

6-8-2010

# Dual Enrollment and Advanced Placement Programs: A Comparison of Persistence, Student Academic Achievement, Graduation Completion and Time-to-Degree Attainment

Amber N. Sherman Valentine  
*Indiana University of Pennsylvania*

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DUAL ENROLLMENT AND ADVANCED PLACEMENT PROGRAMS:  
A COMPARISON OF PERSISTENCE, STUDENT ACADEMIC ACHIEVEMENT,  
GRADUATION COMPLETION AND TIME-TO-DEGREE ATTAINMENT

A Dissertation

Submitted to the School of Graduate Studies and Research

in Partial Fulfillment of the

Requirements for the Degree

Doctor of Education

Amber N. Sherman Valentine

Indiana University of Pennsylvania

May 2010

Indiana University of Pennsylvania  
The School of Graduate Studies and Research  
Department of Professional Studies in Education

We hereby approve the dissertation of

Amber N. Sherman Valentine

Candidate for the degree of Doctor of Education

---

---

George R. Bieger, Ph.D.  
Professor, Professional Studies in Education,  
Chair

---

---

Holley A. Belch, Ph.D.  
Associate Professor, Student Affairs in  
Higher Education

---

---

Valeri R. Helterbran, Ed.D.  
Associate Professor, Professional Studies in  
Education

ACCEPTED

---

Timothy P. Mack, Ph.D.  
Dean  
School of Graduate Studies and Research

Title: Dual Enrollment and Advanced Placement Programs: A Comparison of Persistence, Student Academic Achievement, Graduation Completion and Time-to-Degree Attainment

Author: Amber N. Sherman Valentine

Dissertation Chair: Dr. George R. Bieger

Dissertation Committee Members: Dr. Holley A. Belch  
Dr. Valeri R. Helterbran

The purpose of this study was to evaluate the difference in persistence from first year to second year, degree attainment within four years, first semester grade point average (GPA), and time-to-degree completion of students who participated in dual enrollment programs, Advanced Placement (AP) programs, both dual enrollment and AP programs, and traditional students. Participation in dual enrollment and/or AP programs was analyzed along with several demographic characteristics and academic performance indicators to determine if participation in AP and/or dual enrollment programs was more of a predictor of first to second year persistence, first semester GPA, degree attainment within four years, and time-to-degree completion than other variables. The data for this study were obtained from the Office of Institutional Research, Planning, and Assessment at Indiana University of Pennsylvania (IUP).

The researcher selected the use of longitudinal data because it easily allows tracking the student from the time of matriculation through the expected time of degree completion. The target population for this study was all first-time, traditional first-year students who earned dual enrollment and/or AP credits prior to enrolling at IUP during the fall of 2005. The researcher used descriptive statistics for the initial analysis of data. A Chi-square was used to compare gender and ethnicity of students with dual enrollment

credits, AP credits, both dual enrollment and AP credits, and traditional students. A one-way ANOVA was used to determine if participation in dual enrollment and/or AP programs had any influence on first semester GPA or SAT score. In addition, the researcher used a Chi Square to analyze the relationship between the dependent variables “degree attainment,” “persistence,” and “time-to-degree attainment” and the independent variables.

The researcher found that students who participated in dual enrollment and/or AP programs had higher retention and four-year graduation rates than those students who did not participate in either program. The study also revealed that participating in dual enrollment and/or AP programs had a significant influence on first semester GPA and time-to-degree-attainment.

## ACKNOWLEDGEMENTS

I would like to thank the Administration and Leadership Program for providing me with an opportunity to pursue my doctorate. I would like to express my gratitude to my dissertation committee. To Dr. George Bieger, chair, for his support and expertise in helping me analyze my data. To Dr. Valeri Helterbran, committee member, for her interest in my topic and attention to detail. A special thanks to Dr. Holley Belch, committee member, for instilling in me a passion for lifelong learning and for being an extraordinary mentor. Most importantly, I would like to thank my parents for always supporting me in every endeavor and challenging me to do my best.

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## CHAPTER ONE

### INTRODUCTION

Increasing the number of students who complete a two-year or four-year degree has become a national priority among educational, government, and corporate leaders (Delicath, 1999). Since the number of high school graduates is on the decline, it is more important than ever for institutions to recruit students who are likely to persist. Furthermore, university administrators recognize that it is more effective and less costly to retain current students than to continuously locate, recruit, and enroll new first-year and transfer students (Delicath, 1999).

One way that colleges and universities can begin to increase enrollment is by offering dual enrollment programs to area high school students. According to the American Association of State Colleges and Universities (AASCU) (2002), dual enrollment programs can generate revenue for institutions and increase enrollment because students who start a degree at an institution are more likely to complete their degree at the same institution. Dual enrollment programs open new pathways to recruitment and retention at the college or university level. Institutions with dual enrollment programs can increase their visibility within their local recruitment area and attract top high school students who otherwise might not have considered a local institution (AASCU, 2002).

Many outcomes have been identified regarding a student's participation in dual enrollment programs. Delicath (1999) wrote that the purpose of dual enrollment programs is fourfold. First, these programs provide high school students access to learning a wider range of courses and different level of curricula. Second, the costs

associated with attending an institution of higher education may be reduced because high school students are able to earn college credit for certain introductory level college courses. Third, these programs allow students, who have completed their requirements for graduation, to participate in a challenging environment and fight off senior year boredom. Lastly, dual enrollment programs allow high school students to gauge their ability to perform at the college level and to prove to themselves that they can be successful.

Dual enrollment programs date back to the 1970s, but did not gain popularity until the mid-1980s. The intent of these programs is to bridge the gap between secondary and postsecondary education. Since the 1990s, dual enrollment programs have expanded and are among the fastest growing programs in the United States (Welsh, Brake, & Choi, 2005). Nearly every state offers high school students the opportunity to earn college credit. In a report by Boswell (2001), thirty-eight states have policies to encourage students to take advantage of dual enrollment programs, while ten have agreements at the institutional level. Estimates that within the United States, in the 1995-1996 academic year, indicated 204,790 high school students participated in some kind of program in which they earned college credit(s) (Andrews, 2000). According to Porter (2003), this number had grown to 560,000 by 2002. Colleges and universities can use this information to change the way they recruit high school students or determine whether or not they want to capitalize on this population of students by offering their own dual enrollment programs.

Throughout the past twenty years, the population of students who have participated in dual enrollment programs has drastically changed. According to

Greenberg (1991), the pool of students eligible to participate in and benefit from dual enrollment programs has increased dramatically. Traditionally, dual enrollment was targeted toward the most academically proficient high school students, who are thought of as being capable of performing at the college level. More recently, it is believed that a broader range of students could benefit from these programs. It may be possible for dual enrollment programs to help low-achieving students prepare for college by exposing them to the rigorous academic coursework that research has shown to be related to success in college (Adelman, 1999).

The mode of delivery for dual enrollment programs varies by state and institution. Some school districts encourage high school teachers to gain certification to teach community college level courses; therefore, students do not have to leave their high school setting to participate in the dual enrollment program (Harrington, 2005). Other models require high school students to attend class at a college or university in order to obtain dual enrollment credits. Furthermore, these students may take a course with only dual enrollment students or they can be mixed with other college students.

Dual enrollment programs smooth the transition between high school and post secondary education; thus increasing the likelihood that these students will be retained by the institution (AASCU, 2002). Furthermore, students with dual enrollment credits are able to complete their degree in less time than traditional students. A 1987 Syracuse University study of students enrolled in dual enrollment programs found that the first-year retention rate for this population of students was 96% compared to the national average of 79% (Delicath, 1999). In addition, the average GPA was 2.71 compared to the national average of 2.51 (Delicath, 1999).

Another program that bridges the gap between secondary and postsecondary education is the Advanced Placement (AP) program which was created by the College Board in the 1950s. The College Board develops and maintains courses in various subject areas, supports those who teach the courses, assists universities as they define their policies related to AP grades, and develops and coordinates the administration of annual AP examinations (Boswell, 2001). Advanced Placement courses can help high school students improve their writing skills and problem-solving techniques, develop study habits necessary to complete college level coursework, stand out in the college admissions process, and study subjects in greater depth and detail (The College Board, 2006).

The number of students that have participated in the AP program has increased in the last several years. Of the estimated 2.7 million students who graduated from U.S. public schools in 2006, 406,000 (14.8%) earned an AP exam grade of three or higher on one or more AP exams while in high school. This is up from 14.1% for the year of 2005 and 10.2% for the year of 2000 (The College Board, 2006).

Several positive outcomes have been associated with a student's participation in an AP course. Research shows that these students have higher GPAs and graduation rates than other students. The grades of 18,000 students enrolled in introductory science classes at 63 randomly selected U.S. colleges and universities were reviewed, and it was found that students who took an AP course in the same subject received slightly higher grades (The College Board, 2006). A Texas study followed 67,000 students who graduated from high school in 1998 and determined students who scored at least a three on the AP exam were more likely to complete college than those who scored lower or did not take the test (The College Board, 2006). Furthermore, a California study yielded

similar conclusions after researchers followed 81,445 students who entered the University of California at Berkeley between 1998 and 2001 (The College Board, 2006). After comparing students with similar academic and economic profiles, these studies show that the students who succeed on an AP exam are better prepared for the rigors of college and more likely to obtain a bachelor's degree (The College Board, 2006).

Most studies related to this topic combine AP credits with dual enrollment credits and do not analyze the data separately. This researcher found one study conducted by Delicath (1999) that compared AP credits and dual enrollment credits. Delicath (1999) conducted a cohort longitudinal study of 2,760 first time, bachelor's degree seeking students who entered St. Louis University between the fall of 1989 through the fall of 1991. The study concluded that students with AP credits take 2.7% less time to graduate than students without those credits. In addition, students with dual enrollment credits take 5.1% less time to graduate than students without those credits. Overall, students who have dual enrollment or AP credits had a graduation rate of 68.78% and the rate for students without credits was 49.2% (Delicath, 1999). This study determined that students without dual enrollment or AP credits persisted at a rate of 69.64% from their first year to their second year and the rate for students with those credits was 85.57% (Delicath, 1999). Since Delicath (1999) discovered differences between students with AP and dual enrollment credits, further research needs to be conducted to examine these populations in more detail.

## Statement of the Problem

There is very little direct literature available regarding the success of dual enrollment programs; therefore, these programs are under a high level of scrutiny for their academic and personal value. This study evaluated students who have chosen to enroll in dual enrollment programs or AP courses through their high schools and how participation in dual enrollment and/or AP programs have impacted their persistence, first semester GPA, graduation completion within four years, and time-to-degree attainment at a four-year, public institution located in Western Pennsylvania. There is a need to gather more information about the characteristics of students who participate in dual enrollment programs and their levels of achievement to supplement the outcomes that have already been reported in previous studies (Hoffman, 2003). This study will work to quantify the benefits of enrollment in such programs. The retention and time-to-graduation rates of student earning AP credits should be compared to those students who have earned dual enrollment credits (Porter, 2003).

## Purpose of the Study

The purpose of this comparative study was to evaluate the difference between students who participated in dual enrollment programs, AP programs, both dual enrollment and AP programs, and traditional students in persistence from first year to second year, degree attainment within four years, first semester GPA, and time-to-degree completion. The researcher attempted to broaden the research base concerning the assumed benefits of dual enrollment and AP programs.

## Research Questions

1. Is there a statistically significant difference in first semester GPA among students who have dual enrollment credits, AP credits, both dual enrollment and AP credits, and traditional students?
2. Is there a statistically significant difference between the SAT scores of students who participated in dual enrollment programs, students who participated in AP programs, students who participated in both dual enrollment and AP programs, and traditional students?
3. Is there a statistically significant difference between the persistence of students who participated in dual enrollment programs, students who participated in AP programs, students who participated in both dual enrollment and AP programs, and traditional students?
4. Is there a statistically significant difference between the four-year graduation rate of students who participated in dual enrollment programs, students who participated in AP programs, students who participated in both dual enrollment and AP programs, and traditional students?
5. Is there a statistically significant difference between the time-to-degree attainment of students who participated in dual enrollment programs, students who participated in AP programs, students who participated in both dual enrollment and AP programs, and traditional students?

