meet certification/licensure requirements

9 = Undecided/unknown/other

For the purpose of this study, the variable was collapsed into two categories which were: 1) transfer to another college/university and 2) prepare to enter job market for the regression analyses. It should be noted that the student intent variable primarily represents goals not related to the student's aspiration of completing a degree.

*Student CIP Major or Program CIP number.* The definition of an instructional program is based on the Classification of Instructional Programs (CIP), developed by the U.S. Department of Education's Center for Education Statistics (CES). Their definition of award programs are programs of instruction requiring a specific amount of educational work and resulting in a diploma, certificate, or degree conferred by the faculty and ratified by the governing board of the school or agency granting the award. The program CIP number is the initial major declared by the student when enrolling in a concurrent enrollment program/course at the community colleges in Iowa. Specific programs of study are defined according to the first 6 digits of the CIP code (an 8-digit code). The purpose of using the first 6 digits is that in many cases the last two digits only indicate the degree goal, resulting in redundancy of similar programs.

*Student Status.* Students in this study are defined by their status. The Iowa Community Colleges divide their curriculum into two categories, 1) Arts and Sciences and 2) Career and Technical. The students are identified as arts and

sciences concurrent enrollment students or career and technical concurrent enrollment students. Based on a student's CIP major or program CIP number.

*Iowa Career Clusters.* Career clusters are the major programs in which students enroll, as defined by the Iowa Department of Education MIS data system based on the Classification of Instructional Programs (CIP) codes. The purpose of the States' Career clusters Initiative was to standardize and improve the pathways to successful careers for participants in Career Technical Education (CTE) programs. This is done through creating rigorous standards for the knowledge and skills that are expected in each cluster (States' Career Clusters, 2007). The Iowa Department of Education determines which programs are included under each career cluster for Iowa community colleges. The career clusters are groupings of similar occupations and industries that were developed in collaboration between the Office of Vocational and Adult Education (OVAE) in the U.S. Department of Education, the National Association of State Directors of Career and Technical Education Consortium (NASDCTEC), and other Career and Technical Education (CTE) organizations (State's Career Clusters, 2007). The Iowa career clusters are: Business Information, Management, and Marketing; Agriculture and Natural Resources; Arts and Communications; Engineering, Industrial Technological Sciences; Family and Human Services; Health Services; College Parallel; and Multi-Occupational. This variable is defined in the Iowa Department of Education MIS data system based on the Classification of Instructional Programs (CIP) codes. The Iowa career cluster groupings were used for this study to identify the students' initial enrollment in a program.

*Award Code.* Degree completed is measured through a single variable, student award code. The following award codes denote college degree completed: Associate of Arts (AA) degree; Associate of Science (AS) degree; Associate of General Studies (AGS) degree; Associate of Applied Arts (AAA) degree; Associate of Applied Science (AAS) degree; Diploma (awarded for fulfilling the requirements of typically one-year career and technical program); Certificate (represents completion of career and technical program designed for less than one year of study).

*Award Date.* Fiscal year in which the student completed their degree is measured through a single variable, student award date. Award dates for graduation included the following: Fiscal years 2002, 2003, 2004 and 2005.

*Time To Award.* Represents the time from first enrollment as a student to last date of attendance or completion.

**Table 3.3**

**Coding of Independent Variables**

<b>Variables from MIS Files</b>	<b>Coding/ Scale</b>	<b>Definition</b>	<b>Research Questions</b>
<b>Background Characteristics</b>			
Social Security Number/ Unique Student Identifier	Unique 9-digit Numeric	Social Security Number, including leading zeros. Use a locally assigned unique identifier for students who will not provide their social security number.	1, 2, 3, 4, 5
Gender	0 = Unknown 1 = Male 2 = Female	Male or Female	1, 2, 3, 4, 5

**Table 3.3 (continued)****Coding of Independent Variables**

<b>Variables from MIS Files</b>	<b>Coding/ Scale</b>	<b>Definition</b>	<b>Research Questions</b>
Race/Ethnicity	<p>1 = American Indian or Alaskan Native</p> <p>2 = Asian or Pacific Islander</p> <p>3 = Black</p> <p>4 = Hispanic</p> <p>5 = White</p> <p>6 = Choose not to reply</p>	<p>A person having origins in any of the original peoples of North America, and who maintains cultural identification through tribal affiliations or community recognition.</p> <p>A person having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific islands. This includes, for example, Philippine Islands and Samoa.</p> <p>A person having origins in any of the black racial groups of Africa.</p> <p>A person of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish culture or origin, regardless of race.</p> <p>A person having origins in any of the original peoples of Europe, North Africa, or the Middle East.</p>	1, 2, 3, 4, 5
Earned Credit Hours	<p>1 = 0-.50</p> <p>2 = 1-6</p> <p>3 = 7-12</p> <p>4 = 13-20</p> <p>5 = 21-30</p> <p>6 = 31-40</p> <p>7 = 41 or more</p>	The total credit hours posted to student transcript at time of report.	1
Served With Support Services	<p>0 = No</p> <p>1 = Yes</p>	Individuals who are members of one or more special populations who received supplemental assistance beyond what is provided other students in order to succeed in their program.	1

Table 3.3 (continued)

## Coding of Independent Variables

Variables from MIS Files	Coding/ Scale	Definition	Research Questions
Student Intent/Goal	1=transfer to another college/ university 2=prepare to enter job market 3=explore courses to decide on career 4=self-improvement/improve basic skills 5=take courses for personal interest 6=improve skills for present job 7=prepare to change careers 8=meet certification/ licensure requirements 9=undecided/ unknown/other	Derived variable based on response indicating the intent/goal of the respondent (student) at time of registration. Students were asked to indicate their intent/goal from a series of statements on the admission application. For regression analyses, the variables 1=transfer to another college/university and 2=prepare to enter job market were used. The variables were added to the logistics regression equation in question 4 to determine to what extent students' educational goals relate to the likelihood of a concurrent enrollment student completing a degree. The variables were added to the multiple regression equation in question 5 to determine the extent to which the variables predict time to award.	1, 4, 5
Student CIP Major or Program CIP Major	First 8 digits including leading zeros – Student Major at end of fiscal year. 1=arts and sciences 2=career and technical	Student Academic Status – Arts & Sciences or Career & Technical	1, 2, 3, 4, 5

**Table 3.3 (continued)****Coding of Independent Variables**

<b>Variables from MIS Files</b>	<b>Coding/ Scale</b>	<b>Definition</b>	<b>Research Questions</b>
Iowa Career Clusters	1 = Agriculture and Natural Resources 2 = Arts and Communications 3 = Business Information, Management and Marketing 4 = Engineering, Industrial Technological Sciences 5 = Family and Human Services 6 = Health Services 7 = College Parallel 8 = Multi-occupational	Career clusters defined by programs and CIP code	2, 3
Award Code	1 = Associate of Arts (AA) 2 = Associate of Science (AS) 3 = Associate of General Studies (AGS) 4 = Associate of Applied Arts (AAA) 5 = Associate of Applied Science (AAS) 6 = Diploma 7 = Certificate 8 = Other Z = Non-graduate program completer (Tech-Prep/Perkins)	Associate Degree Attainment, Diploma or Certificate Completed	3, 4, 5
Award Date	CCYYMMDD (Example: May 1, 2004 would be 20040501)	Fiscal year in which the student completed their degree is measured through a single variable, student award date.	3, 4, 5
Time to Award	Fiscal years 2002, 2003, 2004, and 2005	Represents the time from first enrollment as a student to last date of attendance or completion.	5

## CHAPTER 4. RESULTS

This chapter provides a comprehensive overview of the findings from the statistical analyses of the study. The chapter is organized based on the five research questions and two hypotheses. The first research question explored the demographics of concurrent enrollment students who participated in college credit programs during fiscal year 2002. The second research question illustrates the analysis of concurrent enrollment students by program major and gender/ethnicity for fiscal year 2002. The third research question analyzes the concurrent enrollment students who completed a program of study at the community college and reports the degree completers by gender and ethnicity. The fourth research question examined the results of logistic regression analysis on the relationship of several independent variables to the likelihood of concurrent enrollment students completing a degree. The fifth research question investigated the results of multiple regression analysis on the relationship of several independent variables to predicting the time it takes concurrent enrollment students to obtain a degree.

### Demographics of Concurrent Enrollment Students

The first research question guiding this study is *What are the background characteristics of the students enrolled in concurrent enrollment programs in fiscal year 2002 (07/01/01-06/30/02)?* To address this question, a descriptive table of the background characteristics of concurrent enrollment students enrolled during fiscal 2002 are presented. The sample for this question consisted of all concurrent enrollment students enrolled at one of Iowa's 15 community colleges for fiscal year

2002. The initial data match was based on 14,765 concurrent enrollment students enrolled in college credit courses during fiscal year 2002. Table 4.1 illustrates the background characteristics of the sample of concurrent enrollment students in this study.

**Table 4.1**

**Frequency (Percentages) of Concurrent Enrollment Students' Demographics**

**(N = 14,765)**

<i>Variable</i>	<u>Student Demographics</u>	
	<i>N</i>	<i>%</i>
Gender		
Male	7056	47.8
Female	7696	52.1
Unknown	13	.1
Racial/Ethnic Background		
American Indian	47	.3
Asian or Pacific Islander	225	1.5
Black	102	.7
Hispanic	175	1.2
White	13082	88.6
Chose not to reply	331	2.2
Missing	734	5.0
Unknown	69	.5
Earned Credit Hours		
0-.50	2336	15.8
1-6	7314	49.5
7-12	3142	21.3
13-20	1363	9.2
21-30	424	2.9
31-40	120	.8
41 or more	66	.5

**Table 4.1 (continued)****Frequency (Percentages) of Concurrent Enrollment Students' Demographics****(N = 14,765)**

<i>Variable</i>	<b><u>Student Demographics</u></b>	
	<i>N</i>	<i>%</i>
Served with Support Services		
No	4585	31.1
Yes	273	1.8
Total	4858	32.9
Missing in System	9907	67.1
Intent/Goal of Student at Registration		
Transfer to Another College/University	2879	19.5
Prepare to Enter Job Market	1768	12.0
Explore Courses to Decide on Career	1635	11.1
Self-improvement/Improve Basic Skills	374	2.5
Take Courses for Personal Interest	451	3.1
Improve Skills for Present Job	64	.4
Prepare to Change Careers	57	.4
Meet Certification/Licensure Requirements	290	2.0
Undecided/Unknown/Other	5556	37.6
Missing Response	1691	11.5
Program Major		
Arts and Sciences	11,812	80.0
Career and Technical	2,953	20.0

### *Gender*

Table 4.1 indicates that just over half of the concurrent enrollment students were females (n = 7,696, 52.1%), compared to males (n = 7,056, 47.8%) of the sample.

### *Race/Ethnicity*

The concurrent enrollment students were asked to choose one of five options to identify their racial/ethnic background when completing the application form for enrolling in college credit courses offered by the Iowa community colleges. By race/ethnicity, the majority of all respondents were white (88.6%). Other ethnic groups in the sample include: Asian or Pacific Islander students (1.5%), Hispanic (1.2%), Black (.7%), and American Indian (.3%). 2.2% of the students chose not to reply to this option when completing the enrollment application for enrolling in a college credit course. For (5.5%) of the students this variable had missing information or the students race/ethnicity was unknown.

### *Earned Credit Hours*

In terms of students' number of earned credit hours at time of enrollment in a college credit course for fiscal year 2002, 49.5% of the students had earned one to six credits. 21.3% of the students had earned six to twelve credits, while 9.2% had earned thirteen to twenty credits, 4.2% had earned twenty or more credits. 15.8% of the concurrent enrollment students had no documented credit hours recorded at the community colleges at the time of enrollment in college credit courses.

### *Served with Support Services*

1.8% of the concurrent enrollment students in the sample reported receiving supplemental assistance beyond what is provided other students in order to succeed in their program. These students are members of one or more special populations. Accommodations for Special Populations/Special Needs students were authorized by the Vocation Education Act of 1963 (Amendments of 1968 and 1973) to develop special vocational programs and supportive services for disabled youth and adults. The main objective of Special Needs is to provide vocational education programs for persons who have academic, socio-economic, or other social disabilities that prevent them from succeeding in the regular vocational education program. Special Needs vocational funds are available for supportive services and promoting programs which help disabled individuals become vocationally prepared and gainfully employed. If disabled persons are in regular vocational programs, Special Needs will provide remedial help, extra counseling services and additional experiences supporting vocational preparation to help the students succeed in the programs of their choice. When vocationally oriented programs are not available in schools, Special Needs funds can be used to develop programs for disabled persons.

### *Intent/Goal of Student at Registration*

The concurrent enrollment students were asked to rate their intent or goal at time of registering for a college credit course on a nine-point scale. As shown in Table 4.1, the nine variables were transfer to another college/university; prepare to enter the job market; explore courses to decide on career; self-improvement/improve

basic skills; take courses for personal interest; improve skills for present job; prepare to change careers; meet certification/licensure requirements; and undecided/unknown/other. 19.5% of the students indicated they plan to transfer to another college/university, compared to 12% of the students were preparing to enter the job market. In addition, 11.1% of the concurrent enrollment students were taking a college credit course to explore courses to decide on a career, compared to 2.5% of the concurrent enrollment students that were enrolling in a college credit course to improve their basic skills. 3.1% of the concurrent enrollment students were in a college credit course for personal interest, while .4% of the concurrent enrollment students' intent was to improve their skills for their present job. Similarly, .4% of the concurrent enrollment students indicated that their intent or goal for enrolling in a college credit course was to prepare to change careers. 2% of the concurrent enrollment students indicated their goal was to meet certification or licensure requirements. Of the 14,765 concurrent enrollment students in this analysis, 37.6% of the students responded undecided or unknown and 11.5% of the students did not complete a respond.

### *Program Major*

The concurrent enrollment students in this study are defined by their enrollment in a program major. The two broad categories of program majors are Arts and Sciences students enrolled in college parallel programs or students enrolled in Career and Technical (CT) programs. College parallel programs include courses that articulate to a community college or a four-year university. Career and technical education programs prepare students to articulate to the community college to

complete an Associate of Applied Science (A.A.S.) program or prepare students to enter the workforce. The data revealed that 11,812 (80%) of the community college students were enrolled in an arts and sciences program and a total of 2,953 (20%) of the students were enrolled in a career and technical program for fiscal year 2002.

#### Demographics of Concurrent Enrollment Students by Program Major

The second research question guiding this study is: *How do concurrent enrollment students differ in their enrollment by program major?* To address this question, descriptive tables of concurrent enrollment students' gender and ethnicity by program major and concurrent enrollment students' enrollment by the Iowa State Clusters (program majors) are presented.

Table 4.2 presents a detailed description of the concurrent enrollment students in the sample by program major, gender, and ethnicity. As stated earlier, student program majors are defined by two categories: arts and sciences students enrolled in college parallel programs, and concurrent enrollment students enrolled in career and technical programs. Table 4.3 illustrates the concurrent enrollment students' program major identified by the Iowa Career Clusters.

#### *Program Major by Gender*

A larger percentage of females ( $n = 6,711$ , 57.5%) were enrolled in college parallel programs compared to ( $n = 4,950$  42.4%) of the concurrent enrollment students in college parallel programs were male. Approximately two-thirds of the concurrent enrollment students enrolled in career and technical programs were male

(n = 2,051, 70%), while approximately one-third (n = 880, 30%) were female. A higher percentage of females (15%) were enrolled in college parallel programs while more males (40%) were enrolled in career and technical programs.

#### *Ethnicity by Program Major*

White students comprised the largest racial/ethnic group (88.6%) enrolled in concurrent enrollment program majors. Minority racial/ethnic groups comprised 3.7% of the total students participating in concurrent enrollment programs. 10,306 (88.3%) of the arts and sciences students were white, followed by Asian/Pacific Islander students 182 (1.6%), Hispanic students 106 (.9%), Black students 72 (.6%), and American Indian students 28 (.2%). White students, 2,630 represented approximately 90 percent of the students enrolled in career and technical programs, followed by Hispanic students 67 (2.3%), Asian or Pacific Islander students 40 (1.4%), Black students 29 (1.0%), and American Indian students 18 (.6%). As shown in Table 4.2, career and technical enrollees that were members of minority racial/ethnic groups comprised 5.3% of the total career and technical concurrent enrollment. A slightly lower percentage of arts and sciences concurrent enrollment students (3.3%) were members of minority racial/ethnic groups.

**Table 4.2**

**Frequency (Percentages) of Concurrent Enrollment Students' Gender and Ethnicity by Program Major**  
**(N = 14,605)**

Variable	<u>Gender/Ethnicity Cross Tabulation</u>					
	<u>Arts &amp; Science</u>		<u>Career &amp; Technical</u>		<u>Total</u>	<u>Percent</u>
	N=11,674	%	N=2,931	%	N	%
Gender						
Male	4,950	42.4	2,051	70.0	7,001	48.0
Female	6,711	57.5	880	30.0	7,591	52.0
Unknown	13	.1			13	.0
Racial/Ethnic Identification						
American Indian	28	.2	18	.6	46	.3
Asian or Pacific Islander	182	1.6	40	1.4	222	1.5
Black	72	.6	29	1.0	101	.7
Hispanic	106	.9	67	2.3	173	1.2
White	10,306	88.3	2,630	89.7	12,936	88.6
Choose not to reply	324	2.8	7	.2	331	2.3
Missing Information	616	5.3	112	3.8	728	5.0
Unknown	40	.3	28	1.0	68	.5

*Iowa Career Clusters (Program Majors)*

Table 4.3 illustrates a summary of the concurrent enrollment student enrollees by the Iowa Career Clusters (program majors). Participants with missing information on the variable program major, were eliminated, resulting in a final subsample of 14,605 students. The Iowa Career Clusters, are groupings of similar occupation and industries educational programs for the purpose of integrating academic and occupational skills. This variable is defined in the Iowa Department of Education MIS data system based on the Classification of Instructional Programs

(CIP) codes. The Iowa Career Clusters include the following: Agriculture and Natural Resources, Arts and Communications, Business Information, Management, and Marketing, College Parallel, Engineering, Industrial Technological Sciences, Family and Human Services, Health Services, Industrial Technological Sciences, and Multi-Occupational.

The majority of the concurrent enrollment students 79.1% (n = 11,674) were enrolled in the College Parallel cluster programs. 9.9% (n = 1,455) of the concurrent enrollment students were enrolled in the Industrial Technological Sciences cluster programs, while 5.4% (n = 798) students in Business, Information, Management, and Marketing cluster programs, followed by 3.7% (n = 548) in Health Services cluster programs, .4% (n = 60) in Family and Human Services cluster programs, .3% (n = 51) in Agriculture and Natural Resources cluster programs and .1% (n = 19) in Multi-Occupational cluster programs.

**Table 4.3**

**Frequency (Percentages) of Concurrent Enrollment Students Enrolled by Iowa Career Clusters (Program Majors)**

**(N = 14,605)**

Variable	State Cluster Cross Tabulation	
	N	%
Iowa Career Clusters Program Major		
Agriculture and Natural Resources	51	.3
Arts and Communication	0	0
Business Information, Management, and Marketing	798	5.4
College Parallel	11,674	79.1
Engineering, Industrial and Technological Sciences	0	0
Family & Human Services	60	.4
Health Services	548	3.7
Industrial Technological Sciences	1455	9.9
Multi Occupation	19	0.1
Missing	160	1.1

Degree Completers by Program Major

The third research question guiding this study asks *How many of the students in a concurrent enrollment program in 2002, completed a program of study at the community college?* Descriptive statistics of the concurrent enrollment students who were enrolled in a college credit course for fiscal year 2002 and completed a program of study at one of the Iowa Community Colleges in fiscal year 2002 (FY02), fiscal year 2003 (FY03), fiscal year 2004 (FY04) and fiscal year 2005 (FY05) were examined to answer this question. Additionally, the analysis indicates the number and percentage distribution of degree awards earned by each concurrent enrollment student. The following completion award codes were tracked in this study:

Associate of Arts (A.A.), Associate of Science (A.S.), Associate of General Studies (A.G.S.), Associate of Applied Science (A.A.S.), diploma, certificate and other credentials. The sample for this question consists of all concurrent enrollment students enrolled in a college credit course for fiscal year 2002 and all completers from fiscal year 2002 through fiscal year 2005. A completer is defined as an individual who received a degree, certificate, or diploma from an Iowa Community College.

Table 4.4 displays the concurrent enrollment students who completed a degree, diploma, certificate or other credentials in fiscal year 2002, 2003, 2004, or 2005. Results show that of the 2,931 students enrolled in a career and technical program during fiscal year 2002, 445 (15%) of the concurrent enrollment students completed a degree, diploma, certificate or other credentials during fiscal year 2002, 2003, 2004 or 2005. Among the 11,674 concurrent enrollment arts and sciences students, 1,042 students (8.9%) completed a degree, diploma, certificate or other credentials. Results show that 23.9% of the concurrent enrollment students completed a program of study at an Iowa Community College.

**Table 4.4****Frequency (Percentages) of Concurrent Enrollment Student Degree****Completers by Program Major****(N = 14,605)**

Variable	<u>Student Completers</u>				Total	%
	Arts & Science N=11,674		Career and Technical N=2,931			
		%		%		
Student Completers						
Arts & Science	1042	8.9			1042	8.9
Career and Technical			445	15.0	445	15.0
					1,487	23.9

*Degree Completers by State Clusters (Program Majors)*

Table 4.5 illustrates a summary of the concurrent enrollment student degree completers by State Cluster. The concurrent enrollment students were enrolled and completed their program of study in the seven Iowa Career Clusters (Program Majors). The majority of degree completers 70.3% (n = 1,042) were College Parallel majors. In terms of degree completers for career and technical programs, a higher proportion of Industrial Technological Sciences students 14.2% (n = 210) completed a program. This was compared to 7.1% (n = 105) Health Services students, 5.7% (n = 84) Business Information, Management, and Marketing students; 1.5% (n = 23) Agriculture and Natural Resources students, .9% (n = 13) Family and Human Services students and .3% (n = 5) Multi Occupation students. Five students were missing information on this variable.

**Table 4.5**

**Frequency (Percentages) of Concurrent Enrollment Student Degree Completers by State Cluster (Program Major)**  
**(N = 1482)**

Variable	<i>State Cluster Degree Completers Tabulation</i>		Total	%
	Arts & Science N=1,042	Career & Technical N=440		
State Cluster Program Major				
Agriculture	0	23	23	1.5
Business	0	84	84	5.7
College Parallel	1042	0	1042	70.3
Family & Consumer	0	13	13	.9
Sciences				
Health	0	105	105	7.1
Industrial Technology	0	210	210	14.2
Multi Occupation	0	5	5	.3
Missing Information	0	5	5	.3

Analysis of Concurrent Enrollment Student Degree Completers by Award Type

Table 4.6 depicts the results of the frequency and cross tabulations analysis of concurrent enrollment students enrolled in fiscal year 2002 who completed a degree, diploma, certificate and other credentials at an Iowa Community College in Fiscal Year 2002, 2003, 2004, or 2005. Completers are defined as those students who completed an Associate of Arts (A.A.), Associate of Science (A.S.), Associate of General Studies (A.G.S.), Associate of Applied Arts (A.A.A.), Associate of Applied Science (A.A.S.), Diploma, Certificate, and other credentials.

Table 4.6 shows the concurrent enrollment completers by award type. In terms of concurrent enrollment student degree completion by award type, 1042

concurrent enrollment arts and sciences students completed a degree, diploma, certificate or other credentials. Over half of the concurrent enrollment arts and sciences students 58.5% (n = 610), completed an Associate of Arts degree. This was followed by 17.8% (n = 185) received a Diploma and 14.2% (n = 148) completed an Associate of Applied Science degree. Further, 6.8% (n = 71) completed an Associate of Science degree and 1.9% (n = 20) completed other credentials. Results show that of the 445 career and technical concurrent enrollment degree completers, 28.1% (n = 125) completed a diploma, while 27.4% (n = 122) completed an Associate of Applied Science degree. 22.5% (N = 100) of the concurrent enrollment career and technical students completed certificates. Further, 14.8% (n = 66) of the concurrent enrollment career and technical students completed an Associate of Arts degree compared to 4.9% (n = 22) completed an Associate of Science degree.

Additionally, within both program majors (arts and sciences and career and technical), 45.5% (n = 676) of the concurrent enrollment students completed an Associate of Arts degree, while 20.8% (n = 310) of the concurrent enrollment students completed a diploma. Further 18.2% (n = 270) of the concurrent enrollment students completed an Associate of Applied Science degree, compared to 6.7% (n = 100) of the concurrent enrollment students completed a certificate, while 6.3% (n = 93) of the concurrent enrollment students completed an Associate of Science degree.

**Table 4.6****Frequency (Percentages) of Concurrent Enrollment Students' Completion by****Award Type****(N = 1487 )**

Variable	<u>Award Type Cross Tabulation</u>					
	Arts & Science		Career & Technical		Total	%
	N = 1,042	%	N = 445	%		
Award Type						
Associate of Arts	610	58.5	66	14.8	676	45.5
Associate of Science	71	6.8	22	4.9	93	6.3
Associate of General Studies	6	.6	2	.5	8	.5
Associate of Applied Arts	2	.2	4	.9	6	.4
Associate of Applied Science	148	14.2	122	27.4	270	18.2
Diploma	185	17.8	125	28.1	310	20.8
Certificate	0	0	100	22.5	100	6.7
Other	20	1.9	4	.9	24	1.6
Total	1042		445		1487	

Concurrent Enrollment Student Completers by Gender and Ethnicity*Gender*

Table 4.7 illustrates the number and percent of concurrent enrollment student completers for the arts and sciences and career and technical programs by gender and ethnicity. The majority of concurrent enrollment career and technical degree completers were male 61.1% (n = 272), while 37.8% (n = 168) were female. The majority of concurrent enrollment arts and sciences degree completers were females 62.2% (n = 648), compared to 37.6% (n = 392) were male.

*Ethnicity*

By race/ethnicity, the majority of all concurrent enrollment degree completers were white, 94.2%. There were very small numbers of ethnic minorities who completed concurrent enrollment degrees. 5.4% (n = 35) were American Indian, Asian or Pacific Islander Hispanic, and Black concurrent enrollment students.