6. Is there a statistically significant difference in the gender of students who participated in dual enrollment programs, students who participated in AP programs, students who participated in both dual enrollment and AP programs, and traditional students?
7. Is there a statistically significant difference between the ethnicity of students who participated in dual enrollment programs, students who participated in AP programs, students who participated in both dual enrollment and AP programs, and traditional students?

### Theoretical Perspectives

Since we have yet to determine exactly what is needed to help students transition from high school to college, this study determined if participation in dual enrollment programs and/or AP courses increased students' success in college. This study is framed in Tinto's (1987) Theory of Departure which stated that students possess pre-entry college attributes including such things as family background, skills and abilities, and pre-college schooling. These attributes influence individuals' choice of goals and commitments. Institutional experiences then interact with students' goals and commitments. Whether a student departs from an institution is largely a result of the extent of the students' academic and social integration with the institution. By researching students who have received dual enrollment and/or AP credit prior to college, the researcher will determine if these characteristics can enhance Tinto's theory regarding the impact of pre-college schooling on retention. Since little research has been previously conducted, this study will identify characteristics of students who participate in these programs, which will expand upon Tinto's research.

Research also shows that the majority of students who depart from the university do so voluntarily and their decision to leave is a result of what goes on after the students enter the institution (Tinto, 1987). Oftentimes, students who do not persist in college cite non-academic factors as reasons for dropping out. These factors may include being overwhelmed by the new institution, having unrealistic expectations of the college experience, and lacking a connection to the institution (Tinto, 1987). Dual enrollment programs help to facilitate the psychological transition that occurs when students move from a high school to college environment. Since many dual enrollment programs require the students to spend time on the college campus, this can help facilitate students' acclimation to the environment much earlier. Furthermore, many dual enrollment programs allow students to have access to campus activities, recreation centers, and academic support programs, which enables them to learn about these services before they need them. Essentially, students who participate in dual enrollment programs begin to understand what is expected of them in college and this enables them to adjust more easily when they enter the university as full-time, degree-seeking students. This study determined whether the population of students who participate in dual enrollment programs, and experience the requirements expected from a college-level course prior to attending an institution, have higher first semester GPAs, rates of persistence, are more likely to graduate within four years, and lower time-to-degree attainment than students with AP credits and traditional students.

Additional research was conducted to determine why students depart from a college or university. Previous research on retention was centered on the causal links between student background, educational and institutional commitment, and academic

and social integration (Herzog, 2005). However, others have analyzed the impact of specific factors on retention, such as assimilation in program major, admission status, student ethnicity and gender, classroom-based learning experiences, institutional support services, intention to leave, and pre-college academic preparation (Herzog, 2005). This study will work to expand the research that has previously examined pre-college academic preparation and to determine if participating in AP classes or dual enrollment programs help students to gain an understanding of what level of work will be expected from them during college.

The body of literature related to student retention indicates that pre-existing factors can affect whether or not a student is successful in college. Hossler, Bean, and Associates (1990) stated that as the number of pre-college attributes rise, the likelihood of graduation increases. Additionally, academic success correlates with rank, GPA, high school grades, ACT scores, age, gender, ethnicity, and SES. The study will control for the preexisting characteristics that are known to directly affect student retention and provide additional data to expand upon these theories.

#### Definition of Terms

For the purpose of this study, the following definitions are offered:

1. Advanced placement allows students to register for special courses in high school and take a standardized test at the end of the course. High school students receive high school credit if they score a three or above, on a scale from one to five, and they may receive college credit for a score of a three, four, or five, depending on the college accepting the AP credits (The College Board, 2000).

2. Dropout refers to those students who fail to earn a degree within a specified period of time (Tinto, 1987).
3. Dual enrollment refers to a high school student enrolled and taking courses in a postsecondary institution while still in high school and the college courses earning college and high school credit simultaneously. These courses are offered at either the high school or the college campus. At the high school, a full-time college instructor or a high school teacher hired as an adjunct faculty member by the college might teach the course (Delicath, 1999).
4. First Year is the first academic college experience for students with credit hours ranging from 1 – 28.
5. Grade Point Average (GPA) is an average derived from taking the total grade points earned in a semester and dividing by the total number of semester hours attempted for college credit during the semester, reported on a 4.00 scale.
6. Persistence is the continuation of enrollment from first year to second year.
7. Retention is the act of re-enrolling for subsequent college terms until the student graduates from the higher education institution.
8. Traditional student refers to a student who graduated from high school in 2005 and did not participate in dual enrollment or AP programs prior to entering IUP.
9. Non-traditional student refers to a student who did not enroll at IUP immediately following high school graduation as a full-time, degree-seeking student.

## Significance of the Problem

Research demonstrates clear economic benefits for continuing education beyond high school and therefore college aspirations have risen dramatically in the last two decades (NCES, 2001). However, far fewer young people graduate from postsecondary school. Almost two-thirds of high school graduates enter postsecondary school immediately after high school, yet 37% of the students who entered higher education in the 1995-1996 academic year left two years later without earning a degree (NCES, 2001). In 2000, 66% of high school graduates age twenty-five to twenty-nine had completed some college but only 33% of graduates held a bachelor's degree (NCES, 2001). Based on the statistics it appears as though the transition from high school to college can be unsuccessful for many high school graduates. Using the High School & Beyond national longitudinal data set, Adelman (1999) determined that the strongest predictor of bachelor's degree completion was the intensity and quality of students' high school curriculum. A student's record in high school is strongly related to success once the student is in college. Many researchers argue that stronger communication and collaboration between secondary and postsecondary institutions is needed and dual enrollment and AP programs have been created to fill this gap.

The cry for accountability for all educational programs is increasing; hence, program scrutiny is at a high level. Any program that does not have data to support progress and academic gain is in jeopardy of being phased out (AASCU, 2002). Individuals will use the information from this study to help them decide if they will participate in dual enrollment or AP programs and to what extent. Postsecondary and secondary schools will find the information useful when deciding if dual enrollment or

AP programs should be increased or decreased and institutions may decide to give more weight to students with these credits during the admissions process. Lastly, institutions can develop marketing tools that attract students who have participated in dual enrollment or AP programs.

### Methods

The target population for this study is all first-time traditional, first-year students with dual enrollment or AP credits when enrolling at IUP during the fall of 2005. A traditional first-year student is defined in this study as a student who entered the university the fall after he or she graduated from high school. During the fall of 2005 there were 2,279 total traditional, first-time, first-year students admitted and enrolled; and of the 2,279 total traditional first-year students, 94 had AP credits, 107 transferred in credits from a dual enrollment experience prior to entering the university, and 21 students participated in both AP and dual enrollment programs. Students in the cohort who did not participate in dual enrollment or AP programs comprised 90.3% of the population, 4.1% participated in AP programs, 4.7% participated in dual enrollment programs, and .9% participated in both dual enrollment and AP programs. The researcher used institutional data to compare enrollment at an initial point in time and at regular intervals to determine if there is difference in degree completion within four years, persistence, first semester GPA, and time-to-degree attainment between students with dual enrollment credit(s), AP credit(s), both dual enrollment and AP credit(s), and traditional students. The researcher used descriptive statistics for the initial analysis of data. A Chi-square was used to compare gender and ethnicity of students with dual enrollment credits, AP credits, both dual enrollment and AP credits, and traditional students. A one-way

ANOVA was used to determine if participation in dual enrollment and/or AP programs had any influence on first semester GPA or SAT score. In addition, the researcher used a Chi Square to analyze the relationship between the dependent variables “degree attainment,” “persistence,” and “time-to-degree attainment” and the independent variables.

### Limitations of the Study

There are several limitations evident in this study. This study will be limited to college first-year students who enrolled in a mid-sized, public university in Western Pennsylvania for the 2005 fall semester. In addition, the researcher will only include incoming first-year students who graduated from high school in 2005. There are several populations of students that were not included in this study. The first population is students who transfer to another university. Since there is not a process in place to track students who choose to voluntarily leave the institution or transfer to another school, the researcher was unable to collect data from these students. The second population of students who were not included in the study is International students. The researcher was not able to include International students in this study because they do not experience AP and dual enrollment programs that exist in the United States. The third population that was excluded from this study is transfer students. The current data collection system is not able to differentiate credits from AP courses, dual enrollment programs, and previously attended universities. Since all transfer students will have previously earned credits, the researcher will be unable to determine the source of these credits. The last population that was not included in this study is non-traditional students. The researcher was not able to account for their life experiences and many of these students are not

enrolled full time or seeking a degree. Since this study excluded International students, transfer students, non-traditional students, and all non-bachelor, degree-seeking students, the results may only apply to the students within the parameters of this study.

### Summary

Research demonstrates that participating in dual enrollment and/or AP programs positively affects student achievement and success. However, much of the literature focuses on the outcomes of completing dual enrollment programs and does not compare the two. There is a push to bridge the gap between high school and post secondary institutions and dual enrollment and AP programs are two initiatives that are being promoted to help students successfully transition to college. In order to substantiate the positive outcomes of enrolling in these programs further research needs to be conducted. The next chapter will review the history of dual enrollment and AP programs, discuss studies involving the outcomes and perception of participating in these programs, and identify where this study fits within pre-existing research.

## CHAPTER TWO

### REVIEW OF RELATED LITERATURE

The body of literature related to higher education emphasizes the disconnect that exists between secondary and postsecondary institutions. This disconnect is detrimental in the end because many policies and practices that govern these institutions are not congruent. Oftentimes high school graduation requirements differ from college admissions requirements and there tends to be significant overlap in the curriculum between the last two years of high school and the first two years of college (Greenberg, 1991). National politicians and educational leaders are calling for a seamless integration between secondary and postsecondary institutions (Boswell, 2001). This integration would allow for a smoother transition from high school to college. This interest also stems from evidence that high school students are unprepared for college despite their intention to pursue higher education (Karp, Bailey, Hughes, Fermin, & the Office of Vocational and Adult Education, 2004). Although the majority of graduating high school seniors indicate that they intend to earn a bachelor's degree, in 2001 only 28% of high school graduates held a degree and only 58% of graduates aged 25 to 29 completed some college (NCES, 2001). The literature indicates that state policy makers have adopted dual enrollment programs to promote increased productivity, improved access, and enhanced relationships between high schools and colleges. In addition, research documents the ability of dual enrollment programs to encourage students to attend college. We must bridge the gap between postsecondary education and secondary education in order to prepare students for life, citizenship, work, and education (AASCU, 2002). Two of the models that assist with the transition of high school to college are dual

enrollment programs and AP courses. In this review the following topics are addressed: An Historical Perspective of Advanced Placement and Dual Enrollment Programs, Statewide Program Structure and Organization, Benefits of Dual Enrollment Programs, Challenges of Dual Enrollment Programs, Review of Studies Related to Dual Enrollment and Advanced Placement Programs, Review of Studies Related to College Student Retention, and Conceptual Framework in Support of Dual Enrollment Programs.

### An Historical Perspective of Advanced Placement and Dual Enrollment Programs

During the 1860s, the Missouri school system was the first to provide accelerated instruction to students who were determined to be academically qualified for the educational experience (The College Board, 2000). Accelerated educational programming options remained inconsistent, informal, and isolated across the United States until a century later (Shannon, 2005). In 1951, the Ford Foundation sponsored two research studies to assess the status of the perceived gap between the nation's high schools and colleges. These studies concluded that some high school students could succeed in college-level academic courses while still in high school, suggesting that educators had an obligation to fill the "gap" between high school and college.

The Ford Foundation established a committee that took the lead in developing the curricula, standards, and exams to meet this need. These efforts led to the implementation of an AP program in the United States in 1955 (The College Board, 2000). The AP program was developed to offer accelerated and more rigorous courses than what are typically available at the secondary level and was marketed to academically gifted high school students. Eventually the College Board officially took ownership over

the AP program, renamed it the College Board Advanced Placement Program, and managed all 11 of its initial subject areas (The College Board, 2000).

Advanced placement allows students to register in special courses in the high school and take a standardized test at the end of the course. High school students receive high school credit if they score a three or above, on a scale from one to five, and they may receive college credit for a score of a three, four, or five, depending on the postsecondary institution accepting the AP credits.

Throughout the last 50 years, there has been a significant increase in the number of students enrolling in AP courses. During this time, more than 1.2 million students have taken over 2.1 million AP exams in more than 32 subjects (Sadler & Tai, 2007). Increasingly more students are applying to college with AP courses on their high school transcripts. In 2006, 61.6% of college freshmen reported that they had taken at least one AP course and 14.9% took five or more (Sadler & Tai, 2007). Not only have the number of students who have taken AP courses increased, the number of students preparing for AP exams grew from 9,736 in 1990-1991 to 14,157 in 2001-2002 (Hoffman, 2003). Although these data indicate an increase in the number of students who have taken AP courses and AP exams over time, an estimated 30% to 40% of students choose not to take the exam (Sadler & Tai, 2007).

Twenty years after the inception of AP programs, the dual enrollment program emerged as another model that can be used to help students transition from secondary to postsecondary education. Dual enrollment refers to a high school student enrolled and taking courses in a postsecondary institution while still in high school and the dual enrollment courses earning college and high school credit simultaneously. Dual

enrollment programs were initially used as a way for gifted students to participate in more challenging coursework than what their high schools offered (AASCU, 2002). Similarly to AP programs, dual enrollment options have provided secondary and postsecondary institutions a new way to make the senior year more productive, explore majors and career paths prior to becoming full-time students, and allow students to see if they will be successful at the college level. All 50 states currently offer dual enrollment programs (AASCU, 2002). It has been estimated that within the United States, in the 1995-1996 academic year, 204,790 high school students participated in some kind of program in which they earned college credit(s) (Andrews, 2000) and this number had grown to 560,000 by 2002 (Porter, 2003). This increase can greatly affect the role and programming scope of numerous colleges and universities.

#### Statewide Program Structure and Organization

Unlike the national AP program, rules and regulations that govern dual enrollment programs vary from state-to-state and by institution (AASCU, 2002). Some states use dual enrollment programs to change drastically the diversity and number of students that participate in higher education. In 2000, the Kentucky Council on Postsecondary Education (CPE) deregulated its policy on dual credit to permit colleges and universities more flexibility in operating dual enrollment programs. The new policy was intended to use dual credit courses as a tool to increase the number and diversity of Kentucky students pursuing postsecondary education, primarily through community colleges. The CPE and Kentucky Community and Technical College System (KCTCS) report that dual enrollment programs are expected to assist with two primary goals including increased enrollment in community colleges and the use of community colleges as initial points of

access for students from underserved and underrepresented populations. The variations among dual enrollment programs include how course content is selected, who funds the programs, the admission and academic requirements for entering the programs, and the instruction.

There are many variations on how course content is selected and offered in dual enrollment programs. There are times when the state dictates what types of courses are offered and the postsecondary and secondary institutions give little to no input (Karp et al., 2004). Once it is decided what courses are offered, each state or program may handle how course content is selected. Either the high school, postsecondary institution, or the state must approve the course syllabus, textbook(s) and exams (Karp et al., 2004).

Another option is that dual enrollment courses must use a standardized curriculum and textbook(s).

The policies that indicate who is eligible to participate in dual enrollment programs also have variation. Some dual enrollment programs only admit students who are academically advanced or proficient based on high school GPA and/or a standardized test score. Oftentimes the criteria differ based on the course of study the student wishes to take. Ultimately, the standards can be set by the secondary partner, the postsecondary partner, the state, or it can be a joint decision.

Another difference that exists among dual enrollment programs is who pays for a student's tuition. Some states are responsible for paying tuition costs (Karp et al., 2004) and other times the high school or postsecondary institution pay for tuition or have the authority to decide who pays. Some dual enrollment programs require the student to pay

his or her own costs associated with dual enrollment. Some programs require the students to pay a portion of the expenses associated with such programs.

The final difference among dual enrollment programs is how instructors are selected and where the courses are held. Some dual enrollment programs allow high school or college instructors to teach the courses and others only allow college faculty. If high school instructors are permitted to teach the courses, they may be required to have the same credentials as faculty or the postsecondary institution must approve the high school instructors who teach dual enrollment courses. In addition, high school instructors may be required to participate in training or other professional development activities. Dual enrollment courses can be held at the high school, college campus, or via the Internet. Some courses are made up of high school students and others have a mixture of high school and college students (Bailey, Hughes, & Karp, 2002). Each student's experience can vary based on who funds the program, the admission and academic requirements for entering the program, the course content, and instruction.

#### Benefits of Dual Enrollment Programs

Several benefits have been noted in the research pertaining to participation in dual enrollment programs. These benefits can be categorized as benefits for the student, high schools, or postsecondary institutions. By participating in dual enrollment programs students can be better prepared for the demands of college (AASCU, 2002). Dual enrollment students are exposed to the academic expectations of postsecondary education and can determine if higher education is the best fit for them. Since many high school students complete their requirements for graduation during their junior year, they tend to opt out of taking challenging courses their senior year. Dual enrollment programs can

reduce senior dropout rate and increase the likelihood that students remain at the institution (AASCU, 2002). The college credits that students earn for their dual enrollment courses may help them complete their degree in less time and, if their tuition costs are covered, less costs (AASCU, 2002). The number of college credits earned by each student varies. A study conducted by Andrews (2004) indicated that 30% of students in dual enrollment courses at Marquette High School earned 24-30 college credits by the time that they graduated from high school. Dual enrollment programs can help students make the psychological transition by getting them on campus (student activities), acclimating them to the new environment, and getting them to learn about services provided before they need them (Bailey, Hughes, & Karp, 2002).

Offering dual enrollment courses to high school students generates many benefits for colleges and universities. Since high school students are included in admissions numbers, they can help to add revenue and increase enrollment for these institutions (AASCU, 2002). College and universities can use these programs to market their academic and social programs to attract local high school students who may not have originally been interested in their institution (AASCU, 2002). The dual enrollment programs can create new pathways for recruitment and retention and increase visibility (AASCU, 2002). The percentage of high school graduates going to college has remained below 50% since the 1970s and there has been a decline in the number of high school graduates (Delicath, 1999). Based on this information, administrators recognize that retention of current students is more effective and less costly than locating and enrolling new or transfer students. First-year students who do not return represent a cumulative three-year loss of revenue to the institution (Delicath, 1999). College administrators can

use dual enrollment programs to retain students that are more likely to persist and graduate.

Offering dual enrollment courses to high school students generates many benefits for the high schools. This new found collaboration between high school administrators and college officials can be used to improve communication between high schools and colleges. In addition, high school administrators can continue to learn what is expected from students at the college level and alter programs to prepare students appropriately. Oftentimes dual enrollment courses are used to supplement the curriculum that the secondary institutions already offer. These programs can help expand current curriculum by offering more courses geared toward the development of more well rounded students (AASCU, 2002). The existence of dual enrollment programs can increase resource sharing among instructors as partnerships form between high schools and postsecondary institutions (Shannon, 2005).

#### Challenges of Dual Enrollment Programs

There are many challenges that have been identified related to participation in dual enrollment programs. These challenges fall into three categories including funding, academic concerns, and research. Critics of dual enrollment programs think when the state covers the cost of tuition the taxpayers are paying twice to educate the same student (AASCU, 2002). If parents or students have to pay for the program, affordability may be an issue (AASCU, 2002). If the student is responsible for covering the cost of tuition, dual enrollment programs may not be accessible to some students with financial limitations; therefore, access could be a major challenge.

There are a number of academic concerns that have been identified in the literature. If dual enrollment programs allow high school instructors to teach the courses there may be concern regarding academic preparation (AASCU, 2002). In addition, critics of dual enrollment programs think that college courses will be less rigorous if high school students are permitted to participate (Bailey, Hughes, & Karp, 2002). Since dual enrollment students are only enrolled in college part-time, they may have difficulty getting acclimated to their new settings. Day-to-day concerns about transportation, scheduling out-of-class assignments, and functioning under two academic calendars may cause undue stress for a high school student, especially if he or she does not have the appropriate coping mechanisms in place (Shannon, 2005). One of the biggest challenges is that credits may not always transfer to all colleges or universities.

Research relating to dual enrollment programs is sparse and the studies that have been conducted are used to promote one's own program (Bailey, Hughes, & Karp, 2002). The research that has been conducted focuses on student perceptions of the dual enrollment program, and the way that dual enrollment programs are used, not on the long-term outcomes (Bailey, Hughes, & Karp, 2002).

#### Review of Studies Related to Dual Enrollment and

#### Advanced Placement Programs

According to the research, most of the studies that have been conducted on dual enrollment or AP courses analyze student's perceptions, student retention and academic success, and transition from high school to a postsecondary institution. Many of the studies analyzing student perceptions are qualitative in nature. A Brigham Young University study indicated that the experience of dual enrollment increased the students'

self-perception of what they could achieve (Delicath, 1999). Buchanan (2006) conducted a mixed method study to determine the experience of dual enrollment students who participated in the North Carolina dual enrollment program. The study included school districts in North Carolina containing one high school and who participate in dual enrollment programs at a local community college in the district. Buchanan's (2006) survey data combined with in-depth interviews with six students determined that seniors are more likely to participate in dual enrollment programs, females outnumber males, ethnic make up of participants mirrors school demographics, students participate to save money; students are goal-oriented, like being treated like adults, recommend the experience, and enjoy being in classes with varying age groups. A similar observation occurred in a study at Southside Virginia Community College. Their survey indicated that dual enrollment students felt that their experiences prepared them for college, enabled them to meet professor expectations, and that the credits that transferred put them ahead without paying for college (Andrews, 2004).

Additional research on dual enrollment programs focused on the psycho-educational portrayal of students who selected dual enrollment as an educational option (McConnaha, 1996). The researcher interviewed twenty high school students involved in dual enrollment programs and conducted interviews with the students' high school and university instructors, counselors, and parents as secondary sources. Through triangulation, it was determined that students in dual enrollment programs are highly

motivated and possess positive attitudes and self concepts (McConnaha, 1996). The study also indicated that students who make their own decision to participate in dual enrollment programs viewed the social impact on their lives as positive (McConnaha, 1996).

A study was conducted to compare the success rates of students that entered college through the traditional pathway to success rates of students enrolled in the early admit program (Brown-Ingles, 2003). The researcher collected data from students with high school dual enrollment credits and traditional community college students. Follow-up interviews were conducted with students with high school dual enrollment credits. The study indicated that dual enrollment students had higher GPAs and standardized test scores than those without these credits. It was also determined that dual enrollment students had an increased level of motivation to succeed in high school and post secondary institutions (Brown-Ingles, 2003).

Another major body of research looked at student retention and academic success. In his longitudinal study, Delicath (1999) examined specific cohorts of students over time, compared their fall entry, and then reexamined the same group year after year. Each fall term the students were identified as persisters, dropouts, or graduates. The participants included first-time, non-foreign, bachelor's degree seeking students who entered in the fall of 1989 through the fall of 1991. There were 1,017 students in the 1989 fall cohort, 917 in the 1990 fall cohort, and 826 in the 1991 fall cohort. Of the 2,760 students who were involved in this study, 644 had an average of 11.62 dual enrollment credits and 6.11 of AP credits (Delicath, 1999). This study found that students enrolled in their dual credit program had a first year retention rate of 96%

compared to the national norm of 79% with the 2.71 average GPA of these students being slightly higher than the norm of 2.57 (Delicath, 1999). Students without dual enrollment or AP credits had a persistency rate of 69.64% compared to 85.51% for students with dual enrollment or AP credit (Delicath, 1999). The study also concluded that dual enrollment or AP credits influence the students' ability to graduate in six years; students without dual enrollment or AP credit had a graduation rate of 49.20% compared to 68.78% for students with dual enrollment or AP credit (Delicath, 1999). The results of this research should be used to influence institutions recruiting efforts and strategies. Delicath (1999) indicated that this research would enhance university administrator's knowledge of recruitment and retention because it will identify whether or not students with AP and dual enrollment credits persist and graduate at a higher level than those without these credits.