**Table 4.7**

**Frequency (Percentages) of Concurrent Enrollment Student Completers by Gender/Ethnicity**

**(N = 1,487)**

Variable	<u>Student Status Crosstabulation</u>					
	<u>Arts &amp; Science</u>		<u>Career &amp; Technical</u>		<u>Total</u>	<u>Percent</u>
	<b>N=1,042</b>	<b>%</b>	<b>N=445</b>	<b>%</b>		
Gender						
Male	392	37.6	272	61.1	664	44.7
Female	648	62.2	168	37.8	816	54.9
Unknown	2	.2	5	1.1	7	.4
Total	1042		445		1487	
Racial/Ethnic Identification						
*Non-white	20	2.0	15	3.4	35	5.4
White	987	94.7	413	92.8	1400	94.2
Choose not to reply/ Missing Unknown	35	3.4	17	3.6	52	3.5
Total	1042		445		1487	

\*Non-White (American Indian, Asian or Pacific Islander, Black and Hispanic)

### Concurrent Enrollment Students Completing a Degree

The fourth research question explored *the relationship of several independent variables to the likelihood of a concurrent enrollment student completing degree requirements at an Iowa Community College using sequential logistic regression.*

The question was addressed by applying logistic regression analysis.

#### *Regression Analysis*

A sequential logistic regression analysis was conducted to determine the relationship of certain independent variables to the likelihood of students enrolled in concurrent enrollment programs completing degree requirements at an Iowa community college. The results are given in Table 4.8. The correlation matrix in Appendix A indicates which independent variables positively are correlated with completing a degree.

The dependent variable graduation was recoded to a dichotomous variable using 1 as completed degree requirements and 0 as did not complete degree requirements. Degree completion has become a state and national indicator of postsecondary educational health. The literature review showed concurrent enrollment students improve graduation and college continuation rates when participating in concurrent enrollment/dual credit programs. The Iowa Department of Education, Bureau of Community Colleges (2008) report, found a large share of joint enrollees in postsecondary education after graduating from high school. Sixty-one percent of joint enrollees from fiscal year 2004 attended a four-year college or two-year institution within three years of high school graduation. Forty-nine percent of

joint enrollees transferred to a four-year institution after graduating from high school. There were significant demographic differences between joint enrollees who attended a four-year institution and those who did not. Not surprisingly, a larger share of females transition to college than males. Females have typically enrolled in colleges at a higher rate since the early 1980's. Similarly, white students were 12 percent more likely to enroll in a four-year institution.

The sequential logistic regression analysis focused on the independent effects of the following variables on the recoded dependent variable graduation: gender, ethnicity, student status (arts and sciences or career and technical), student intent/goal at registration (transfer to another college or university or prepare to enter the job market). Variables were added to the regression equation in three controlled blocks allowing for more accurate comparisons of the unique effects of the independent variables in determining the likelihood of students enrolled in concurrent enrollment programs completing a degree at the community college. These independent variables were supported by the literature review which revealed that gender, race/ethnicity and college aspirations were strongly related to student persistence and degree attainment. Extensive research has established the correlation between student achievement and various demographic variables such as race-ethnicity, income, parent education, gender, age, and family structure (Desimone, 1999; Hurtado, Inkelas, Briggs, & Rhee, 1997). In this study, the variables of gender, ethnicity, student status (arts and sciences or career and technical), student intent/goal (transfer to another college or university or prepare to

enter the job market) are considered to control for their effect on degree completion and acceleration.

The first block in Table 4.8 contains two independent variables for background characteristics only: gender and ethnicity. The variables gender and ethnicity indicate no significant impact on degree completion in block 1.

The second logistic equation incorporated variables related to student status (arts and sciences or career and technical) to the equation. The variable of ethnicity changed little between blocks 2 and 3. The predictor variable of being female is positively correlated with completing a degree at  $p < .05$  ( $p = .026$ ). Student status became statistically significant at the  $p < .001$  ( $p = .000$ ), indicating those students enrolled in arts and sciences college parallel degree programs are 4.35 times more likely to graduate with a degree. According to the Nagelkerke  $R^2$ , 8.2 of the variance was explained by block 2. The correlation matrix of degree completion (Appendix A) indicates that degree completion is positively correlated with student status, and being female became a more significant factor when the student's status is an arts and sciences program major.

Block 3 added variables related to the student's intent and/or goal at time of registration for a college credit course, using two of the nine variables derived from the student registration application form. The variable transfer to another college or university had a significant effect at  $p < .01$  ( $p = .002$ ). This suggests that students who perceived they would transfer to a college or university were 3.7 times more likely to complete a degree. The variable prepare to enter job market also had a significant effect at  $p < .05$  ( $p = .012$ ). This suggests that students who perceived they

will enter the job market were 2.4 times more likely to complete a degree. The predictor variable of student status in block 3 became statistically significant at the  $p < .001$  ( $p = .000$ ), indicating those students enrolled in arts and sciences degree programs are 3.7 times more likely to graduate with a degree. According to the Nagelkerke  $R^2$ , 12.3% of the variance was explained by Block 3. The block of variables that relate to the concurrent enrollment students intent/goal at time of registration for a college course adds a significant amount of predictive power to the model.

**Table 4.8**

**Odds Ratios for the Independent Variables Associated with Students Enrolled in Concurrent Enrollment Programs Completing a Degree**

**(N = 900)**

Variable Blocks	Block 1		Block 2		Block 3	
	Sig.	Exp(B)	Sig.	Exp(B)	Sig.	Exp(B)
Background Characteristics						
Gender	.200	.689	.026*	.512	.016	.479
Ethnicity	.525	1.618	.649	1.424	.627	1.469
Student Status						
Arts and Sciences			.000***	4.349	.000***	3.669
Student Intent/Goal at Enrollment						
Transfer to another college or university					.002**	3.667
Prepare to enter the job market					.012*	2.425
$R^2$	.006		.082		.123	
Model Chi-Square [df]	2.020[2]		25.226[3]		41.399[5]	
Block Chi-Square [df]			25.200[1]		14.173[2]	
Prediction: % Correct	100%		100%		100%	
Prediction: Total % Correct	94%		94%		94%	

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

## Predicting Concurrent Enrollment Students' Time to Degree

### *Multiple Regression Analysis*

A multiple regression analysis was conducted on research question five to examine the relationship between independent variables gender (female and male), ethnicity (white and non-white), student status, (arts and sciences and career and technical), and student's intent and/or goal at time of enrollment (transfer to another college or university or prepare to enter the job market) on the dependent variable time to degree (the time it takes the concurrent enrollment student to obtain a degree). In colleges, educational "time" is normally measured in semester or quarters, and quarters and semesters are measured in the amount of time a student spends in the classroom, usually in terms of hours, weeks, or months (Nitzke 2002). The dependent variable in this analysis is TIMETO, a constructed variable measuring months to graduation for the concurrent enrollment students from their first date of attendance. The Iowa Department of Education and Iowa State University's Office of Community College Research and Policy (OCCRP) conducted a study of the placement of joint enrollees after completing high school (Laanan, Starobin, Schenk, and Audino). In this study, joint enrolled students are more likely to transfer to a 4-year institution than remain at a community college after graduating from high school. However, when high school students continue their postsecondary education at community college, their time-to-degree is significantly shorter. The average time-to-degree for a joint enrolled student who stayed at a

community college was 2.6 years. Meanwhile, students who never jointly enrolled stayed 3.5 years before completing a degree.

Using the SPSS<sup>R</sup> software 17 program for linear regression analysis, cases were excluded using a listwise deletion method resulting in a final sample of 884 students. Through SPSS, the independent variables were controlled for in the model. The predictor variables were selected based on the literature review research about educational progress and attainment. Most of the evidence is based on research conducted on students at four-year institutions, not on the “largely ignored student constituency of the community college (Pascarella, 1999, p.13).

Table 4.9 indicates the predictor variables entering the regression equation in three models on the dependent variable. In Model 1, variables associated with the student’s background gender (females and males) were entered into the regression analysis. Model 2 added student academic status (i.e., arts and sciences or career and technical) into the equation. The third model entered students’ intent and/or goal (transfer to another college/university and model four entered student goal and/or intent (prepare to enter job market) at time of enrollment in a college credit course. The coefficient of determination,  $R^2$ , is included to indicate how well the linear prediction fits the data, and the standardized regression coefficients (Betas— $\beta$ ) to show the direct comparison of the relative strengths of relationships between the variables. Appendix D-1 presents a complete table of unstandardized (B) coefficients, standardized ( $\beta$ ) coefficients, standard error (SE), and probabilities (p).

The significance of the bivariate relationship between gender (female) and time to degree is assessed at the end of step 1,  $F(1,882) = 6.841, p < .009^{**}$ . The

bivariate correlation is 8.8, accounting for 8% of the variance. After step 2, with gender and status (arts and science) in the equation,  $F(2,881) = 78.395$ ,  $p < .000$ ,  $R = 38.9$ , and  $R^2 = 15.1$ . With the addition of student intent/goal at enrollment (transfer to another college or university),  $F(3,880) = 61.271$ ,  $p < .000$ ,  $R = 41.6$ , and  $R^2 = 17.3$ . With the addition of student intent/goal at enrollment (prepare to enter the job market),  $F(4,879) = 48.747$ ,  $p < .000$ ,  $R = 42.6$ , and  $R^2 = 18.2$ .

Of the five variables entered into the regression analysis, being an arts and sciences student, is a significant and positive predictor. Two variables had negative final betas. Among the concurrent enrollment students, the variables for student intent/goal at time of registration were negatively associated. The variable transfer to another college/university had a negative beta and the variable prepared to enter the job market had a negative beta. These negative predictors are not surprising since the concurrent enrollment arts and sciences students' goal is to transfer to a college or university and they are not considering entering the job market. The opposite is true of the career and technical concurrent enrollment students who intend to enter the job market and are not thinking about transferring to a college or university. The concurrent enrollment students are for the most part juniors and seniors in high school.

**Table 4.9**

**Summary of Regression Analysis for Variables Predicting Time to Degree for  
Concurrent Enrolled Students**

**(N = 884)**

<b>Variable Blocks</b>	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>	<b>Model 4</b>
Block 1: Background Characteristics				
Gender	.088	.008**	.021*	.017*
Block 2: Student Status				
Arts & Science		.387	.426	.423
Block 3: Student Intent/Goal at Enrollment				
Transfer to another college or university			-.154***	-.203***
Block 4: Prepare to enter the job market				-.107**
<b>Model R</b>	<b>.008</b>	<b>.389</b>	<b>.416</b>	<b>.426</b>
<b>R<sup>2</sup></b>	<b>.008</b>	<b>.151</b>	<b>.173</b>	<b>.182</b>

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

The discussion and analysis of the findings, implications for research and overall significance of the study is presented next in Chapter 5.

## CHAPTER 5. DISCUSSION, CONCLUSIONS AND IMPLICATIONS

This chapter presents a summary and discussion of the major findings, conclusions, relationships to existing studies, limitations of the study, recommendations for future research, and overall significance of the study. The study focused on two benefits to participating in concurrent enrollment programs that of degree attainment and accelerated progress towards the degree. The purpose of this quantitative study was to: (1) develop a profile of the demographic characteristics of Iowa's concurrent enrollment students; (2) develop a profile of the demographic characteristics of concurrent enrollment students who complete a degree, diploma or certificate at an Iowa community college; (3) determine the effects of gender, ethnicity, and student status (arts and sciences versus career and technical) and student intent/goal at registration (transfer to college or university or prepare to enter the job market) on degree completion and acceleration towards a degree, and (4) contribute to the existing body of knowledge related to concurrent enrollment/dual enrollment. Results and conclusions are intended to provide useful information for concurrent enrollment students and instructors, community college and school district administrators, board members, legislators and policymakers who are directly involved with concurrent enrollment/dual credit programs.

### Background Characteristics of Concurrent Enrollment Students

The first research question establishes a profile of demographic characteristics of concurrent enrollment students, specifically gender and ethnicity. The students' enrollment in a program major is also discussed.

### *Gender*

This study found that concurrent enrollment students tend to be female with 51.2 percent of students enrolled in college credit courses for fiscal year 2002 being female. The composition of female students enrolling in college credit courses has not substantially changed from fiscal 2002 through fiscal 2008. In fiscal year 2008, 52.5 percent of the students in concurrent enrollment programs were female. This is compared with just over 57 percent of the Iowa Community College student body being female in fiscal 2008. In Iowa, females have outnumbered males since the Iowa Department of Education began collecting data in 1998 (Iowa Department of Education Fall Enrollment Report, 2008). Snyder, Dillon and Hoffman (2008) reported just over 56 percent of students enrolled at community colleges and four year colleges were female. Females have outnumbered males nationally in higher education since 1978 (Snyder, Tan, and Hoffman, 2003). In terms of concurrent enrollment students enrolled in program majors by gender, more females, 15 percent were enrolled in college parallel programs, while more males 40 percent were enrolled in career and technical programs in this study.

### *Race/Ethnicity*

In terms of the racial/ethnic background of concurrent enrollment students in the study, 88.6 percent of the concurrent enrollment students were white and minorities comprised 3.7 percent of the enrollees in concurrent enrollment programs for fiscal 2002. Asian students were the largest minority group, followed by Hispanic and Black students. In fiscal year 2008, the Iowa Department of Education, Bureau of Community Colleges reported approximately 8 percent of concurrent enrollment

students having a minority racial/ethnic background. Hispanics were the largest minority group with 44.4 percent of minority joint enrollment followed by Asian and Black students with 26.0 percent and 23.9 percent respectively. Therefore, there was a 4.3 percent increase in concurrent enrollment students being from a racial/ethnic background from fiscal 2002 to fiscal 2008. However, overall progress in terms of minority representation enrolled in concurrent enrollment programs is disappointing.