Although the findings of Delicath's (1999) study are significant, the sample consists of students from one university so the information may not be applicable to other institutions. In addition, this study excludes transfer students, foreign students, adult students, and non-degree seeking students so the findings may only be applicable to other students who have the same characteristics of the cohort that was studied. In addition, Delicath (1999) had failed to indicate that research shows that academically prepared students tend to persist more than underprepared students and students who feel a connection to the university are more likely to be retained than those who do not.

Kentucky reformed its postsecondary education systems after experiencing a competitive disadvantage with other states in measures such as college participation, retention and graduation, and literacy per capita. Since 2000, the new policy was

intended to increase the number and diversity of Kentucky students pursuing higher education. Welsh, Brake, and Choi (2005) conducted a correlational study to determine if dual credit programs within the KCTCS provided increased access to higher education for the underserved and underrepresented student's in Kentucky. The study measured student participation and success specifically focusing on credits earned in dual-credit courses, deficient credits in dual-credit courses, and the quality point average in dual-credit courses. The predictor variables examined in this study include student performance in high school, gender, residence, ethnicity, and SES. The target population consisted of all Kentucky high school students enrolled in dual-credit courses in the KCTCS during the fall 2000 and fall 2001 semesters. The subjects were enrolled in Kentucky community colleges in the fall 2000 and fall 2001 semesters. The data was pulled from a KCTCS database, which included demographic information from student applications, which was completed by high school students each semester. The findings indicated that there was an increase in the enrollment of high school students in the KCTCS system between the fall of 2001 and 2002. In addition, the changes initiated at the state level have had some impact on the barriers that impede the accessibility of all students to dual-credit programs in Kentucky. In 2000, the Kentucky Council on Postsecondary Education changed the dual enrollment policy to increase the number and diversity of Kentucky students pursuing postsecondary education and they had over a 2,000 student increase between fall of 2000 and 2001 (Welsh, Brake, & Choi, 2005). A Chi-Square analysis showed a statistically significant increase in enrollment growth from fall 2000 to fall 2001 in underserved populations including blacks, gender, low SES, and rural residence (Welsh, Brake, & Choi, 2005).

A study was conducted to formally evaluate the Public Act in Michigan, which allows high school students to earn college credit (Shannon, 2005). The case study included 180 participants admitted to Lake Superior State University (LSSU) from fall 1996 to fall 2002. Shannon (2005) included a group of 227 first-year students without postsecondary academic credits that were randomly selected. The researcher used pre-existing data that was retrieved from the university's information system. The results indicated that dual enrollment students have positive differences than the control group in many pre-college attributes including higher GPAs, higher high school rank, and higher ACT scores. Once enrolled full-time in college, students with dual enrollment credits had higher first semester LSSU credits hours earned, higher first and second semester GPAs, higher five-year graduation rate, and shorter time-to-degree attainment than students without these credits (Shannon, 2005).

A similar study was conducted to determine if there are significant differences in GPA, retention rates, and first to second year persistence in Texas public, four-year universities between students who took dual enrollment in their senior year of high school and those who did not (Peng, 2003). The researcher divided the students into groups depending on whether they were enrolled in a single dual enrollment course or multiple dual enrollment courses and the groups were further divided by gender and ethnicity. The analysis of variance indicated that white students were more likely to enroll in dual enrollment programs in Texas high schools, dual enrollment students performed better in GPA and retention than non-dual enrollment students during two academic years, and dual enrollment students who enrolled in multiple dual enrollment courses had higher GPAs than students who enrolled in a single dual enrollment course

(Peng, 2003). A similar observation was revealed in a study of first-time, first-year students with dual enrollments credits at Arizona State University. According to Harrington (2005), dual enrollment students have better persistence, graduates rates, and shorter time-to-degree attainment than traditional students do.

A study conducted at the University of Arizona indicated that the first semester grades for dual enrollment students were higher than those of a typical community college transfer student (Bailey, Hughes, & Karp, 2002). University of Arizona dual enrollment participants maintained higher GPAs upon entering the university than other students (Bailey, Hughes, & Karp, 2002). Hartman (2007) had a similar observation when he conducted a study to determine if there was a positive relationship between participating in dual enrollment programs and academic success. Hartman (2007) collected data from 4,000 dual enrollment students and it was determined that students who participated in dual enrollment programs performed better than average academically in their first year of college than those who did not participate.

#### Review of Studies Related to College Student Retention

Previous research on retention was centered on the causal links between student background, educational and institutional commitment, and academic and social integration (Herzog, 2005). However, others analyzed the impact of specific factors on retention, such as assimilation in program major, admission status, student ethnicity and gender, classroom-based learning experiences, institutional support services, intention to leave, academic and social integration, and pre-collegiate academic preparation (Herzog, 2005). The literature pertaining to college student retention identified the impact of pre-

college attributes, financial aid, college preparation, and attending multiple institutions. As the number of pre-college attributes rises the likelihood of graduation increases. Additionally, academic success correlates with rank, GPA, high school grades, ACT, age, gender, ethnicity, SES, and first generation students (Hossler, Bean, & Associates, 1990).

There is research that focuses on the affect of financial aid on student persistence and retention. Students who lack the financial resources to pay for college are more likely to drop out; however, offering more financial aid to these students does not deter them from leaving the institution (Herzog, 2005). Delicath (1999) stated that students with loans or work study are more likely to transfer out after their first semester compared to students without aid. In addition to the factors indicated above, other research has identified the role that financial support plays in college attendance. Research has shown that the impact of financial aid on student persistence is not consistent among institutional studies (Herzog, 2005). Herzog (2005) identified that this trend is not adequately accounted for in current retention literature. Previous research regarding the impact of financial aid on persistence measured the direct effect of financial aid in conjunction with cognitive, affective, and economic variables, which have overcome some of the limitations of earlier studies that focused on the equalization effect of aid on low-income students.

The departure risk of students is typically the highest in the first year and it is important to know the factors that elevate the risk for a student to dropout. The growing trend is for students to transfer or attend multiple institutions at the same time. Braxton's (2000) *Reworking the Student Departure Puzzle* provided an overview of theories related to student retention and indicated that much of the literature ignores transferring to

another institution, which is a growing trend. To reiterate the importance of acknowledging this trend, Herzog (2005) identified literature, which stated that over a third of 1992 high school graduates, who earned a degree by 2000, completed the degree at an institution other than the one that they students first attended. In addition, over 73% of those who started at a four-year institution took courses at a different institution.

A study was conducted that incorporated student demographics, high school preparation, college experience, and financial aid status and measured persistence within two semesters following the initial enrollment term based on new freshmen that entered fall semesters between 2000 and 2002 (Herzog, 2005). All freshmen that entered the university between fall 2000 and 2002 and were not varsity athletes, part-time, or foreign students were selected for this study. There were 5,261 (96%) students in the examined population for the 2000-2002 fall semester cohorts; 4,671 (96%) for the spring-enrolled cohorts; and 4,298 (97%) for the 1996-1999 cohorts. The findings state that almost 11% of fall students chose to transfer within one year (Herzog, 2005). Living on-campus, use of recreation facilities, concurrent enrollment at another college, taking a greater credit load, majoring in a field requiring a higher-level math, and passing a first-year math course all statistically improve the odds of second-year retention (Herzog, 2005).

Herzog (2005) also identified that previous research on retention was based on more homogenous, full-time cohorts and that freshmen today increasingly come from first-generation, low-income, and ethnically diverse backgrounds. Therefore, these students are less prepared to take on college-level courses. In addition, only 32% of high school graduates are qualified to enter four-year colleges (Adelman, 1999). Further, students who have completed Algebra II level mathematics or higher in high school are

more likely to persist in college (Adelman, 1999). In addition, three of the courses students most likely fail in college are in the area of math and that students are most likely to repeat or withdraw from a math course. Research has concluded that a student's high school curriculum is a strong positive predictor for postsecondary graduation (Adelman, 1999). Adelman's (1999) study indicated that next to the college GPA, student performance in first-year math courses is the strongest retention predictor for new freshmen in their first semester. In addition, students who are taking remedial math are more likely to drop out or transfer than other students.

#### Conceptual Framework in Support of Dual Enrollment Programs

The literature on student retention indicates that there are several factors that impact a student's continued enrollment at an institution including the student's personality structure (the ability to adjust to a new environment, prior academic preparation, and strength of personal commitment) and the institution's programmatic structure (academic and personal support programs, effectiveness of advising, and emphasis on career and major exploration) (Krhin, 2003). There are three frameworks that can be applied to dual enrollment including Tinto (1975, 1987, 1993), Merton (1968), and Sanford (1966).

One of the major contributors to student retention theory is Vincent Tinto who researches why student departure occurs. Tinto's theory first published in 1975 and revised in 1987 and 1993 offers a model that explains how students separate and transition from their pre-college environments to their college surroundings. His original framework focuses on a student's pre-college skills and knowledge as a primary indicator of persistence and degree attainment (Tinto, 1975). The revised model looks at retention

from a broader perspective; it emphasizes that a student's post-matriculation experiences have more of an impact on retention than their pre-college skills and knowledge. Tinto's 1993 model incorporates and discusses intentions, goals, institutional commitments, and external commitments (see Figure 1).

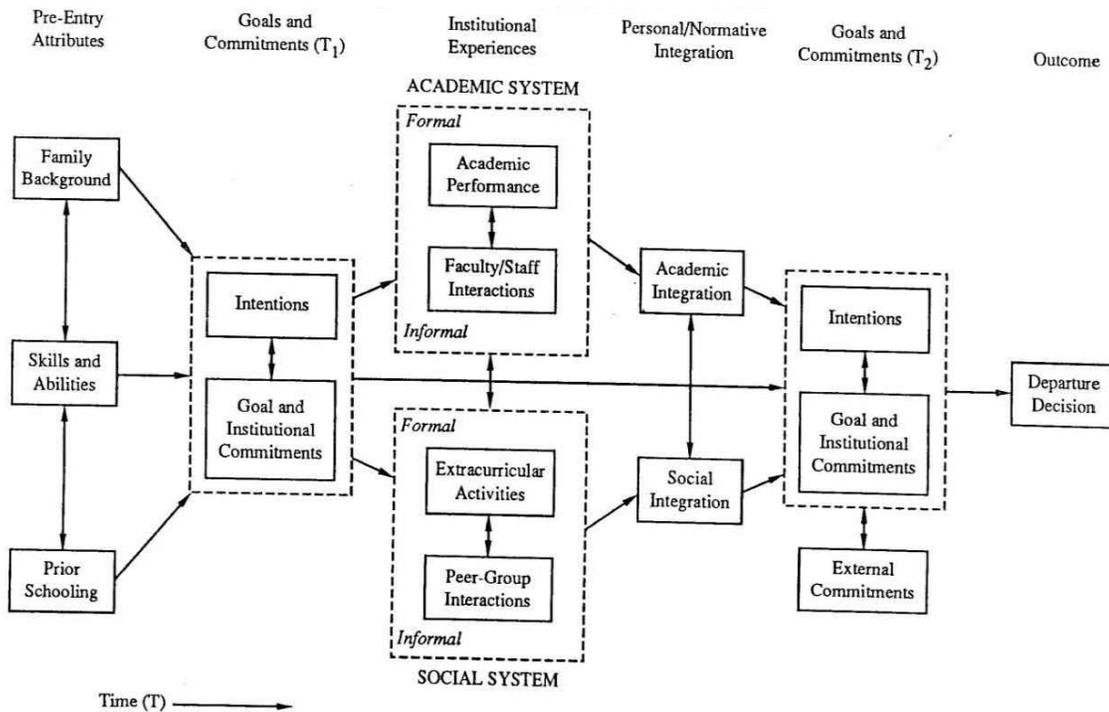


Figure 1. A longitudinal model of institutional departure.

Source: Tinto, V. (1993). *Leaving college: Rethinking the causes and cures of student attrition* (2<sup>nd</sup> ed.). Chicago: University of Chicago Press, p. 114.

In order to understand this model fully, it is imperative to identify how each aspect of the model is defined. Tinto (1993) defined goals and intentions as they relate to the students' educational aspirations. This aspect of the model encompasses the students' goal of earning a college degree and their commitment to staying at the institution. Institutional commitment was described as the ways in which students psychologically assimilate with their college of choice (Tinto, 1993). The model acknowledged that the

process of identifying with or connecting to the institution greatly affects students' decision to depart. A "sense of belonging" is a primary element in assisting students to feel connected to the academic and social community of the college or university campus (Tinto, 1993). It is important for institutions to educate students about the campus culture as soon as they arrive on campus and help them develop positive coping mechanisms to enable them to navigate successfully their new environment (Tinto, 1987). External commitments include family, friends, work, and other obligations that take time away from a student's ability to focus on school (Tinto, 1993).

The model puts academic and social integration in the center and identifies the impact of academic performance, faculty and staff interaction, getting involved with extracurricular activities, and peer interaction on students' decision to depart an institution (Tinto, 1993). The degree to which students develop close, mentoring relationships with faculty, staff, and other students greatly affects an institution's retention rate (Tinto, 1987). Dual enrollment programs allow students to begin developing these relationships early and oftentimes they have immediate support from the person who coordinates the program on the college campus. These relationships can help create a smooth transition from secondary to postsecondary institutions. A positive transitional experience can increase student motivation and provide support that encourages student retention (Tinto, 1993). All of these things combined contribute to students' academic and social integration. Tinto's theoretical model may help to explain how participating in dual enrollment programs impacts student persistence.

A second conceptual framework that can be applied to dual enrollment programs is anticipatory socialization. Anticipatory socialization is the process or set of

experiences through which individuals come to anticipate correctly the values, norms, and behaviors they will encounter in a new social setting (Merton, 1968). Anticipatory socialization is a necessary component that is needed for students to transition into their new role. Oftentimes a student beginning college can face a strenuous adjustment period because he or she is entering an unfamiliar setting that may require new behaviors and social structures; therefore, a student who appropriately anticipates the socialization that is required in the college setting may experience less stress when leaving behind his or her pre-college routines (Swanson, 2008).

The concept of anticipatory socialization can be applied to many socialization situations in higher education (Shannon, 2005). Most dual enrollment programs follow the postsecondary academic calendar, have high school students take courses with college students, and allow dual enrollment students to use the college's academic, personal and social support services. Since dual enrollment programs assist students in learning about the academic expectations of college, these concepts fit into the model of anticipatory socialization. Students who participate in pre-college activities prior to matriculation actually assimilate behaviors of college students through anticipatory socialization (Merton, 1968). Experimentation with college courses may solidify a student's desire to attend college and identify any academic and social deficits that may need to be further developed before matriculation. Participating in dual enrollment programs allows students to encounter the college admissions process, take placement exams, purchase textbooks, and experience the norms and behaviors that are expected by college professors. These experiences and activities may lead to higher levels of academic and

social integration during the student's first year at college resulting in increased persistence and degree attainment (Swanson, 2008).

The third framework that can be applied is Sanford's (1966) theory of challenge and support. Sanford (1966) was one of the first theorists to focus on a student's relationship with the environment. The underlining concepts of his theory pertain to students moving through a cycle of differentiation and integration using the appropriate levels of challenge and support along the way (Hartman, 2007). Sanford's (1966) theory identified three development tasks including readiness, challenge, and support. Sanford (1966) indicated that students could not exhibit certain behaviors until they are ready to do so. This readiness can be facilitated by student maturation or the appropriate environmental conditions. Ultimately, developmental tasks cause disequilibrium to occur and students must be ready to initiate new behaviors or perceptions (Sanford, 1966). Differentiation and integration occur when students learn about their own personal characteristics and understand how they help to shape their individual identities. A student's environment offers challenge and support and the goal is to find the optimal dissonance for each individual. If the environment presents too much of a challenge than students tend to regress to earlier behavior, polarize current modes of behavior, advert the challenge, or avoid the challenge (Sanford, 1966). Based on Sanford's (1966) theory of challenge and support, students must be faced with situations that challenge their current coping mechanisms, behaviors, and beliefs in order for growth or development to occur. It is the responsibility of postsecondary institutions to create an environment that offers the optimal amount of challenge and support, which is the overall goal of dual enrollment programs.

## Summary

It is apparent from the literature that students benefit from participation in dual enrollment and/or AP programs. The facilitation and structure of dual enrollment programs vary from state to state and differ from AP courses; however, both programs were designed to challenge students and help them become acclimated to college level coursework. Research focuses on participation in one particular program (AP or dual enrollment), perception of program, or is conducted by an institution that is trying to quantify the outcomes of participation in their own program. Therefore, it is necessary to enhance the research by conducting a study that compares the outcomes of participating in dual enrollment and AP programs. The next chapter will explain the design of this study, how data was obtained, and how it was analyzed.

## CHAPTER 3

### METHODOLOGY

There is very little direct literature available regarding the success of dual enrollment programs; therefore, these programs are under a high level of scrutiny for their academic and personal value. Dual enrollment and AP programs enable high school students to fulfill the requirements for their first year in college and therefore these students may be able to graduate early. There is a need to gather more information about the characteristics of students who participate in the dual enrollment programs and their levels of achievement to supplement the outcomes that have already been reported in previous studies (Hoffman, 2003). This study worked to quantify the benefits of enrollment in such programs. Porter (2003) indicated that the retention and time-to-degree attainment rates of students earning dual enrollment credits should be compared to those students who have earned AP credits. This study evaluated students who have enrolled in dual enrollment programs or AP courses through their high schools and how the dual enrollment and/or AP credits have impacted their first to second year persistence, first semester GPA, graduation rate within four years, and time-to-degree attainment at a four-year, public institution located in Western Pennsylvania.

#### Research Questions

1. Is there a statistically significant difference in first semester GPA among students who have dual enrollment credits, AP credits, both dual enrollment and AP credits, and traditional students?

2. Is there a statistically significant difference between the SAT scores of students who participated in dual enrollment programs, students who participated in AP programs, students who participated in both dual enrollment and AP programs, and traditional students?
3. Is there a statistically significant difference between the persistence of students who participated in dual enrollment programs, students who participated in AP programs, students who participated in both dual enrollment and AP programs, and traditional students?
4. Is there a statistically significant difference between the four-year graduation rate of students who participated in dual enrollment programs, students who participated in AP programs, students who participated in both dual enrollment and AP programs, and traditional students?
5. Is there a statistically significant difference between the time-to-degree attainment of students who participated in dual enrollment programs, students who participated in AP programs, students who participated in both dual enrollment and AP programs, and traditional students?
6. Is there a statistically significant difference in the gender of students who participated in dual enrollment programs, students who participated in AP programs, students who participated in both dual enrollment and AP programs, and traditional students?

7. Is there a statistically significant difference between the ethnicity of students who participated in dual enrollment programs, students who participated in AP programs, students who participated in both dual enrollment and AP programs, and traditional students?

#### Choice of Quantitative Research Method

There are several different approaches that have been used to research student retention including quantitative, qualitative, or a mixed-method design. Qualitative research attempts to describe a situation as it exists and tries to determine patterns or trends that transpire (Slavin, 2007). Oftentimes the researcher is immersed into the situation attempting to describe fully the events that unfold. Qualitative data is best used to examine an experience from the participant's perspective and when the phenomena to be studied are complex human interactions that are not easily quantifiable (Gay & Airasian, 2000).

Quantitative research collects data (often numerical) from individuals and uses statistical analysis to determine if, and to what extent, a relationship exists among them (Slavin, 2007). Based on these differences, the main research questions for this study will be addressed through a non-experimental, quantitative research design because the researcher is seeking to evaluate how AP and/or dual enrollment credits have affected student persistence from first year to second year, first semester GPA, graduation completion within four years, and time-to-degree attainment.

The researcher selected the use of longitudinal data because it easily allows tracking the student from the time of matriculation through the expected time of degree completion. By using longitudinal data, a researcher is able to control for the initial

differences among students when they first enter college (Harrington, 2005).

Longitudinal studies collect data two or three times in order to measure change over a period of time and are useful to the dynamics of a topic or issue (Gay & Airasian, 2000).

Due to this research, preexisting data will be used to conduct this study. By using longitudinal data, the researcher will be able to capture preexisting data through the course of a student's college career. A longitudinal study is likely to have more validity if the data is extracted from college records rather than to rely on a self-report survey (Porter, 2003). In addition, a benefit of using a longitudinal approach is that the cohorts can easily be compared because they are all involved at the same level (Gay & Airasian, 2000).

### Research Design

The researcher used a cohort longitudinal study which examined specific groups of students over time and compared their enrollment at an initial point in time and at regular intervals to determine if there is difference in degree attainment within four years, first to second year persistence, first semester GPA, and time-to-graduation between students who have participated in dual enrollment programs, AP programs, both dual enrollment and AP programs and traditional students. Participants were divided into four groups including students with AP credits, students with dual enrollment credits, students with both dual enrollment and AP credits, and traditional students.

## Setting and Participants

The target population for this study was all first-time, traditional first-year students who earned dual enrollment or AP credits prior to enrolling at a public, western Pennsylvania university during the fall of 2005. A traditional first-year student is defined in this study as a student who entered the university the fall after he or she graduated from high school. During the fall of 2005, there were 2,279 total traditional, first-time, first-year students admitted and enrolled; and of the 2,279 total traditional first-year students, 94 had AP credits, 107 transferred in credits from a dual enrollment experience prior to entering the university, and 21 students participated in both AP and dual enrollment programs.

Indiana University of Pennsylvania is a public, doctoral granting institution within the Pennsylvania State System of Higher Education (PASSHE) and was founded in 1875. IUP is the largest of fourteen institutions in PASSHE with a total of 14,018 students, 11,724 which are undergraduates (IUP, 2008). The campus is situated on 374 acres and is nestled in a rural town in Western Pennsylvania. IUP has four-year graduation completion rate of 26.62%, a six-year graduation completion rate of 49.09%, and 75.77% of students are retained from their first year to sophomore year (IUP, 2008). IUP employs approximately 822 faculty members and offers over 100 undergraduate majors (IUP, 2008).

## Validity and Reliability

Longitudinal data allows the researcher to compare the same subject at continuous intervals over an extended period of time; therefore, it has high internal validity and provides good quantitative, descriptive, and analytical data for the study of attrition and

retention (Diggle, Liang, & Zeger, 1995). One of the concerns about using preexisting data is the demand for file data accuracy and consistency of data captured within files over time (Diggle, Liang, & Zeger, 1995).

All studies pertaining to persistency and graduation rates, regardless of design, are strictly correlation (Delicath, 1999). Therefore, no causal links can be established. If one finds a variable, or group of variables, that is significantly related to graduation rates, the researcher can only state the relationship is probably not due to chance (Delicath, 1999). An additional limitation is that a correlation between X and Y may mean that X is a determinate of Y, or that Y is a determinate of X, or that a third variable Z determines both X and Y, or that the relationship between X and Y is due to an artifact or unknown factor (Harrington, 2005).