The racial/ethnic background of concurrent enrollment students continues to be less diverse than the total community college enrollment in Iowa. In fiscal 2008, 13.4 percent of Iowa's community college student body were reported to have a minority racial/ethnic background in fiscal 2008. 43.7 percent were Black and 30.5 percent were Hispanic (Iowa Department of Education, Bureau of Community Colleges, Joint Enrollment Report, 2008). There is also a higher percentage of minorities enrolled in community colleges in Iowa than in the state population. Moreover, 4.9 percent of all minorities in Iowa are enrolled in community colleges – the third highest in the nation (U.S. Department of Education, Integrated Postsecondary Data System, Fall 2006). The U.S. Census Bureau (2008) estimates ten percent of Iowans are non-white. According to data on public two-year institutions (Knapp, Kelly-Reid, Whitmore, and Miller, 2007), 59% of all students enrolled are White, and 34% are Non-White. If, in fact the community college of the new century is expected to take on the responsibility of the underserved and disfranchised, then it would seem reasonable to promote greater diversity in the number of minority students participating in concurrent enrollment programs

(O'Banion, 2007, p. 45). In Iowa the lack of significant numbers of minority students enrolling in concurrent enrollment courses is of concern since the entry point for most minority students for beginning their postsecondary education are the community colleges. The results from this study, support Clark's (2001) study that minorities are underrepresented in concurrent enrollment programs.

### *Credit Hours*

This study corroborates an increasing percentage of concurrent enrollment students are seniors and juniors in high school when enrolling in a college credit course. The majority of the concurrent enrollment students, 84.2 percent had completed at least one college course at an Iowa Community College before enrolling in a college credit course for fall 2002. This finding is consistent with the Condition of Iowa's Community Colleges 2008 report, which states jointly enrolled students tend to be upperclassmen and, in particular, seniors. Fifty-eight percent of concurrent enrollment students were seniors in high school, while a third were juniors. More than 92 percent of jointly enrolled students were in their last two years of high school (Iowa Department of Education, Bureau of Community Colleges, 2008). The majority of students enrolled in concurrent enrollment programs in Iowa are juniors and seniors in high school which is comparable to Iowa's policy for students' eligibility for concurrent enrollment courses. The guidelines allow students in 11<sup>th</sup> and 12<sup>th</sup> grades as well as 9<sup>th</sup> and 10<sup>th</sup> grade students identified as gifted and talented by their local district to enroll in college courses. In 2008, the Iowa legislature enacted Senior Year Plus. Senior Year Plus was created to provide increased and more equal access to college credit and advanced placement

courses. Concurrent enrollment program requirements established in 2008 state that concurrent enrollment programs shall be made available to all eligible resident students in grades 9 through 12. During the 2007 – 2008 academic year in Iowa, more than 24,400 students enrolled in contracted courses, mostly concurrent enrollment programs. Concurrently enrolled students are predominately upperclassmen, more than nine out of every ten students were a junior or senior in Fiscal Year 2008 (Iowa Department of Education Fall Enrollment Report, 2008). Since the Senior Year Plus guidelines for student eligibility changed to all 9th and 10<sup>th</sup> grade students eligible for college credit and advanced placement courses provided they meet requirements, this finding may change in future studies.

#### *Program Major*

The program major describes the student's concentration of courses and/or declared program completion goal (Condition of Iowa's Community College Report, 2008). The findings in this study revealed 79.1 percent of the concurrent enrollment students were enrolled in college parallel programs in fiscal year 2002, the balance of the concurrent enrollment students were enrolled in career and technical programs (19.8 percent). According to the Annual Condition of Iowa's Community Colleges report for 2008, nearly 70 percent of the concurrent enrollment students enrolled in college parallel programs in fiscal year 2008, more than 27 percent of the students enrolled in career and technical education (CTE) programs. Nationally, 36 percent of students enrolled in dual credit courses enrolled in career and technical education courses and 64 percent enrolled in arts and sciences courses (Waits, Setzer, and Lewis, 2005). Since 2002 there has been a 7.2 percent increase in

concurrent enrollment students enrolling in career and technical programs, although this is still less than the national average.

#### Concurrent Enrollment Student Degree Completers by Award Type

The results of this study reveal that 23.9 percent of the concurrent enrollment students enrolled in college credit courses for fiscal 2002 completed a degree in fiscal years 2002, 2003, 2004 or 2005. Degree completion refers to the type of degree completed (if a degree was completed). Concurrent enrollment students may complete an Associate of Arts (AA), Associate of Science (AS), Associate of General Studies (AGS), Associate of Applied Arts (AAA), Associate in Applied Science (AAS), Diplomas and Certificates. Nationally, the three-year graduation rate for community colleges is 33 percent (Knapp, Kelly-Reid and Whitemore, 2006). The graduation rate for Iowa's community college students has fluctuated between 41 and 38 percent since 2001 (Iowa Department of Education, Bureau of Community Colleges MIS, 2008). The percent of concurrent enrollment students graduating from an Iowa Community College may seem low but the students enroll in a college credit course for various reasons besides seeking a degree. The largest number of awards in this study were granted to the Associate of Arts (A.A.) awardees. The Associate of Arts degree comprised 676 (45.5 percent) of the total student awards granted to concurrent enrollment students for fiscal year 2002. The A.A. program is designed to transfer to a 4-year institution and ultimately lead to a Bachelor's degree. Completion rates were next highest for the diploma and Associate of Applied Science (A.A.S.) degree, these awards are designed to lead toward

immediate participation in the workforce. Diplomas accounted for 310 students (20.8 percent) of awards issued. Associate in Applied Science awards accounted for another 270 students (18.2 percent) of awards granted, followed by certificates 100 students (6.7 percent) and Associate of Science 93 students (6.3 percent). The findings for the concurrent enrollment student awards by type are very similar to the overall Iowa Community College credit student awards by type granted from 2000 – 2008. Steadily over the last nine years, the prevailing number of degrees (69-72 percent) were Associate degrees, followed by Diplomas and Certificates (Iowa Department of Education, Bureau of Community Colleges, Community College MIS 2000-2008). These findings are consistent with other studies where typically, students would receive a diploma or certificate in the first year and later receive an Associate's degree from the college. Meanwhile, in the third year 12 percent of the students received an award and transferred to a four-year school.

#### Background Characteristics of Concurrent Enrollment Student Degree Completers

In this study, degree completion rates were highest for female, white concurrent enrollment students enrolled in college parallel programs and for the male, white student enrolled in career and technical programs. Degree completion rates were lowest for male, non-white students enrolled in arts and sciences programs.

The typical Iowa community college awardee is a white female with an Associate of Arts or Associate of Applied Sciences in Health Science degree (The Condition of Iowa's Community Colleges, Report 2008). Nationally, women also

earn more awards than men (Knapp, Kelly-Reid, and Ginder, 2008). Sixty-three percent of awards in community colleges were given to women in the U.S.

The racial distribution of degree completers mirrors the patterns in concurrent enrollment programs. White students comprised 88.6 percent of the students enrolled in concurrent enrollment programs in 2002, white concurrent enrollment students comprise 94.2 percent of the students completing degrees in 2002, 2003, 2004 and 2005 fiscal years.

#### Concurrent Enrollment Students' Completing a Degree and Time to Degree

Research question four and five in this study investigated the relationship of gender, ethnicity, student status (arts and sciences or career and technical), student intent/goal at registration (transfer to another college or university or prepare to enter the job market) to the likelihood of completing a degree and predicting time to degree. The dependent variables, degree completion and time to degree, were regressed on the independent variables of gender, ethnicity, student status, and student intent/goal.

The results suggest that students enrolled in arts and sciences college parallel degree programs, who plan to transfer to a college or university are more likely to complete a degree and shorten their time to degree. Of the student background characteristics in this study, gender appeared to play the largest role in degree completion and acceleration rate. Females had significantly higher graduation and acceleration rates than males.

Ethnicity had no impact on any of the regression models. However, there were very small numbers of ethnic minorities enrolled in concurrent enrollment programs for fiscal 2002.

For students' intent/goal (transfer to a college or university or prepare to enter the job market) these variables had a positive influence on degree completion and a negative influence on acceleration (time to degree). The contribution of predicting degree completion was not as great when having both arts and sciences and career and technical students combined and gender (female/male) combined in the models. It should be noted that the results may be different if the model were analyzing only arts and sciences, white/female concurrent enrollment students. Since 80 percent of the concurrent enrollment students were enrolled in arts and sciences programs and 20 percent were enrolled in career and technical programs it would be best to separate the two groups when considering whether students do in fact value degree completion. The arts and sciences concurrent enrollment students may have no intent of going into the job market at this time, they are planning to transfer to a college or university to complete a degree. The career and technical concurrent enrollment students' intent/goal is to enter the job market and are therefore not considering transferring to a college or university to complete a degree.

#### *Limitations of the Study*

Secondary datasets were used for this study. Some of the limitations result from the nature of these datasets. The student record must have a valid social security number to be included in this study. In 2001 the Iowa Department of Education MIS data is limited to self-reported data. Thus, students often choose not

to report personal information such as race. The student intent/goal variable is also self reported at registration. The variable is collected at only one point in time. The student intent/goal variable is limited because it does not account for students changing their intentions through their time of enrollment and attending the community college.

The accuracy of the data is dependent upon the consistent and reliable data received from all fifteen Iowa Community Colleges on each concurrent enrollment student. The Iowa Department of Education data files do not contain information on the student completing a four-year college or university degree or the student becoming employed in their field of study. This study could have been more extensive if university/college transfer and degree completion information and employment data was included in the Iowa Department of Education Management Information System (MIS). In 2007, the Iowa Department of Education implemented a new system (Project EASIER) to match students from the community college dataset to the state's K-12 data repository. This new system during fiscal year 2008 found data on 90 percent of jointly enrolled students. Some students were not found due to incomplete student information, but this was within the expected margin of error. The remainder of the students were from nonpublic schools (Iowa Department of Education, Bureau of Colleges and Bureau of Planning, Research, and Evaluation, 2008).

My study was also limited by the variables available through the Department of Education MIS data for Fall 2002. The Iowa MIS data system does not contain information on ACT scores (The American College of Testing (ACT) assessment is a

common entrance exam to college and universities), high school GPA, and high school rank. This study does not account for all variables that may influence graduation and acceleration of concurrent enrollment students.

This study did not find a difference based on ethnicity, perhaps because of the small number of Non-White students in the sample.

The  $R^2$  values for the regression models in this study were low. To improve the predictive ability of the models, it would be necessary to include more variables in the models. The variables could include high school GPA, high school rank and ACT scores.

Interview data or survey data could add affective variables to the models such as satisfaction of students with concurrent enrollment programs. This could provide useful information about program effectiveness and students perceptions of the programs.

### *Delimitations*

In addition to the limitations of the study that were caused by the nature of the datasets, decisions were also made to delimit the study. First, it was decided the study would focus on those students who participated in concurrent enrollment programs through the Iowa community colleges for fiscal year 2002. This study is delimited to the Iowa context in which it was conducted. This study may have implications for concurrent enrollment participants in other states, although this study is not intended to be generalized beyond its immediate context.

### Recommendations for Future Research

Concurrent enrollment/dual credit programs have grown steadily in the last ten years in Iowa both in the number of students participating in the programs and in number of credit hours earned by the students.

- 1) More research studies are needed to determine if participants of concurrent enrollment/dual credit programs are completing a four year degree and if so, how long is it taking them to complete the degree. Studies could also be conducted on participants who began their postsecondary education in two-year colleges and are they more likely to transfer to a four-year college and complete a baccalaureate degree than non-participants, or if concurrent enrollment participants enjoy higher wages than non-participants.
- 2) A study could be conducted on concurrent enrolled students who complete a degree in the career and technical programs and then track where they are employed and their starting salaries in the field.
- 3) As concurrent enrollment programs continue to grow, the programs need to track students' grade point averages and standardized test scores to compare their success in completing a degree.
- 4) A study could be conducted comparing the retention and degree completion rates of students earning Advanced Placement Credit to those students earning concurrent enrollment credit.
- 6) A study could be conducted on concurrent enrollment participation and the impact on high school graduation rates and how it enhances student engagement in high school.

7) To build on the investigation of the impact of concurrent enrollment programs on students, additional studies could be focused on existing programs that target minority students, at risk and low income students. The findings can be used to design effective programs to be offered to those specific population groups.

8) Research studies could be conducted on how concurrent enrollment affects the academic achievement and retention of minority students, at risk and low income students.

#### *Implications for Practice and Policy*

The findings of this study provide useful information for community college and school district administrators, faculty, advisors/counselors and students, particularly in the State of Iowa. These findings can be useful to assist administrators in making decisions to improve concurrent enrollment programs. Community college and school district administrators may use graduation statistics both internally and externally as an indicator of how effective the program is in helping students to succeed. For at least some students, we would expect the likelihood of attending a community college to increase when participating in concurrent enrollment programs. Considering how much attention is paid to graduation rates by legislative and funding bodies, as well as the public, it is important for community colleges and school districts to conduct research studies on graduation rates of their concurrent enrollment students.

The findings of this study could provide information that concurrent enrollment programs used in achieving their benefits and goals. High school, community

college and four-year college curriculum should be aligned and integrated to assure seamless transition for students from one level of education to the next.

Concurrent/dual enrollment credits should be accepted for meeting two and four year college graduation requirements (Morrison, 2008). The state should provide workshops for all faculty at the high school, community college and four-year colleges to meet to discuss curriculum and teaching and learning strategies. Iowa should continue to review, revise, and adopt policies and procedures for concurrent/dual enrollment programs so that programs are more uniform across the state.

Iowa legislators should connect concurrent enrollment programs to workforce development and economic development initiatives in the state. Policymakers should provide funding and incentives for the creation of more regional academies. Morrison (2008) reported that acceleration (dual enrollment) be connected to the nation's competitiveness agenda and to workforce development. He stated, "policymakers must now act to improve educational outcomes and efficiency. Acceleration promises to deliver on both improved educational outcomes and efficiency."