#### Data Collection

The Office of Institutional Research, Planning, and Assessment, extracted the data in this study from the institution's Banner system, which is the name of software, developed by Sungard Higher Education and used by the University to manage its business including the storage of all student information. The institution uses the Banner system to enter, maintain, analyze, and retrieve student data. The following information was extracted from the Banner system:

1. All 2005 first-year students who graduated from high school in May or June of 2005
2. Gender
3. Ethnicity
4. Standardized test scores (SAT)

5. The type (dual enrollment or AP) of college credit hours accumulated prior to entering the university
6. Grade point average at the end of the first semester
7. Last semester of attendance or graduation semester

#### Description of Variables

For purposes of this study, the independent variables that were examined included gender, ethnicity, SAT scores, dual enrollment credits, and AP credits. The dependent variables are first year to second year persistence, first semester GPA, graduation completion within four years, and time-to-degree attainment.

*High School Grade Point Average* is an average of grades earned through the student's high school career.

*College Grade Point Average* is the average grade earned at the completion of the student's first semester of attendance.

*Cumulative Grade Point Average* is an average of all the grades earned through graduation from college or the last semester attended.

*Standardized Test Score* includes the scores reported for the SAT reading and mathematics tests, and total score.

*Dual Enrollment Credit* is college credit hours awarded to first-time, first-year students prior to entering the university. Students earn these credits by taking courses at high school and a postsecondary institution simultaneously.

*Advanced Placement Credit* is college credit hours awarded to first-time, first-year students prior to entering the university. Students who register for special courses in their high school take a standardized test at the end of the course to earn these credits. At IUP, students receive college credit for a score of a three or higher on the AP exam.

*Persistence* is determined if a student continued enrollment from his or her first year to second year.

### Data Analysis

The researcher determined if students with dual enrollment and/or AP credits have a greater likelihood to persist, have a higher first semester GPA, graduate within four years, and graduate at an earlier rate than traditional students after statistically adjusting for differences in preexisting background variables. As stated above the dependent variables include persistence, graduation completion within four years, first semester GPA, and time-to-degree attainment and the independent variables include gender, ethnicity, SAT scores, dual enrollment credits, and AP credits. The researcher used descriptive statistics for the initial analysis of data. A Chi-square test is used to explore the relationship between two categorical variables (Pallant, 2007). According to Pallant, a Chi-square analysis “compares the observed frequencies or proportion of cases that occur in each of the categories, with the values that would be expected if there were no association between the two variables being measured” (p. 214). Therefore, a Chi-square was used to compare gender and ethnicity of students with dual enrollment credits, AP credits, both dual enrollment and AP credits, and traditional students. Additionally, a Chi Square to analyze the relationship between the dependent variables “degree attainment” and “persistence” and “time-to-degree attainment” and the independent

variables. In order to determine if dual enrollment and/or AP credit impacted first semester GPA or SAT score, the researcher needed to compare the mean scores between these groups. According to Pallant, a one-way ANOVA “compares the variability between the different groups (believed to be due to the independent variable) with the variability within each of the groups (believed to be due to chance)” (p. 242). Therefore, a one-way ANOVA was used to determine if participation in dual enrollment and/or AP programs had any influence on first semester GPA or SAT score.

### Summary

The review of literature suggests that participating in dual enrollment and/or AP programs positively affects a student’s persistence, first semester GPA, and degree attainment. This quantitative study used pre-existing data to analyze the difference in degree completion within four years, first to second year persistence, first semester GPA, and time-to-degree attainment between students who participated in dual enrollment programs, AP programs, both dual enrollment and AP programs, and traditional students. The Office of Institutional Research, Planning, and Assessment at IUP provided this researcher with data from the first time, first-first year students in the Fall 2005 cohort. The educational records of 2,279 students were entered into the Statistical Package for the Social Sciences (SPSS) program and analyzed. Outcomes, results, and implications for further research are discussed in Chapter Four and Chapter Five.

## CHAPTER FOUR

### RESULTS OF DATA ANALYSIS

The purpose of this study was to evaluate the difference in persistence from first year to second year, degree attainment within four years, first semester GPA, and time-to-degree completion of students with AP credits, dual enrollment credits, both AP and dual enrollment credits, and traditional students. Participation in AP and/or dual enrollment programs was analyzed along with several demographic characteristics and academic performance indicators to determine if AP and/or dual enrollment credits was more of a predictor of first to second year persistence, first semester GPA, degree attainment within four years, and time-to-degree completion than other variables.

The findings of this study were based upon data obtained from the Office of Institutional Research, Planning, and Assessment at IUP. Statistical Package for the Social Sciences (SPSS) Version 17.0 was used to analyze the data. This chapter is divided into the following sections which correspond to the research questions stated in Chapter One: (a) descriptive statistics describing the 2005 cohort; (b) analysis of first semester GPA; (c) analysis of SAT scores; (d) analysis of first to second year persistence; (e) analysis of degree attainment within four years; (f) analysis of time-to-degree completion.

#### Demographic Information

The Office of Institutional Research, Planning, and Assessment, extracted the data in this study from the institution's Banner system, which is the name of software, developed by Sungard Higher Education and used by the University to manage its business including the storage of all student information. This study utilized a data file of

the 2005 high school graduates who entered IUP in Fall 2005. This cohort included students who were attending IUP as full-time, degree seeking students who were not International or transferring from another institution. There were 2,279 students included in the data file. This section analyzed demographic information including credits earned before entering IUP, ethnicity, gender, and SAT scores.

*Credits Earned Before Entering IUP*

As shown in Table 1, 2057 students in the cohort did not participate in dual enrollment or AP programs (90.3%), 94 students participated in AP programs (4.1%), 107 participated in dual enrollment programs (4.7%), and 21 students participated in both dual enrollment and AP programs (.9%). Approximately 10% of the students earned college credit prior to attending IUP by participating in dual enrollment and/or AP programs.

Table 1

*Credit Description of Cohort*

<i>Credit Description of Cohort</i>		
	Frequency	Percent
Traditional	2057	90.3
Advanced Placement Credits	94	4.1
Dual Enrollment Credits	107	4.7
Both	21	.9
Total	2279	100.0

### *Gender of Cohort*

As shown in Table 2, 1270 students (55.7%) were female and 1009 (44.3%) were male.

Table 2

### *Gender Description of Cohort*

<i>Gender Description of Cohort</i>		
	Frequency	Percent
Female	1270	55.7
Male	1009	44.3
Total	2279	100.0

### *Ethnicity of Cohort*

Table 3 illustrates the ethnicity of the cohort. The majority of the cohort identified as White Non-Hispanic (76.7%) which represented 1748 students. There were 285 students who identified as Black Non-Hispanic (12.5%) followed by 146 students who identified as Unknown which represented 6.4% of the cohort. There were 43 students who identified as Latino (7.9%), 32 as Multi-Racial (1.4%), 17 as Asian or Pacific Islander (.7%), and 8 as American Indian or Alaskan Native (.4%).

Table 3

*Ethnicity Description of Cohort*

<i>Ethnicity Description of Cohort</i>		
	Frequency	Percent
American Indian or Alaskan Native	8	.4
Asian or Pacific Islander	17	.7
Black Non-Hispanic	285	12.5
Latino	43	1.9
Multi-Racial	32	1.4
Unknown	146	6.4
White Non-Hispanic	1748	76.7
Total	2279	100.0

*SAT Scores of Cohort*

To help determine academic performance the students demonstrated in the past, their total SAT scores were analyzed. As shown in Table 4, the mean SAT score for traditional students was 983.10. Students who participated in dual enrollment or AP programs scored higher on the SAT than traditional students. The mean score for students who participated in dual enrollment programs was 1051.90. Students who participated in AP programs scored nearly 150 points higher than dual enrollment students. The mean score for students who participated in AP programs was 1200.43 and students who participated in both AP and dual enrollment programs earned the highest mean score of 1246.67.

Table 4

*SAT Scores of Cohort*

<i>SAT Scores of Cohort</i>			
	Mean	Std. Deviation	N
Traditional	983.10	132.111	1951
Dual Enrollment	1051.90	112.866	100
Advanced Placement	1200.43	123.601	94
Both	1246.67	133.766	21

Results

In order to address the research questions, the data collected from Banner was imported into Statistical Package for the Social Sciences (SPSS) Version 17.0. SPSS was used to analyze the data.

First Semester GPA

This section corresponds to the research question that asked: Is there a statistically significant difference in first semester GPA among students who have dual enrollment credits, AP credits, both dual enrollment and AP credits, and traditional students? To answer this question, a one-way analysis of variance (ANOVA) was conducted to explore the impact of participating in dual enrollment or AP programs and a student's GPA at the end of his or her first semester. The cohort was coded into four groups including students who participated in dual enrollment programs, students who participated in AP programs, students who participated in both dual enrollment and AP programs, and students who did not participate in either program. This independent variable was labeled "altogether" for the purpose of this study. As shown in Table 5, a *p*

value of .001 was recorded against an alpha of  $<.05$ . Therefore participating in dual enrollment, AP, or both dual enrollment and AP programs does seem to impact students' GPA at the end of their first semester.

Table 5

*One-way ANOVA Test: Comparison of Participating in Dual Enrollment and AP Programs and First Semester GPA*

<i>First Semester GPA</i>					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	130.963	3	43.654	41.315	.001
Within Groups	2395.358	2267	1.057		
Total	2526.322	2270			

When a Post Hoc test was run, illustrated in Table 6, to investigate differences among subgroups, it was found there is a significant difference in first semester GPA between traditional students, students with dual enrollment credits, students with AP credits, and students with both dual enrollment and AP credits.

Table 6

*Post Hoc Test: First Semester GPA*

<i>First Semester GPA</i>				
(I) Altogether	(J) Altogether	Mean Difference (I-J)	Std. Error	p
Traditional	Advanced Placement	-.903*	.108	.001
	Dual Enrollment	-.612*	.102	.001
	Both	-1.149*	.225	.001
Dual Enrollment	Traditional	.612*	.102	.001
	Advanced Placement	-.290	.145	.261
	Both	-.537	.245	.188
Advanced Placement	Traditional	.903*	.108	.001
	Dual Enrollment	.291	.145	.261
	Both	-.246	.248	.805
Both	Traditional	1.149*	.225	.001
	Advanced Placement	.246	.248	.805
	Dual Enrollment	.537	.245	.188

*Note.* \*The mean difference is significant at the 0.05 level.

As shown in Table 7, students who did not participate in dual enrollment or AP programs had a mean GPA of 2.52. Students who participated in dual enrollment programs had a mean GPA of 3.13; students who participated in AP programs had a mean GPA of 3.42; and students who participated in both AP and dual enrollment programs had a mean GPA of 3.67.

Table 7

*First Semester GPA*

<i>First Semester GPA</i>			
	Mean	Std. Deviation	N
Traditional	2.52	1.04826	2049
Dual Enrollment	3.13	.81078	107
Advanced Placement	3.42	.88088	94
Both	3.67	.39190	21

## SAT Scores

This section corresponds to the research question that asked: Is there a statistically significant difference between the SAT scores of students who participated in dual enrollment programs, students who participated in AP programs, students who participated in both dual enrollment and AP programs, and traditional students? To answer this question, a one-way ANOVA was conducted to explore the impact of participating in dual enrollment or AP programs and a student's SAT score. As shown in Table 8, a  $p$  value of .001 was recorded against an alpha of  $<.05$ . Therefore participating in dual enrollment, AP, or both dual enrollment and AP programs does seem to impact students' SAT score.

Table 8

*One-way ANOVA Test: Comparison of Participating in Dual Enrollment and AP Programs and SAT Score*

<i>SAT Score</i>					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5873745.192	3	1957915.064	114.178	.001
Within Groups	3.707E7	2162	17147.978		
Total	4.295E7	2165			

When a Post Hoc test was run, illustrated in Table 9, to investigate differences among subgroups, it was found there is a significant difference in SAT score between traditional students, students with dual enrollment credits, students with AP credits, and students with both dual enrollment and AP credits. Students who did not participate in dual enrollment or AP programs had a mean SAT score of 983.10. Students who participated in dual enrollment programs had a mean SAT score of 1051.90; students who participated in AP programs had a mean SAT score of 1200.43; and students who participated in both AP and dual enrollment programs had a mean SAT score of 1246.67.