Community colleges and school districts need to provide information to students and parents about the value and benefits of participating in concurrent/dual enrollment programs. Appropriate counseling and planning for successful experiences in accelerated (dual enrollment) programs must begin in eighth grade. All eighth grade students should complete a career and college plan outlining prerequisite courses for a successful outcome (Morrison, 2008).

Funding presents one of the greatest challenges in providing to continue initiatives such as concurrent enrollment in the State of Iowa. The state's current fiscal condition could alter lawmaker's motivations for supporting concurrent enrollment in the future. The bleak fiscal environment hitting states across the nation has drawn increased attention to the funding for concurrent enrollment courses. As concurrent enrollment courses increase in popularity among students and parents, the question on how to fund concurrent enrollment courses equitably while making the most efficient use of taxpayers dollars will become an even more debated topic for Iowa legislators. In the future the funding of concurrent enrollment courses may be addressed to examine the conflicting interests and motives for participation among the different stakeholders. The state will need to review the purpose for offering concurrent enrollment programs. The necessary stakeholders at the high school, community college, and university levels must work together with the offering and transfer of credits for concurrent enrollment courses. In the end legislators will need to raise the question as to what extent are state policy decisions based on serving the best interest for Iowa students and to what extent are they based on saving the state costs.

**APPENDIX A**

Pearson Correlation Matrix of Selected Variables for Degree Completion

### Pearson Correlation Matrix of Selected Variables for Degree Completion

(N = 900)

	Degree	Gender	Ethnicity	Status	Transfer	Enter Job Market
<b>Degree</b>	1					
<b>Gender</b>	-.220***	1				
<b>Ethnicity</b>	-.954***	-.019***	1			
<b>Status</b>	-.062***	-.205***	-.034***	1		
<b>Transfer</b>	-.059***	-.066***	-.004***	-.177***	1	
<b>Enter Job Market</b>	-.163***	-.023***	.042*	.068	.223	1

\*Correlation is significant at the  $p < .05$  level (2-tailed)

\*\*Correlation is significant at the  $p < .01$  level (2-tailed)

\*\*\*Correlation is significant at the  $p < .001$  level

**APPENDIX B**

Summary of Regression Analysis for Variables Predicting  
Concurrent Enrollment Students' Time To Degree

**Summary of Regression Analysis for Variables Predicting Concurrent  
Enrollment Students' Time to Degree**

**(N = 884)**

Independent Variable Blocks	B	SE	$\beta$	P
<u>Model 1</u>				
Female	.208	.079	.088	.009**
<u>Model 2</u>				
Female	.019**	.075	.008**	.804
Arts and Sciences	.968	.079	.387	.000***
<u>Model 3</u>				
Female	.049*	.074	.021*	.514
Arts & Science	1.065	.081	.426	.000***
Transfer to College/University	-.374**	.078	-.154***	.000***
<u>Model 4</u>				
Female	.039*	.074	.017**	.596
Arts and Sciences	1.057	.081	.423	.000***
Transfer to College/University	-.495**	.087	-.203***	.000***
Enter Job Market	-.281***	.092	-.107***	.002**

\*p<.05, \*\*p<.01, \*\*\*p<.001

**APPENDIX C**

Copy of Approved Institutional Review Board Application – October 2008

**IOWA STATE UNIVERSITY**  
OF SCIENCE AND TECHNOLOGY

Institutional Review Board  
Office of Research Assurances  
Vice President for Research  
1138 Pearson Hall  
Ames, Iowa 50011-2207  
515 294-4566  
FAX 515 294-4267

**DATE:** 30 October 2008  
**TO:** Frankie Santos Laanan  
N243 Lagomarcino  
**FROM:** Jan Canny, IRB Administrator  
Office of Research Assurances  
**IRB ID:** 05-519

**Approval Date:** 30 October 2008  
**Date for Continuing Review:** 30 September 2009

The Co-Chair of Institutional Review Board of Iowa State University has conducted the annual continuing review and approved the modification of the protocol entitled: "The Postsecondary Earnings of Vocational Students at Iowa Community Colleges." Your study has been approved for a period of one year. The continuing review date for this study is no later than **30 September 2009**.

Based on the information you provided in Section II of the documents submitted for continuing review, we have coded this study in our database as being permanently closed to the enrollment of new subjects, where all subjects have completed all research related activities and the study remains open only for data analysis. To open enrollment or initiate research-related interaction with subjects you must submit a modification and receive IRB approval prior to contacting subjects.

Even though enrollment of subjects has ended, federal regulations require continuing review of ongoing projects. Please submit the form with sufficient time (i.e. **three to four weeks**) for the IRB to review and approve continuation of the study, prior to the continuing review date.

Failure to complete and submit the continuing review form will result in expiration of IRB approval on the continuing review date and the file will be administratively closed. As a courtesy to you, we will send a reminder of the approaching review prior to this date.

Any **changes in the protocol or consent form** should not be implemented without prior IRB review and approval, using the "Continuing Review and/or Modification" form. These documents are located on the Office of Research Assurances website or available by calling (515) 294-4566, [www.compliance.iastate.edu](http://www.compliance.iastate.edu).

You must promptly report any of the following to the IRB: (1) **all serious and/or unexpected adverse experiences** involving risks to subjects or others; and (2) **any other unanticipated problems involving risks** to subjects or others.

Upon completion of the project, please submit a Project Closure Form to the Office of Research Assurances, 1138 Pearson Hall, to officially close the project.

For IRB Use Only	Modification Approval Date <u>October 30, 2009</u>	IRB SEP 30 2008
	Continuing Review Approval Date <u>October 30, 2008</u>	
	Approval Expiration Date: <u>September 30, 2009</u>	

**ISU HUMAN SUBJECTS CONTINUING REVIEW AND/OR MODIFICATION FORM**

TYPE OF SUBMISSION:  Continuing Review  Modification  Continuing Review and Modification

Principal Investigator: Frankie Santos Laanan		Phone: 294-7292
Degree: Ph.d.	Correspondence Address: N243 Lagomarcino Hall	
Department: Educational Leadership and Policy Studies	E-mail Address: laanan@iastate.edu	
Project Title: The Postsecondary Earnings of Vocational Students at Iowa Community Colleges		
IRB ID: 05-519	Date of Last Continuing Review: 09-27-2007	
IF STUDENT PROJECT		
Name of Major Professor:	Phone:	
Department:	Campus Address:	
	E-mail Address:	

**FUNDING INFORMATION:**

<input checked="" type="checkbox"/> External Grant/Contract	<input type="checkbox"/> Internal Support (no specific funding source) or Internal Grant (indicate name below)
Name of Funding Source: Iowa Department of Education	OSPA Record ID on Gold Sheet: 88868
<input type="checkbox"/> Part of Training, Center, Program Project Grant – Director:	Overall IRB ID No:

**CONFLICT OF INTEREST**

The proposed project or relationship with the sponsor require the disclosure of significant financial interests that present an actual or potential conflict of interest for investigators involved with this project. By signing this form, all investigators certify that they have read and understand ISU's Conflict of Interest policy as addressed by the ISU Faculty Handbook and made all disclosures required by it. (<http://www.provost.iastate.edu/faculty> .)

Do you or any member of your research team have a conflict of interest?  Yes  No  
 If yes, has the appropriate disclosure form been completed?  Yes  No

**ASSURANCE**

I certify that the information provided in this application is complete and accurate and consistent with proposal(s) submitted to external funding agencies. I agree to provide proper surveillance of this project to insure that the rights and welfare of the human subjects are protected. I will report any adverse reactions to the IRB for review. I agree that modifications to the originally approved project will not take place without prior review and approval by the Institutional Review Board, and that all activities will be performed in accordance with state and federal regulations and the Iowa State University Federal Wide Assurance.

 09-30-08  
 Signature of Principal Investigator Date

Student Projects: Faculty signature indicates that this application has been reviewed and is recommended for IRB review.

Signature of Supervising Faculty \_\_\_\_\_ Date \_\_\_\_\_ IRB Approval Signature Kerry A. Agnitchel Date October 30, 2008

For IRB Use Only	EXPEDITED per 45 CFR 46.110(b) <u>1</u> , Category <u>8</u> , Letter <u>a, c</u>
	STUDY REMAINS EXEMPT per 45 CFR 46.101(b) _____
	WAIVER of SIGNED CONSENT per 45 CFR 46.117(c) <u>yes</u>
	WAIVER of ELEMENTS of Consent per 45 CFR 46.116 _____
	VULNERABLE POPULATION per 45 CFR 46. _____

ORIGINAL

Please answer each question. If the question does not pertain to this study, please type not applicable (N/A).

**SECTION I: KEY PERSONNEL**

Yes  No Have there been any personnel/staff changes since the last IRB approval was granted?  
If yes, complete the following sections (Additions/Deletions) as appropriate.

Add	Delete	Last Name	First Name
	x	Eggleston	Latrice
X		Wilson	Emerald
x		McLaughlin	Michael

Add New Row

List all members and relevant experiences of the project personnel. This information is intended to inform the committee of the training and background of the investigators and key personnel.

NAME & DEGREE(S)	POSITION AT ISU & ROLE ON PROJECT	TRAINING & DATE OF TRAINING
Frankie Santos Laanan, PhD UCLA <i>10-23-03</i>	Principal Investigator	National Institutes of Health Human Participants Protections Education for Research Teams Online training (11/15/2002)--refer to certificate (enclosed)
Seko Starobin, PhD University of North Texas <i>8-14-03</i>	Assistant Professor	National Institutes of Health Human Participants Protections Education for Research Teams Online training (08/14/03)
Emerald Wilson, B.S. Chemistry, Chatham College <i>9/11/08</i>	Doctoral Student and Graduate Research Assistant	National Institutes of Health Human Participants Protections Education for Research Teams Online training (09/09/08) - refer to certificate
Jacquelyn Baughman, B.S. Met. Engr, ISU MBA, Keller Graduate School of Management <i>8/25/07</i>	Doctoral Student and Graduate Research Assistant	ISU Human Subject Training (Online) 8/25/2007
Christopher Duree, MSE Drake University, EdS Missouri State <i>8/17/06</i>	Doctoral Candidate and Graduate Research Assistant	ISU Human subject Training, 8/17/2006
Adam Audino <i>6/11/06</i>	Undergraduate Research Assistant	NIH Human Participant Protections Education for Research teams On-line training (6/11/05)
Jonathan Compton, MA ISU <i>9/19/00</i>	Doctoral Candidate and Graduate Research Assistant	ISU Human Subject Training, 9/19/2000
Ken Maguire, MS University of Nebraska - Lincoln <i>7/24/05</i>	Doctoral Student	ISU Human Subject Training 7/2005
Mariene McComas <i>9/8/04</i>	Doctoral Student	ISU Human Subject Raining 9/8/2004
Michael McLaughlin, MAT University of Iowa <i>5/21/06</i>	Doctoral Student	ISU Human Subject Raining 5/21/2006

Add New Row

**SECTION II: CONTINUING REVIEW**

In addition to completing Section I: Key Personnel, please complete Section II if this is an application for Continuing Review. If this is an application for continuing review and you will be modifying your project in the future, please complete all sections of the form. If this application is only to request approval for a modification or change to your study, please complete Section I: Key Personnel and Section III: Proposed Modifications or Changes.

1.  Yes  No Is the research **permanently** closed to the enrollment of new subjects? *per 10/28/08 email*
2.  Yes  No Have **all** subjects completed all research-related interventions? (ct)
3.  Yes  No Does research remain active only for long-term follow-up of subjects?
4.  Yes  No Are the remaining research activities limited to data analysis?
5.  Yes  No Subject enrollment has not begun and no additional risks have been identified.

**Part A: Enrollment Status**

Number of Subjects Approved by IRB: 300,000	Number of Subjects Consented to Date: 300,000
Number of Subjects Consented Since Last Continuing Review: Total: no change (last consented 30,000)	
Males: no change (last consented 12,000) Females: no change (last consented 18,000)	
Number of Subjects Screened:	Number of Subjects Lost to Follow-up:
Check if any enrolled subjects are: <input type="checkbox"/> Minors (under 18). Age Range of Minors: _ <input type="checkbox"/> Pregnant Women/Fetuses <input type="checkbox"/> Cognitively Impaired <input type="checkbox"/> Prisoners	Check below if this project involves either: <input checked="" type="checkbox"/> Existing Data/Records <input checked="" type="checkbox"/> Secondary Analysis <input type="checkbox"/> Pathology/Diagnostic Specimens
List Estimated Percent of the Total Enrolled That Are Minorities Below	
American Indians: .011%	Alaskan Native:
Asian or Pacific Islander: 2.23%	African American: 1.81%
Black (Not of Hispanic Origin):	Hispanic:

1.  Yes  No Have any subjects withdrawn or have you asked any subjects to withdraw from the study?

List number for each and reason for withdrawal:

**Part B: Protocol Summary – Please use the amount of space needed to adequately address the questions.**

1. Please provide a concise summary of the purpose and main procedures of the study.

The purpose of this study is to use data from the Iowa Department of Education (IA DE) to measure high school-community college dual credit and GED program participation regarding students' persistence to Iowa higher education institutions. The data were provided by the IA DE to the PI for analysis.

2. Please provide a summary of how the study is progressing (e.g., progress to date in terms of the overall study plan, success or problems encountered, reasons enrollment has not begun, etc.)

This is a continuing study to measure persistence among Iowa community college students to higher education institutions. We would like to focus on measuring high school-community college dual credit and GED program participation regarding students' persistence to Iowa higher education institutions. The data provided from the IA DE, which include 300,000 cases will be used for the analysis.  
*Enrollment is closed. per 10/28/08 email (ct)*

- 3. Is there any new information (positive or negative) from this study (e.g., interim analysis) or elsewhere (e.g., current literature) that might affect someone's willingness to enroll or continue in the study. It is especially important for the investigator to notify the IRB of literature or information that's relevant to the risks participants in the study.

There are no new risks foreseeable to participants in this study.

- 4. Please provide a summary of amendments or modifications since last IRB review.

Michael McLaughlin and Emerald Wilson have been added to the research team. Latrice Eggleston has been removed from the research team. ~~We propose to complete the analysis on measuring high school-community college dual credit and GED program participation regarding students' persistence to Iowa higher education institutions using the 2002 and 2003 Iowa community college student cohorts. Data will be protected as outlined in the original IRB application: data will be stored in a locked office on a stand alone computer, data will be reported only in aggregated form, and no individuals will be contacted directly. This continuing review was requested as a result of the no-cost extension for this project (has been approved by the Iowa Department of Education).~~

*per Wilson email*  
*(initials)*

**Part C: Adverse Events and Unforeseen Problems**

- 1.  Yes  No Have there been any adverse events or unanticipated problems involving risks to subjects or other people?

If yes, please give them numbers and describe.

If yes, was it reported to the IRB? Date reported  
 If report was not submitted, please explain why.

- 2.  Yes  No Have there been any subject complaints?

If yes, please describe.

Attach any reports submitted to NIH or a Data and Safety Monitoring Board.  Attached  N/A

**Part D: Informed Consent**

- 1.  Yes  No If a signed Informed Consent Form was required, was Informed Consent obtained from all subjects?

If no, please explain.

N/A

- 2.  Yes  No Are all signed Informed Consent Forms on file with the PI?

If no, please explain.

N/A

- 3.

Attached      Submit copy of currently approved Informed Consent Form and an original unstamped copy.  
 N/A              (if stamped). If changes have been made please submit the original, a copy with the highlighted  
changes, and a copy to be stamped with IRB approval.

Attached      Submit currently approved informational letter.  
 N/A

**APPENDIX D**

Copy of Approved Institutional Review Board Application – October 2010

**IOWA STATE UNIVERSITY**  
OF SCIENCE AND TECHNOLOGY

Institutional Review Board  
Office for Responsible Research  
Vice President for Research  
1138 Pearson Hall  
Ames, Iowa 50011-2207  
515 294-4566  
FAX 515 294-4267

**DATE:** 17 September 2009  
**TO:** Frankie Santos Laanan  
N225 Lagomarcino  
**FROM:** Roxanne Bappe, IRB Coordinator  
Office for Responsible Research  
**IRB ID:** 05-519

**Approval Date:** 14 September 2009  
**Date for Continuing Review:** 30 September 2010

The Co-Chair of the Institutional Review Board of Iowa State University has conducted the annual continuing review of the protocol entitled: "The Postsecondary Earnings of Vocational Students at Iowa Community Colleges." Your study has been approved for a period of one year. The continuing review date for this study is no later than **30 September 2010**.

Based on the information you provided in Section II of the documents submitted for continuing review, we have coded this study in our database as being permanently closed to the enrollment of new subjects, where all subjects have completed all research related activities and the study remains open only for data analysis. To open enrollment or initiate research-related interaction with subjects you must submit a modification and receive IRB approval prior to contacting subjects.

Even though enrollment of subjects has ended, federal regulations require continuing review of ongoing projects. Please submit the form with sufficient time (i.e. **three to four weeks**) for the IRB to review and approve continuation of the study, prior to the continuing review date.

Failure to complete and submit the continuing review form will result in expiration of IRB approval on the continuing review date and the file will be administratively closed. As a courtesy to you, we will send a reminder of the approaching review prior to this date.

Any **changes in the protocol or consent form** should not be implemented without prior IRB review and approval, using the "Continuing Review and/or Modification" form. These documents are located on the Office for Responsible Research website or available by calling (515) 294-4566, [www.compliance.iastate.edu](http://www.compliance.iastate.edu).

You must promptly report any of the following to the IRB: (1) **all serious and/or unexpected adverse experiences** involving risks to subjects or others; and (2) **any other unanticipated problems involving risks** to subjects or others.

Upon completion of the project, please submit a Project Closure Form to the Office for Responsible Research, 1138 Pearson Hall, to officially close the project.

For IRB Use Only	Modification Approval Date <u>17 Sept. 2009</u>
	Continuing Review Approval Date <u>17 Sept. 2009</u>
	Approval Expiration Date: <u>30 Sept. 2010</u>

**ISU HUMAN SUBJECTS CONTINUING REVIEW AND/OR MODIFICATION FORM**

**IRB**

SEP 04 2009

TYPE OF SUBMISSION:     Continuing Review     Modification     Continuing Review and Modification

Principal Investigator: Frankie Santos Laanan		Phone: 294-7292
Degree: Ph.d.	Correspondence Address: N225 Lagomarcino Hall	
Department: Educational Leadership and Policy Studies	E-mail Address: laanan@iastate.edu	
Project Title: The Postsecondary Earnings of Vocational Students at Iowa Community Colleges		
IRB ID: 05-519	Date of Last Continuing Review: 10-30-2008	
<b>IF STUDENT PROJECT</b>		
Name of Major Professor:	Phone:	
Department:	Campus Address:	
	E-mail Address:	

**FUNDING INFORMATION:**

<input checked="" type="checkbox"/> External Grant/Contract	<input type="checkbox"/> Internal Support (no specific funding source) or Internal Grant (indicate name below)
Name of Funding Source: Iowa Department of Education	OSPA Record ID on Gold Sheet: 88868
<input type="checkbox"/> Part of Training, Center, Program Project Grant – Director:	Overall IRB ID No:
<input type="checkbox"/> Student Project—No funding or funding provided by student	

**CONFLICT OF INTEREST**

The proposed project or relationship with the sponsor require the disclosure of significant financial interests that present an actual or potential conflict of interest for investigators involved with this project. By signing this form, all investigators certify that they have read and understand ISU's Conflict of Interest policy as addressed by the ISU Faculty Handbook and made all disclosures required by it. (<http://www.provost.iastate.edu/faculty>)

Do you or any member of your research team have a conflict of interest?     Yes     No  
 If yes, has the appropriate disclosure form been completed?     Yes     No

**ASSURANCE**

I certify that the information provided in this application is complete and accurate and consistent with proposal(s) submitted to external funding agencies. I agree to provide proper surveillance of this project to insure that the rights and welfare of the human subjects are protected. I will report any adverse reactions to the IRB for review. I agree that modifications to the originally approved project will not take place without prior review and approval by the Institutional Review Board, and that all activities will be performed in accordance with state and federal regulations and the Iowa State University Federal Wide Assurance.

*Frankie Santos Laanan*                      09.02.09  
 Signature of Principal Investigator                      Date

Student Projects: Faculty signature indicates that this application has been reviewed and is recommended for IRB review.

Signature of Supervising Faculty                      Date Sept 17, 2009  
 IRB Approval Signature *Frankie Santos Laanan*                      Date

For IRB Use Only	EXPEDITED per 45 CFR 46.110(b) <u>81</u> , Category <u>B</u> , Letter <u>a, c</u>
	STUDY REMAINS EXEMPT per 45 CFR 46.101(b) _____
	WAIVER of SIGNED CONSENT per 45 CFR 46.117(c) <u>yes</u>
	WAIVER of ELEMENTS of Consent per 45 CFR 46.116 _____
	VULNERABLE POPULATION per 45 CFR 46. _____

Please answer each question. If the question does not pertain to this study, please type not applicable (N/A).

**SECTION I: KEY PERSONNEL**

Yes  No Have there been any personnel/staff changes since the last IRB approval was granted?  
If yes, complete the following sections (Additions/Deletions) as appropriate.

Add	Delete	Last Name	First Name
	x	Wilson	Emerald
	x	Baughman	Jacquelyn
	x	Duree	Chistopher
	x	Audino	Adam
	x	Compton	Jonathan
	x	Maguire	Ken
	x	McLaughlin	Michael
x		Zhang	Yi
x		Hernandez	Ignacio

Add New Row

List all current members and relevant experiences of the project personnel. This information is intended to inform the committee of the training and background of the investigators and key personnel.

NAME & DEGREE(S)	POSITION AT ISU & ROLE ON PROJECT	TRAINING & DATE OF TRAINING
Frankie Santos Laanan, PhD UCLA	Principal Investigator	National Institutes of Health Human Participants Protections Education for Research Teams Online training (11/15/2002) 10/23/03
Soko Starobin, PhD, University of North Texas	Assistant Professor	National Institutes of Health Human Participants Protections Education for Research Teams Online training (08/14/03)
Yi Zhang, MS, Fort Hays State University	Doctoral Student and Graduate Research Assistant	National Institutes of Health Human Participants Protections Education for Research Teams Online training (08/20/08)
Ignacio Hernandez, MS, California State University, Long Beach	Doctoral Student and Graduate Research Assistant	National Institutes of Health Human Participants Protections Education for Research Teams Online training (08/26/09) 8/24/08
Marlene McComas	Doctoral Student	ISU Human Subject Training, (9/8/04)

Add New Row

**SECTION II: CONTINUING REVIEW**

In addition to completing Section I: Key Personnel, please complete Section II if this is an application for Continuing Review. If this is an application for continuing review and you will be modifying your project in the future, please complete all sections of the form. **If this application is only to request approval for a modification or change to your study, please complete Section I: Key Personnel and Section III: Proposed Modifications or Changes.**

Part A: Enrollment Status

1.  Yes  No Is the research **permanently** closed to the enrollment of new participants?
2.  Yes  No Have **all** participants completed all research-related interventions?
3.  Yes  No Does research remain active only for long-term follow-up of participants?
4.  Yes  No Are the remaining research activities limited to data analysis? OR
5.  Yes  No Participant enrollment has not begun and no additional risks have been identified.

Number of Participants Approved by IRB: 300,000	Number of Participants Consented to Date: 300,000
Number of Participants Consented Since Last Continuing Review: Total: no change (last consented 30,000) Males: no change (last consented 12,000) Females: no change (last consented 18,000)	
Number of Participants Screened:	Number of Participants Lost to Follow-up:
Check if any enrolled participants are: <input type="checkbox"/> Minors (under 18). Age Range of Minors: _ <input type="checkbox"/> Pregnant Women/Fetuses <input type="checkbox"/> Cognitively Impaired <input type="checkbox"/> Prisoners	Check below if this project involves either: <input checked="" type="checkbox"/> Existing Data/Records <input checked="" type="checkbox"/> Secondary Analysis <input type="checkbox"/> Pathology/Diagnostic Specimens
List Estimated Percent of the Total Enrolled That Are Minorities Below	
American Indians: .011%	Alaskan Native:
Asian or Pacific Islander: 2.23%	African American: 1.81%
Black (Not of Hispanic Origin):	Hispanic:

1.  Yes  No Have any participants withdrawn or have you asked any participants to withdraw from the study?

List number for each and reason for withdrawal:

**Part B: Protocol Summary – Please use the amount of space needed to adequately address the questions.**

1. Please provide a concise summary of the purpose and main procedures of the study.

The purpose of this study is to use data from the Iowa Department of Education (IA DE) to measure high school-community college dual credit and GED program participation regarding students' persistence to Iowa higher education institutions. The data were provided by the IA DE to the PI for analysis.

2. Please provide a summary of how the study is progressing (e.g., progress to date in terms of the overall study plan, success or problems encountered, reasons enrollment has not begun, etc.)

This is a continuing study to measure persistence among Iowa community college students to higher education institutions. We would like to focus on measuring high school-community college dual credit and GED program participation regarding students' persistence to Iowa higher education institutions. The data provided from the IA DE, which include 300,000 cases will be used for the analysis. The enrollment is closed.

3. Is there any new information (positive or negative) from this study (e.g., interim analysis) or elsewhere (e.g., current literature) that might affect someone's willingness to enroll or continue in the study? It is especially important for the investigator to notify the IRB of literature or information that's relevant to the risks to participants in the study.

There are no new risks foreseeable to participants in this study.

4. Please provide a summary of amendments or modifications since last IRB review.

Yi Zhang and Ignacio Hernandez have been added to the research team. Emerald Wilson, Jacquelyn

Baughman, Christopher Duree, Adam Audino, Jonathan Compton, Ken Maguire, and Michael McLaughlin have been removed from the research team.

**Part C: Adverse Events and Unforeseen Problems**

- 1.  Yes  No Have there been any adverse events or unanticipated problems involving risks to participants or other people?

If yes, please give them numbers and describe.

[Empty text box]

If yes, was it reported to the IRB? Date reported  
If report was not submitted, please explain why.

[Empty text box]

- 2.  Yes  No Have there been any participant complaints?

If yes, please describe.

[Empty text box]

Attach any reports submitted to NIH or a Data and Safety Monitoring Board.  Attached  N/A

**Part D: Informed Consent**

- 1.  Yes  No If a signed Informed Consent Form was required, was Informed Consent obtained from all participants?

If no, please explain.

N/A

- 2.  Yes  No Are all signed Informed Consent Forms on file with the PI?

If no, please explain.