Table 9

*Post Hoc Test: SAT Score*

<i>SAT Score</i>				
(I) Altogether	(J) Altogether	Mean Difference (I-J)	Std. Error	p
Traditional	Advanced Placement	-217.325*	13.828	.001
	Dual Enrollment	-68.799*	13.426	.001
	Both	-263.566*	28.729	.001
Dual Enrollment	Traditional	68.799*	13.426	.001
	Advanced Placement	-148.526*	18.812	.001
	Both	194.767*	31.433	.001
Advanced Placement	Traditional	217.325*	13.828	.001
	Dual Enrollment	148.526*	18.812	.001
	Both	-46.241	31.607	.544
Both	Traditional	263.566*	28.729	.001
	Advanced Placement	46.241	31.607	.544
	Dual Enrollment	194.767*	31.433	.001

*Note.* \*The mean difference is significant at the 0.05 level.

Since there was a significant difference in both SAT scores and first semester GPA for traditional students and students who participated in dual enrollment and/or AP programs, an analysis of covariance was used to determine if these differences can be attributed to their participation in dual enrollment and/or AP programs. As shown in

Table 10, a  $p$  value of .001 was recorded against an alpha of  $<.05$ . Therefore participating in dual enrollment, AP, or both dual enrollment and AP programs, while adjusting for SAT score, does impact students' first semester GPA.

Table 10

*Analysis of Covariance: Comparison of Participating in Dual Enrollment and AP Programs and First Semester GPA with SAT as a Covariate*

<i>First Semester GPA</i>					
	Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	246.509a	4	61.627	60.804	.001
Intercept	37.984	1	37.984	37.477	.001
SAT	115.455	1	115.455	113.913	.001
Altogether	49.139	3	16.380	16.161	.001
Error	2183.156	2154	1.014		
Total	17013.120	2159			
Corrected Total	2429.665	2158			

When a Post Hoc test was run, illustrated in Table 11, to investigate differences among subgroups, it was found there is a significant difference in first semester GPA between traditional students, students with dual enrollment credits, students with AP credits, and students with both dual enrollment and AP credits while using SAT score as a covariate.

Table 11

*Post Hoc Test: First Semester GPA with SAT as Covariate*

<i>First Semester GPA</i>				
(I) Altogether	(J) Altogether	Mean Difference (I-J)	Std. Error	p
Traditional	Advanced Placement	-.521*	.112	.001
	Dual Enrollment	-.510*	.104	.001
	Both	-.685*	.225	.002
Dual Enrollment	Traditional	.510*	.104	.001
	Advanced Placement	-.010	.147	.943
	Both	-.175	.244	.474
Advanced Placement	Traditional	.521*	.112	.001
	Dual Enrollment	.010	.147	.943
	Both	-.164	.243	.500
Both	Traditional	.685*	.225	.002
	Advanced Placement	.164	.243	.500
	Dual Enrollment	.175	.244	.474

*Note.* \*The mean difference is significant at the 0.05 level.

As shown in Table 12, students who did not participate in dual enrollment or AP programs had an adjusted mean GPA of 2.55. Students who participated in dual enrollment programs had an adjusted mean GPA of 3.06; students who participated in AP programs had an adjusted mean GPA of 3.07; and students who participated in both AP and dual enrollment programs had an adjusted mean GPA of 3.23.

Table 12

*First Semester GPA with Adjusted Means*

<i>First Semester GPA Adjusted</i>	
	Mean
Traditional	2.55
Dual Enrollment	3.06
Advanced Placement	3.07
Both	3.23

Persistence From First Year to Second Year

This section corresponds to the research question that asked: Is there a statistically significant difference between the persistence of students who participated in dual enrollment programs, students who participated in AP programs, students who participated in both dual enrollment and AP programs, and traditional students? To answer this question a cross-tabulation and Pearson Chi Square analysis were calculated. As shown in Table 13, 75.2% of traditional students persisted from Fall 2005 to Fall 2006, compared to 87.2% of students who participated in AP programs, 85.0% of students who participated in dual enrollment programs, and 95.2% of students who participated in both.

Table 13

*Fall 2005 to Fall 2006 Persistence by Dual Enrollment, AP, and Non-Dual Enrollment*

*Participation (Frequency and Percentage)*

	Persistence from Fall 2005 to Fall 2006	
Dual Enrollment, AP, and Non-Dual Enrollment Participation	NO Freq	YES Freq
Traditional Students	511 (24.8%)	1546 (75.2%)
Advanced Placement	12 (12.8%)	82 (87.2%)
Dual Enrollment	16 (15.0%)	91 (85.0%)
Both	1 (4.8%)	20 (95.2%)

This comparison revealed that students who have participated in AP programs, dual enrollment programs, or both programs persisted from Fall 2005 to Fall 2006 at higher rates than traditional students. The difference between the four groups was found to be statistically significant by the Pearson Chi-Square test ( $X^2=16.93$ ,  $df=3$ ,  $p<.001$ ), as illustrated in Table 14.

Table 14

*Significance of Dual Enrollment and AP Program Participation on College Persistence*

*Fall 2005-Fall2006 by Pearson Chi-Square*

	Persistence from Fall 2005 to Fall 2006		
Dual Enrollment, AP, and Non-Dual Enrollment Participation	$X^2$	df	p-value
	16.93	3	$p<.001$

The resulting  $p$  value was less than .001, which is less than the  $\alpha$ -value of .05 deemed to be statistically significant. Therefore, the null hypothesis was rejected. The study found a difference in first to second year persistence for the proportion of students who participated in AP, dual enrollment, or both programs and the proportion of students who did not.

#### Degree Attainment Within Four Years

This section corresponds to the research question that asked: Is there a statistically significant difference between the four-year graduation rate of students who participated in dual enrollment programs, students who participated in AP programs, students who participated in both dual enrollment and AP programs, and traditional students? To answer this question a cross-tabulation and Pearson Chi Square analysis were calculated. As shown in Table 15, 20.6% of traditional students graduated from IUP within four years from entering the institution, compared to 44.7% of students who participated in AP programs, 39.3% of students who participated in dual enrollment programs, and 61.9% of students who participated in both.

Table 15

*Four-Year Graduation Rate by Dual Enrollment, AP, and Non-Dual Enrollment*

*Participation (Frequency and Percentage)*

Dual Enrollment, AP, and Non-Dual Enrollment Participation	Four-Year Graduation Rate	
	NO Freq	YES Freq
Traditional Students	1634 (79.4%)	423 (20.6%)
Advanced Placement	52 (55.3%)	42 (44.7%)
Dual Enrollment	65 (60.70%)	42 (39.3%)
Both	8 (38.1%)	13 (61.9%)

This comparison revealed that students who have participated in AP programs, dual enrollment programs, or both programs graduated within four years at higher rates than traditional students. The difference between the four groups was found to be statistically significant by the Pearson Chi-Square test ( $X^2=66.075$ ,  $df=3$ ,  $p<.001$ ), as illustrated in Table 16.

Table 16

*Significance of Dual Enrollment and AP Program Participation on Four-Year*

*Graduation Rate by Pearson Chi-Square*

Dual Enrollment, AP, and Non-Dual Enrollment Participation	Four-Year Graduation Rate		
	$X^2$	df	p-value
	66.075	3	$p<.001$

The resulting  $p$  value was less than .001, which is less than the  $\alpha$ -value of .05 deemed to be statistically significant. Therefore, the null hypothesis was rejected. The study found a difference in four-year graduation rate for the proportion of students who participated in AP, dual enrollment, or both programs and the proportion of students who did not.

#### Time-to-Degree Attainment

This section corresponds to the research question that asked: Is there a statistically significant difference between the time-to-degree attainment of students who participated in dual enrollment programs, students who participated in AP programs, students who participated in both dual enrollment and AP programs, and traditional students? To answer this question a cross-tabulation and Pearson Chi Square analysis were calculated. The cohort was coded into four groups including students who did not graduate, graduated in Summer 2008, graduated in Fall 2008, and graduated in Spring 2009. As shown in Table 17, 22.8% of the cohort graduated. Of the 470 students who graduated in Spring 2009, 17.2% participated in AP and/or dual enrollment programs. Of the 42 students who graduated in Fall 2008, 31.0% participated in AP and/or dual enrollment programs. Of the 8 students who graduated in Summer 2008, 38.0% participated in AP and/or dual enrollment programs.

Table 17

*Time to Degree Attainment by Dual Enrollment, AP, and Non-Dual Enrollment**Participation (Frequency and Percentage)*

Dual Enrollment, AP, and Non-Dual Enrollment Participation	Time-to-Degree Attainment			
	Did Not Graduate	Summer 2008	Fall 2008	Spring 2009
Traditional Students	1634 (79.4%)	5 (0.2%)	29 (1.4%)	389 (19.9%)
Advanced Placement	52 (55.3%)	0 (0.0%)	3 (3.2%)	39 (41.5%)
Dual Enrollment	65 (60.70%)	2 (1.9%)	6 (5.6%)	34 (31.8%)
Both	8 (38.1%)	1 (4.8%)	4 (19.0%)	8 (38.1%)

This comparison revealed that students who have participated in AP programs, dual enrollment programs, or both programs graduated in less time than students who did not participate in these programs. The difference between the four groups was found to be statistically significant by the Pearson Chi-Square test ( $X^2=112.064$ ,  $df=9$ ,  $p<.001$ ), as illustrated in Table 18.

Table 18

*Significance of Dual Enrollment and AP Program Participation on Time-to-Degree**Attainment by Pearson Chi-Square*

Dual Enrollment, AP, and Non-Dual Enrollment Participation	Time-to-Degree Attainment		
	$X^2$	df	p-value
	112.064	9	$p<.001$

The resulting  $p$  value was less than .001, which is less than the  $\alpha$ -value of .05 deemed to be statistically significant. Therefore, the null hypothesis was rejected. The study found a difference in the time-to-degree attainment for the proportion of students who participated in AP, dual enrollment, or both programs and the proportion of students who did not.

### Gender

This section corresponds to the research question that asked: Is there a statistically significant difference in the gender of students who participated in dual enrollment programs, students who participated in AP programs, students who participated in both dual enrollment and AP programs, and traditional students? To answer this question a cross-tabulation and Pearson Chi Square analysis were calculated. As shown in Table 19, 54.9% of traditional students are women, compared to 60.6% of students who participated in AP programs, 66.4% of students who participated in dual enrollment programs, and 57.1% of students who participated in both.

Table 19

*Gender by Dual Enrollment, AP, and Non-Dual Enrollment Participation (Frequency and Percentage)*

Dual Enrollment, AP, and Non-Dual Enrollment Participation	Gender	
	Male Freq	Female Freq
Traditional Students	927 (45.1%)	1130 (54.9%)
Advanced Placement	37 (39.4%)	57 (60.6%)
Dual Enrollment	36 (33.6%)	71 (66.4%)
Both	9 (42.9%)	12 (57.1%)

This comparison revealed that there is an association between gender and participation in dual enrollment and/or AP programs. As shown in Table 20, the difference between the four groups was found to be statistically significant by the Pearson Chi-Square test ( $X^2=6.36$ ,  $df=3$ ,  $p<.01$ ).

Table 20

*Significance of Dual Enrollment and AP Program Participation and Gender by Pearson Chi-Square*

		Gender	
Dual Enrollment, AP, and Non-Dual Enrollment Participation	$X^2$	df	p-value
	6.36	3	$p<.01$

The resulting  $p$  value was less than .01, which is less than the  $\alpha$ -value of .05 deemed to be statistically significant. Therefore, the null hypothesis was rejected. The study found a difference in gender for the proportion of students who participated in AP, dual enrollment, or both programs and the proportion of students who did not.