N/A

- 3.  Attached  N/A Submit copy of the currently approved Informed Consent Form and an original unstamped copy (if stamped). If changes have been made, please submit the original, a copy with the changes highlighted, and a copy to be stamped with IRB approval

- Attached  N/A Submit currently approved informational letter

- Attached  N/A Submit an unstamped copy of all survey instruments, interview questions, recruitment materials, instructions, and all other material participants will see or hear during their participation so that a current IRB approval stamp can be added. If changes have been made, please submit the original, a copy with the changes highlighted, and a copy to be stamped with IRB approval.

Baughman, Christopher Duree, Adam Audino, Jonathan Compton, Ken Maguire, and Michael McLaughlin have been removed from the research team.

**Part C: Adverse Events and Unforeseen Problems**

1.  Yes  No Have there been any adverse events or unanticipated problems involving risks to participants or other people?

If yes, please give them numbers and describe.

If yes, was it reported to the IRB? Date reported  
If report was not submitted, please explain why.

2.  Yes  No Have there been any participant complaints?

If yes, please describe.

Attach any reports submitted to NIH or a Data and Safety Monitoring Board.  Attached  N/A

**Part D: Informed Consent**

1.  Yes  No If a signed Informed Consent Form was required, was Informed Consent obtained from all participants?

If no, please explain.

N/A

2.  Yes  No Are all signed Informed Consent Forms on file with the PI?

If no, please explain.

N/A

3.  Attached  N/A Submit copy of the currently approved Informed Consent Form and an original unstamped copy (if stamped). If changes have been made, please submit the original, a copy with the changes highlighted, and a copy to be stamped with IRB approval

- Attached  N/A Submit currently approved informational letter

- Attached  N/A Submit an unstamped copy of all survey instruments, interview questions, recruitment materials, instructions, and all other material participants will see or hear during their participation so that a current IRB approval stamp can be added. If changes have been made, please submit the original, a copy with the changes highlighted, and a copy to be stamped with IRB approval.

## REFERENCES

- Adelman, C. *Answers in the Tool Box: Academic Intensity, Attendance Patterns, and Bachelor's Degree Attainment*. (Washington, DC: U.S. Department of Education, Office of Educational Research and Improvement, 1999).
- American Institutes for Research, The, & SRI International (2005, March). *Early college high school initiative evaluation year end report: 2003-04*. Washington DC: Authors.
- Andrews, H. A. (2001). The dual credit explosion at Illinois' community colleges. *Community College Journal*, 12, 12-16.
- Andrews, H. A. (2001). *The dual-credit phenomenon: Challenging secondary school students across 50 states*. Stillwater, OK. New Forums Press. (ERIC Document Reproduction No. ED 463823).
- Andrews, H. A. (2000a). Quotable quotes. *Community College Journal*, 71, 36.
- Andrews, H. A. (2000a). The dual credit explosion at Illinois' community colleges. *Community College Journal*, 71, 36.
- Andrews, H. A. (2000b). Lessons learned from current state and national dual credit programs. *New Directions for Community Colleges*, 111, 31-38.
- Andrews, H. A., & Marshall, R. P. (1991). Challenging high school honor students with community college courses. *Community College Review*, 19(1), 47-51.

- Andrews, Hans A., “*Dual Credit Research Outcomes For Students*”, *Community College Journal of Research and Practice*, 28:415-0422 2004 and Welsh, John, Nick Brake, and Namok Choie, “*Student participation and performance in dual credit courses in a reform environment*,” *Community College Journal of Research and Practice*, 29: 199-213, 2005.
- Astin, A.W., *What Matters in College: Four Critical Years Revisited*. Jossey-Bass, San Francisco, 1993.
- Astin, A.W. (1984). Student involvement: A developmental theory for higher education. *Journal of College Student Personnel*, 25 (3), 297-307.
- Bailey, T.R. (2002) “Community College in the 21<sup>st</sup> Century: Challenges and Opportunities.” In P.A. Gram and N. Stacey (eds.) *The Knowledge Economy and Postsecondary Education: A Report of a Workshop*. Washington, DC: National Academy Press.
- Bailey, T., & Karp, M. (2003), November. *Promoting college access and success: A review of credit-based transition programs*. Washington, DC: U.S. Department of Education, Office of Vocational and Adult Education.
- Bailey, Thomas and Karp, Melinda Mechur, *Promoting College Access and Success: A Review of Dual Credit and Other High School/College Transition Programs*. Report prepared for the Office of Vocational and Adult Education, U.S. Department of Education (New York: Community College Research Center, Teachers College, Columbia University, 2003).

- Bailey, T.R., Hughes, K.L., & Karp, M.M. (2002). *What role can dual enrollment programs play in easing the transition between high school and postsecondary education?* Community College Research Center Institute on Education and the Economy. New York: Teachers College, Columbia University.
- Bers, T. & Smith, K. (1991). *Persistence of community college students: The influence of student intent on academic and social integration.* Research in Higher Education 32(5), 539-556.
- Boswell, K. (2001, Spring). State policy and postsecondary enrollment options: Creating seamless systems. In P.F. Robertson, B.G. Chapman, & F. Gaskin (Eds.), *New Directions for Community Colleges, Vol. 113. Systems for Offering Concurrent Enrollment at High Schools and Community Colleges.* (pp. 7-14). San Francisco: Jossey-Bass.
- Boswell, K. (2001). Dual enrollment programs: Accessing the American dream. *Update on Research and Leadership*, 13(1), 1-3.
- Boswell, K. (2001). State policy and postsecondary enrollment options: Creating seamless systems. In P.F. Robertson, B.G. Chapman, & F. Gaskin (Eds.), *New Directions for Community Colleges, Vol. 113. Systems for Offering Concurrent Enrollment at High Schools and Community Colleges* (pp. 7-14). San Francisco: Jossey-Bass.
- Boswell, K. (2000). Building bridges or barriers? Public policies that facilitate or impede linkages between community colleges and local school districts. *New Directions for Community Colleges*, 111, 3-15.

- Bragg, D.D., Loeb, J.W., Gong, Y., Deng, C., Yoo, J., & Hill, J. (2002, November). *Transition from high school to college and work for tech prep participants in eight selected consortia*. St. Paul: University of Minnesota, National Research center for Career and Technical Education.
- Bragg, Debra D. (2006). *Journal of Applied Research in the Community Colleges*, Vol. 13, No. 2, 117-132.
- Bueschel, A.C. (2004). The missing link: The role of community colleges in the transition from high school to college. In M. W. Kirst, & A. Venezia (Eds.), *From High school to College: Improving Opportunities for success in postsecondary education* (pp. 252-284). San Francisco: Jossey-Bass.
- Burns, H., and Lewis, B. (2000). Dual-enrolled students' perceptions of the effect of classroom environment on educational experience. *The Qualitative Report*, 4, 1-2. Internet: [www.nova.edu/ssss/QR/QR4-1/burns.html](http://www.nova.edu/ssss/QR/QR4-1/burns.html) [Accessed 10 October 2002].
- Cabrera, A.F., Nora, A., & Castañeda, M.B. (1993). *College persistence: Structural equations modeling test of an integrated model of student retention*. *Journal of Higher Education*, 64, 123-139.
- Callan, P. (2005, May). *How does American higher education measure up? Lessons from the national report card*. Presentation at the 45<sup>th</sup> Annual Association for Institutional Research Forum. San Diego, CA.
- Catron, R. K. (1998). The Virginia plan for dual enrollment: A historical perspective. *Inquiry* 2, 13-21.

- Catron, Rhonda K. (2001). Dual Enrollment in Virginia. In P. F. Robertson, B. G. Chapman, & F. Gaskin (EDS.) *Systems for offering concurrent enrollment at high schools and community colleges*. (pp. 51-58). San Francisco, CA. Jossey-Bass.
- Cavalluzzo, L., Jordan, W., & Corallo, C. (2002). *Case studies of high schools on college campuses: An alternative to the traditional high school program*. Charleston, WV: Edvantia and The CNA Corporation.
- Chapman, B. G. (2001, Spring). A model for implementing a concurrent enrollment program. In P. F. Robertson, B. G. Chapman, & F. Gaskin, (Eds.), *Systems for offering concurrent enrollment at high schools and community colleges*. (New Directions for Community Colleges, no. 113, pp. 15-22). San Francisco, CA: Jossey-Bass.
- Clark, R.W. (2001, June). *Dual enrollment: A report of programs and policies that offer high school students college credits*. Seattle, University of Washington: Institute for Educational Inquiry.
- College Now. (2002). Program Information. Internet: [www.kbcc.cuny.edu/kcccn.html](http://www.kbcc.cuny.edu/kcccn.html).
- College Now. (2000). *Program Materials for Kingsborough Community College Tourism and Hospitality Weekend College Now*. Brooklyn, NY: Kingsborough Community College.
- Community College Resource Center, April, 2002. The Community College Presidents' Report on Dual Enrollment Opportunities for High School Students, 2006.

- Creswell, J. W. (2003). *Research design: Qualitative, quantitative, and mixed methods approaches 2<sup>nd</sup> ed.*, Thousand Oaks, CA: Sage.
- Creswell, J.W. (2001). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research*. Columbus, OH: Merrill Prentice Hall.
- Crook, D. (1990). *The impact of College Now: An update: retention and academic progress among program participants who entered CUNY in fall 1987 and fall 1988*. New York: Kingsborough Community College, Office of Institutional Research and Analysis.
- Crooks, K. (1998). *State enhancement of college-level learning for high school students: A comprehensive national policy study and case studies of progressive states*. (Minnesota, Utah, Virginia). (Doctoral Dissertation, State University of New York at Buffalo, 1998). Dissertation Abstracts International, 59, 1479.
- DTI Associates, Inc., & Community College Research Center. (2005). *Accelerating student success through credit-based transition programs. Fact sheet: Middle college high school program*. Washington, DC: U.S. Department of Education, Office of Vocational and Adult Education. Retrieved July 20, 2005, from <http://www.ed.gov/about/offices/list/ovac/pi/cclo/cbtrans/middle.pdf>.
- Education Commission of the States (2001, July). *Postsecondary options: Dual/concurrent enrollment*. Retrieved June 21, 2002, from <http://www.ecs.org/ecsmain.asp?page=/html/issues.asp>.

Education Commission of the States. (2000). *Building bridges not barriers: Public policies that support seamless K-16 education* (Policy Brief P-16). Denver, CO: Author.

Eimers, M.T., & Mullen R. (2003, May). *Dual credit and advanced placement: Do they help prepare students for success in college?* Paper presented at the annual forum of the Association of Institutional Research, Tampa, FL.

Feemster, R. (2002). High school plus: Middle college morphs into early college. *Ford Foundation Report*. New York: Ford Foundation. Available at: [http://www.fordfound.org/publications/ff\\_report/view\\_ff\\_report\\_detail.cfm?report\\_index=356](http://www.fordfound.org/publications/ff_report/view_ff_report_detail.cfm?report_index=356).

Fincher-Ford, Margaret. *High School Students Earning College Credit, A Guide to Creating Dual-Credit Programs*. California: Corwin Press, Inc., 1997.

Finken, Anne Dee. (2003). Double Duty. *Community College Week*. September 29, 2003, 6-8.

Gaines, B. C. & Wilbur, F. P., (1985). College-school collaboration: Appraising the major approaches. New directions for teaching and learning. In W. T. Daly (Ed.) *Early Instruction in the high school: Syracuse's Project Advance* (No. 24, pp. 27-35). San Francisco, CA: Jossey-Bass.

Gall, M. D., Borg, W. R. , & Gall, J. P. (1996). *Educational research: An introduction* (6<sup>th</sup> ed.). White Plains, NY: Longman.

Gardner, D. P. (1983). *A nation at risk: The imperative for educational reform*. Washington D.C.: Department of Education.

- Gardner, D. P., et al. (1983). *A nation at risk: The imperative for educational reform* (Report of the National Commission on Excellence in Education). Washington, DC: U.S. Government Printing Office.
- Garg, R., Kauppi, C., Lewko, J., & Urajnik, D. (2002). A structural model of educational aspirations. *Journal of Career Development, 29*(2), 87-108.
- Greater Expectations: A New Vision for Learning as a Nation Goes to College*, (2002). National Panel Report. Association of American Colleges and Universities. Washington, D.C.
- Gurule, J. M. (1996). A study of high school to community college dual enrollment for underprepared/moderate student achievers. (Doctoral dissertation, Arizona State University). *Dissertation Abstracts International, 57*, 3A, 0990.
- Hoffman, Nancy, *Add and Subtract: Dual Enrollment as a State Strategy to Increase Postsecondary Success for Underrepresented Students*, Jobs for the Future, 2005, p. 9.
- Horn, L., & Kojaku, L. K. (2001). *High school academic curriculum and the persistence path – through college*. Washington, DC: U.S. Department of Education.
- Hughes, K. L., & Karp, M. M. (2006). *Strengthening transitions by encouraging career pathways; A look at state policies and practices*. New York: Community College Research Center, Columbia University.

- Hughes, Katherine L., Karp, Melinda Mechur, Fermin, Baranda J. and Bailey, Thomas R., *Pathways to College Access and Success* (Washington, D.C.: U.S. Department of Education, Office of Vocational and Adult Education) 2005.
- Hugo, E. B. (2001). Dual enrollment for underrepresented student populations. In P. F. Robertson, B. G. Chapman, & F. Gaskin (Eds.), *New Directions for Community Colleges, Vol. 113: Systems for Offering Concurrent Enrollment at High Schools and Community Colleges* (pp. 67-72). San Francisco: Jossey-Bass.
- Hugo, E. B. (2001). Dual enrollment for underrepresented student populations. In P. F. Robertson, B. G. Chapman, & F. Gaskin (Eds.), *Systems for offering concurrent enrollment at high schools and community colleges* (pp. 43-50). San Francisco: Jossey-Bass.
- Iowa Department of Education. 2008. *The Annual Condition of Iowa's Community Colleges 2008*. Des Moines, IA: Iowa Department of Education.
- Iowa Department of Education (2007). Condition of Iowa community colleges, 2007. Retrieved May 25, 2007, from <http://www.iowa.gov/educate/content/view/252/933/1/2/>.
- Johnson, J. A., & Kiger, D. M. (1997). Getting a college's enrollment option program. *Community College Journal of Research and Practice*, 21, 687-693.

- Johnston, G. H. (1999, June). *Looking for the dual credit student and finding the under-aged student ones*. Paper presented at the Annual Forum of the Association for Institutional Research 39<sup>th</sup>, Seattle, WA.
- Karp, M., Bailey, T., Hughes, K., & Fermin, B. (2004). *State dual enrollment policies: Addressing access and quality*. Washington, DC: U.S. Department of Education, Office of Vocational and Adult Education.
- Kazis, R., Vargas, J., & Hoffman, N. (Eds.). (2004). *Double the numbers: Increasing postsecondary credentials for underrepresented youth*. Cambridge, MA: Harvard Education Publishing Group.
- Kiecolt, J. K., & Nathan, L. E. (1985). *Secondary analysis of survey data: Quantitative applications in social sciences*. Beverly Hills, CA: Sage.
- Kim, J. (2006). *The impact of dual and articulated credit on college readiness and total credit hours in four selected community colleges*. Unpublished doctoral dissertation, University of Illinois at Urbana-Champaign.
- Kirst, M.W. (2001). *Overcoming the high school senior slump: New education policies*. Washington, DC: The Institute for Educational Leadership. (ERIC Document Reproduction No. ED455720).
- Kirst, M. W. (2001, May). *Overcoming the high school senior slump: new education policies*. Washington, DC: Institute for Educational Leadership.
- Kirst, M. W. (2000, Fall). *The senior slump: making the most of high school preparation*. National CrossTalk, 8 (4). Online: Retrieved from [www.highereducation.org/crosstalk](http://www.highereducation.org/crosstalk).

- Kirst, M. & Venezia, A. (2001). Bridging the great divide between secondary schools and postsecondary education. *Phi Delta Kappan*, 83(1), 92-97.
- Kleiman, N. S. (2001, June). *Building a highway to higher ed: How collaborative efforts are changing education in America*. New York: The Center for an Urban Future. National Commission on the High School Senior Year. (2001, October). *Raising our sights: No high school senior left behind*. Princeton, NJ: The Woodrow Wilson National Fellowship Foundation.
- Kleiner, B., and Lewis, L. (2005). *Dual Enrollment of High School Students at Postsecondary Institutions: 2002-03* (NCES Publication No. 2005-008). U.S. Department of Education. Washington, D.C.: National Center for Education Statistics.
- Kronholz, J. (1999, March 23). Academic question: Why has senior year of high school lost its purpose for many? *The Wall Street Journal*, p. 83.
- Kruger, Larry A. (2000). An Analysis of the Costs and Savings of the Concurrent Enrollment Program at Salt Lake Community College. Brigham Young University. National Commission on Excellence in Education (1983). *A Nation at risk: The imperative for educational reform*. Washington, D.C.: U.S. Government Printing Office, #401-326.
- Laanan, F. S., Compton, J. I., & Friedel, J. N. (2006). The role of career and technical education in Iowa community colleges. *Community College Journal of Research and Practice*, 30, 293-310.
- LaGuardia Community College/CUNY. (2004). *Middle college*. Available at <http://www.lagcc.cuny.edu/lpp/MiddleCollege.htm>.

- Lang, G., & Hiess, G. (1997). *A practical guide to research methods*. New York: University Press.
- Marshall, R.P. & Andrews, H.A. (1991). Challenging high school honor students with community college courses. *Community College Review*, 19(1), 47-51.
- McDonough, P.M. (1997), *Choosing colleges: How social class and schools Structure opportunity*. Albany, NY: State University of New York Press.
- McMillan, J.H., & Schumacher, S. (1997). *Research in education: A conceptual introduction* (4<sup>th</sup> ed.). New York: Addison Wesley Longman.
- Mertler, C.A., & Vannatta, R.A. (2001). *Advanced and multivariate statistical methods*. Los Angeles, CA: Pyrczak.
- Minnesota State University. (2001). *Post secondary enrollment program (PSEO), admission policy*. Retrieved February 4, 2001, from <http://www.mnstate.edu/admissions/pseo.htm>.
- Monroe Community College (2003). [Dual credit tracking]. Unpublished raw data. Rochester, NY: Monroe Community College, Office of Institutional Research.
- Morrison, Michael C. (2007). The benefits of acceleration: An outcomes analysis of dual enrollment. [http://www.niacc.cc.ia.us/admin/pres/Presentations/Dual Enrollment/Final%20Product-Volume%201/The %20Benefits%20of%20 Acceleration.pdf](http://www.niacc.cc.ia.us/admin/pres/Presentations/Dual%20Enrollment/Final%20Product-Volume%201/The%20Benefits%20of%20Acceleration.pdf).
- Mortenson, T. (1999). *Postsecondary opportunities*. Washington, DC: U.S. Department of Education.

- Mullin, D. L. (1997). A follow-up on students who took courses through the Minnesota postsecondary enrollment options program school choice, accelerated program, dual enrollment. (Doctoral Dissertation, University of Minnesota). *Dissertation Abstracts International*, 58, 02A.
- National Center for Education Statistics. (2002). *Beginning postsecondary students longitudinal study first follow-up (BPS: 1996/2001) methodology report*. Washington, D.C.: National Center for Education Statistics.
- National Commission on the High School Senior Year. (2001). The lost opportunity of senior year: finding a better way.
- National Commission on the High School Senior. (2001). *The lost opportunity of senior year: Finding a better way*. Retrieved August 30, 2002, from [http://www.commissiononthesenioryear.org/About\\_Us/about\\_us.html](http://www.commissiononthesenioryear.org/About_Us/about_us.html).
- Nitzke, J.E. (2002). A longitudinal study of dual credit enrollment of high school students as an accelerator for degree completion. (Doctoral dissertation, Iowa State University). *UMI Dissertation*, AAT 3061852.
- Noel, L., Levitz, R., & Saluri, D. (Eds.). (1985). *Increasing student retention*. San Francisco: Jossey-Bass.
- O'Brien, D.M. and Nelson, T.D. "Strengthening College Preparation and Access Through Concurrent Enrollment in High School and Community College," University of Texas, Dallas, 2004.
- Orr, M.T. (2002). *Dual enrollment: Developments, trends and impacts*. Presentation to the Community College Research Center, Teachers College, Columbia University. New York, NY. January 25, 2002.

- Orr, M.T. (2000). Community colleges and secondary school collaborations on workforce development and education reform. *Community College Research Center Brief, No. 7*. New York: Teachers College, Columbia University.
- Orr, M.T. "Integrating secondary schools and community colleges through School-to-work transition and education reform". *Journal of Vocational Education Research*, 23 (2), (1998) 93-113 and Orr, M.T. *Community College and Secondary School Collaboration on Workforce Development and Education Reform: A Close look at Four Community Colleges*. (New York: Community College Research Center, Teachers college, Columbia University, 1999).
- Orr, M.T. (1998). Integrating secondary schools and community colleges through school to work transition and educational reform. *Journal of Vocational Education Research*, 23 (2), 6-25.
- Pascarella, E. T. (1999, June/July). New Studies track community college effects on students. *Community College Journal*, 8-14.
- Pascarella, E.T. & Terenzini, P.T. (1991). *How college affects students*. San Francisco: Jossey-Bass.
- Peterson, M. K., Anjewierden, J., and Corser, C. (2001). Designing an effective concurrent enrollment program. In P. F. Robertson, B. G. Chapman, and F. Gaskin, Eds. *Systems for offering concurrent enrollment at high schools and community colleges*, (pp. 23-31). San Francisco, CA: Jossey Bass.

- Peterson, M. K., Anjewierden, J., and Corser, C. (2001). Designing an effective concurrent enrollment program: A focus on quality of instruction and student outcomes. In P. F. Robertson, B. G. Chapman, & F. Gaskin (Eds.), *Systems for offering concurrent enrollment at high schools and community colleges* (pp. 43-50). San Francisco: Jossey-Bass.
- Porter, R. (2000). *Status report on dual-enrolled students attending Cleveland state community college*. Unpublished report. Cleveland State Community College, TN.
- Puyear, D. (1998). *Concurrent and dual enrollment of high school students in Arizona community colleges: A status report*. Project Description 141. (Eric Document Reproduction Service No. ED 423930).
- Puyear, D. E., Thor, L. M., and Mills, K. L. (2001). Concurrent enrollment in Arizona: Encouraging success in high school. In P. F. Robertson, B. G. Chapman, and F. Gaskin, (Eds). *Systems for offering concurrent enrollment at high schools and community colleges*, (pp. 33-41). San Francisco, CA: Jossey Bass.
- Richardson, R.M. (1999). *Community college and AP credit: An analysis of the impact on freshman grades*. Internal report. Tucson: University of Arizona.
- Robertson, P.F., Chapman, B.G., & Gaskin, F. (2001). Systems for offering concurrent enrollment at high schools and community colleges. *New Directions for Community Colleges*, 113, 1-6.

- Robertson, O. F., Chapman, B. G., & Gaskin, F. (2001). *Systems for offering concurrent enrollment at high schools and community colleges*. San Francisco: Jossey-Bass.
- Rogers, K.B. & Kimpston, R.D. (1992). Acceleration: What we do vs. what we know. *Educational Leadership*, 50, 58-61.
- Siegelman, Harvey and Daniel Otto (2008). The economic impact of early college opportunity programs at Iowa's community colleges. Des Moines, IA: Strategic Economics Group.
- Social Science Research Council. (2005). *Questions that matter: Setting the research agenda on access and success in postsecondary education*. Retrieved from the Transitions to College: From Theory to Practice website on November 22, 2005, from <http://www.ssrc.org/programs/knowledge/publications/QTM.pdf>.
- Spurling, S., & Gabriner, R. (2002). *The effect of concurrent enrollment programs upon student success at City College of San Francisco: Findings*. (Internal Report). City College of San Francisco, Office of Institutional Development, Research and Planning.
- States' Career Cluster (2007). *What are career clusters?* Retrieved February 25, 2007, from [www.careerclusters.org](http://www.careerclusters.org).
- Study on Dual Credit Programs in Texas: *A Report to the 80<sup>th</sup> Legislature from the Texas P-16 Council*. Retrieved February 1, 2007 at [http://www.tea.state.tx.us/comm/06dcp\\_report.pdf](http://www.tea.state.tx.us/comm/06dcp_report.pdf).

- Syracuse University Project Advance. (1998). 1997 impact study. Online: Retrieved August 31, 2001 from <http://supa.syr.edu/SupaOnline/Research/ResearchMain.htm>.
- Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics (5<sup>th</sup> ed.)* Boston: Pearson.
- Tinto, V. (1993). *Leaving college: Rethinking the causes and cures of student attrition*. Chicago: University of Chicago Press.
- Tinto, V. (1987). *Leaving college: Rethinking the causes and cures of student attrition*. Chicago: University of Chicago Press.
- U.S. Department of Education, Office of Vocational and Adult Education, *The Secondary and technical Education Excellence Act of 2003: Summary of Major Provisions* (Washington, D.C.: Author, 2003); U.S. Department of Education, Office of Vocational and Adult Education. *OVAE Review*, April 2005.
- U.S. Department of Education (Office of Vocational and Adult Education). *State Dual Enrollment Policies: Addressing Access and Quality*, Washington, D.D., 2004.
- University of Arizona. (1999). *Community college and AP credit: An analysis of the impact on Freshman grades*. Tuscon, AZ: Author. Internet: [www.aer.arizona.edu/Enrollment/Papers/dualenr.pdf](http://www.aer.arizona.edu/Enrollment/Papers/dualenr.pdf) [Accessed: 7 January, 2003].

- Venezia, A.M.W. Kirst, and A.L. Antonio. (2003). *Betraying the College Dream: How Disconnected K-12 and Postsecondary Education systems Undermine Student Aspirations*. Palo Alto, CA: The Bridge Project, Stanford Institute for Higher Education Research.
- Windham, P. (2004). Impact of Dual Enrollment on High Performing Students. Florida Community Colleges and Workforce Education. Retrieved July 26, 2004, from [http://www.fldoe.org/meetings/2004\\_05\\_18](http://www.fldoe.org/meetings/2004_05_18).
- Windham, P. (1998). High school and community college dual enrollment: Issues of rigor and transferability. *Journal of Applied Research in the Community College*, 5, 111-115.
- Windham, P. (1996, August). *What happens to community college dual enrollment students?* Paper presented at the annual conference of the Southern Association for Community College Research, Panama City, FL. (ERIC Document Reproduction Service No. ED 398950).
- Windham, P. (1996, August). *What happens to community college dual enrollment students?* Paper presented to Southeastern Association for Community College Research, Panama City, FL.
- Wolcott, N. M. (2001, Spring). New World School of the Arts: creativity across the curriculum. In P. F. Robertson, B. G. Chapman, & F. Gaskin, (Eds.), *Systems for offering concurrent enrollment at high schools and community colleges*. (New Directions for Community Colleges, no. 113, pp. 59-66). San Francisco, CA: Jossey-Bass.