#### Ethnicity

This section corresponds to the research question that asked: Is there a statistically significant difference between the ethnicity of students who participated in dual enrollment programs, students who participated in AP programs, students who participated in both dual enrollment and AP programs, and traditional students? To answer this question a cross-tabulation and Pearson Chi Square analysis were calculated. Due to the low numbers of minority students in cohort, the data was coded into four

groups including “White Non-Hispanic,” “Black Non-Hispanic,” “Unknown,” and “Other.” The “Other” category included students who identified themselves as “Latino,” “Multi-Racial,” “Asian or Pacific Islander,” and “American Indian or Alaskan Native.” As shown in Table 21, 75.5% of traditional students identified themselves as White Non-Hispanic, compared to 79.8% of students who participated in AP programs, 93.5% of students who participated in dual enrollment programs, and 90.5% of students who participated in both.

Table 21

*Ethnicity by Dual Enrollment, AP, and Non-Dual Enrollment Participation (Frequency and Percentage)*

Dual Enrollment, AP, and Non-Dual Enrollment Participation	Ethnicity			
	White Non-Hispanic	Black Non-Hispanic	Unknown	Other
Traditional Students	1554 (75.5%)	280 (13.6%)	132 (6.4%)	91 (4.4%)
Advanced Placement	75 (79.8%)	3 (3.2%)	9 (9.6%)	7 (7.4%)
Dual Enrollment	100 (93.5%)	2 (1.9%)	4 (3.7%)	1 (.9%)
Both	19 (90.5%)	0 (0.0%)	1 (4.8%)	1 (4.8%)

This comparison revealed that there is an association between ethnicity and participation in dual enrollment and/or AP programs. As illustrated in Table 22, the difference between the four groups was found to be statistically significant by the Pearson Chi-Square test ( $X^2=33.43$ ,  $df=9$ ,  $p<.001$ ).

Table 22

*Significance of Dual Enrollment and AP Program Participation and Ethnicity by*

*Pearson*

*Chi-Square*

		Ethnicity	
Dual Enrollment, AP, and Non-Dual Enrollment Participation	X <sup>2</sup>	df	p-value
	33.43	9	p<.001

The resulting *p* value was less than .001, which is less than the  $\alpha$ -value of .05 deemed to be statistically significant. Therefore, the null hypothesis was rejected. The study found a difference in ethnicity for the proportion of students who participated in AP, dual enrollment, or both programs and the proportion of students who did not.

Summary

This chapter presented the analysis for the data obtained from the Office of Institutional Research, Planning, and Assessment for the 2005 high school graduates who entered IUP in Fall 2005. The data analysis concluded that students who participated in dual enrollment and/or AP programs had statistically significant higher first semester GPAs, persistence rates, four-year graduation rates, and graduated in less time than traditional students. Chapter Five will discuss the conclusions and recommendations derived from this study.

## CHAPTER FIVE

### SUMMARY, RECOMMENDATIONS, AND CONCLUSIONS

Although the majority of graduating high school seniors indicated that they intend to earn a bachelor's degree, in 2001 only 28% of high school graduates held a degree and only 58% of graduates aged 25 to 29 completed some college (NCES, 2001). Based on these statistics it is evident that students may have difficulty transitioning from secondary to postsecondary institutions. Since many students leave the institution for voluntary or involuntary circumstances, it is important to recruit students who are likely to persist. Furthermore, university administrators recognize that it is more effective and less costly to retain current students than to continuously locate, recruit, and enroll new first-year and transfer students (Delicath, 1999). Many factors including high school GPA, class rank, standardized test scores, and performance in college-prep courses help institutions predict whether or not a student is likely to be retained. Students may choose to voluntarily leave the institution or they may struggle meeting the academic and social demands that are required at the college level. Whatever the reason may be, dual enrollment and AP programs help bridge the gap between secondary and postsecondary institutions by smoothing the transition between high school and college. There are very few studies that quantify the benefits of participating in dual enrollment and/or AP programs. Of the studies that have been conducted only one by Delicath (1999) compared students who participated in dual enrollment and AP programs.

The purpose of this study was to examine the difference in first semester GPA, persistence from first year to second year, degree completion within four years, and time-to-degree attainment of students with AP credits, dual enrollment credits, both dual

enrollment and AP credits, and traditional students. Participation in AP and/or dual enrollment programs was analyzed along with several demographic characteristics and academic performance indicators to determine if earning AP and/or dual enrollment credit(s) was more of a predictor of first semester GPA, first to second year persistence, degree completion within four years, and time-to-degree attainment than other variables. Specifically, the following research questions were addressed:

1. Is there a statistically significant difference in first semester GPA among students who have dual enrollment credits, AP credits, both dual enrollment and AP credits, and traditional students?
2. Is there a statistically significant difference between the SAT scores of students who participated in dual enrollment programs, students who participated in AP programs, students who participated in both dual enrollment and AP programs, and traditional students?
3. Is there a statistically significant difference between the persistence of students who participated in dual enrollment programs, students who participated in AP programs, students who participated in both dual enrollment and AP programs, and traditional students?
4. Is there a statistically significant difference between the four-year graduation rate of students who participated in dual enrollment programs, students who participated in AP programs, students who participated in both dual enrollment and AP programs, and traditional students?

5. Is there a statistically significant difference between the time-to-degree attainment of students who participated in dual enrollment programs, students who participated in AP programs, students who participated in both dual enrollment and AP programs, and traditional students?
6. Is there a statistically significant difference in the gender of students who participated in dual enrollment programs, students who participated in AP programs, students who participated in both dual enrollment and AP programs, and traditional students?
7. Is there a statistically significant difference between the ethnicity of students who participated in dual enrollment programs, students who participated in AP programs, students who participated in both dual enrollment and AP programs, and traditional students?

A review of literature was compiled and analyzed which include a historical perspective of AP and dual enrollment programs, statewide program structure and organization, benefits of dual enrollment programs, challenges of dual enrollment programs, review of studies related to dual enrollment and AP programs, and a review of studies related to college student retention.

The Office of Institutional Research, Planning, and Assessment, extracted the data in this study from the institution's Banner system, which is the name of software, developed by Sungard Higher Education and used by the University to manage its business including the storage of all student information. This study utilized a data file of the 2005 high school graduates who entered IUP in Fall 2005. The cohort included all full-time, degree-seeking students who were enrolled for the first time. It did not include

International, transfer, or non-traditional students. There were 2,279 students included in the data file. Of the 2,279 students, 2,057 did not participate in dual enrollment or AP programs (90.3%), 94 students participated in AP programs (4.1%), 107 participated in dual enrollment programs (4.7%), and 21 students participated in both dual enrollment and AP programs (.9%). Statistical Package for the Social Sciences (SPSS) Version 17.0 was used to analyze the data.

### Limitations

The population in this study consisted of students who entered IUP in Fall 2005 and met the following criteria:

- Graduated from high school in May or June 2005
- Entered IUP as first-time students
- Enrolled as full-time, degree-seeking students

The study focused on one cohort of students who met these criteria. Since the researcher specifically looked at the impact of participating in dual enrollment and/or AP programs on first semester GPA, persistence rates, degree completion within four years, and time-to-degree attainment, International students, transfer students, and students who took time off between high school and college were not included in the study. The data did not include transfer students because the researcher would not be able to determine if credit(s) earned prior to attending IUP was from a dual enrollment or AP program. The study also excluded International students because this population does not experience dual enrollment or AP programs that exist in the United States. Students who did not enter IUP immediately following graduation from high school were excluded because the researcher would not be able to account for life experiences and many of these students

are not enrolled full time or in a degree seeking program. Additionally, there is not a process in place to obtain information about students who voluntarily leave the institution or transfer to another school; therefore, the researcher was unable to track students who left IUP.

The data file obtained from the Office of Institutional Research, Planning and Assessment included the type of credit earned (either AP or dual enrollment) and from which institution the credit was transferred; therefore, the researcher is unaware of the format in which the dual enrollment credit(s) were earned. Furthermore, it cannot be determined if one format impacts first semester GPA, first to second year persistence, four-year degree completion rates, and time-to-degree attainment more than another format. Additionally, this study did not consider all pre-college attributes such as high school GPA, high school rank, educational level of parent(s), high school courses taken, or SES.

The following summary statements, recommendations, and conclusions are based on the analysis of data from 2,279 first-time, full-time, first-year students who entered IUP in the Fall of 2005.

#### Summary of SAT Scores and First Semester GPA

There are many factors that institutions use to predict academic success and persistence when considering a student's application for admission. These factors may include high school GPA, class rank, standardized test scores, performance in college-prep courses, etc. Pre-college standardized test scores such as the SAT and ACT are used by institutions as reliable and valid predictors of first semester GPA and persistence (House & Keeley, 1997). For this study the researcher wanted to determine if there is a

statistically significant difference in SAT scores for students who participated in dual enrollment programs, AP programs, both dual enrollment and AP programs, or traditional students. A one-way ANOVA determined that students who participated in both dual enrollment and AP programs earned the highest mean SAT score of 1246.67. This score is nearly 260 points higher than traditional students. Students who participated in AP programs also earned a mean SAT score approximately 200 points higher than traditional students; and students who participated in dual enrollment programs earned a mean SAT score of 1051.90, which is 68.8 points higher than the average SAT score for traditional students. Reflective of past research, this study highlights similar findings in the standardized test scores of students who participated in dual enrollment and/or AP programs and traditional students. Duffy (2009) studied 4,713 first-time, full-time freshman at the University of Tennessee at Martin and concluded that students who participated in AP and dual enrollment programs earned higher mean scores on the ACT than traditional students. Similar to this study, students who participated in AP programs earned a mean score of 27.4 compared to 23.85 for students who participated in dual enrollment programs and 21.49 for traditional students (Duffy, 2009). Research conducted by Brown-Ingles (2003) and Shannon (2005) confirmed that students who participated in dual enrollment programs performed better on standardized tests than traditional students. One may expect results similar to these because research demonstrates that students who participate in dual enrollment and/or AP programs are already highly motivated and academically proficient (Bailey, Hughes, & Karp, 2002).

In addition to SAT scores, first semester GPA is also a strong predictor of student success. According to Pascarella and Terenzini (2005), GPA serves as the best predictor of academic achievement and persistence in the first year of school. For this study the researcher wanted to determine if there is a statistically significant difference in first semester GPA for students who participated in dual enrollment programs, AP programs, both dual enrollment and AP programs, or traditional students. A one-way ANOVA determined that students who participated in both dual enrollment and AP programs had a mean GPA of 3.67 at the end of their first semester. This mean score is 1.15 points higher than traditional students ( $M=2.52$ ), which is the difference of earning an “A” average versus a “C” on a 4.0 scale. Students who participated in dual enrollment programs had a mean GPA of 3.13 and students who participated in AP programs had a mean GPA of 3.42.

Since there was a significant difference in both SAT scores and first semester GPA for traditional students and students who participated in dual enrollment and/or AP programs, the researcher wanted to control for the students’ SAT score to determine if these differences can be attributed to their participation in dual enrollment and/or AP programs. An analysis of covariance determined that even after adjusting for SAT score the adjusted mean first semester GPA for students who participated in both dual enrollment and AP programs was 3.23. This mean adjusted GPA is .68 of a point higher than traditional students. The adjusted mean GPA for students who participated in dual enrollment ( $M=3.06$ ) and AP ( $M=3.07$ ) programs was over one half of a point higher than traditional students. It is evident that participating in dual enrollment and/or AP programs greatly impacts students’ first semester GPA.

In regard to first semester GPA, studies conducted at LSSU (Shannon, 2005) and four-year, public universities in Texas (Peng, 2003) demonstrated that students who participated in dual enrollment programs earned higher first semester GPAs than traditional students. Hartman (2007) collected data from 4,000 dual enrollment students and determined that they performed better academically than traditional students. Results are similar for students who participated in AP programs. According to The College Board (2006), the grades of 18,000 students enrolled in introductory sciences classes at 63 randomly selected U.S. institutions were reviewed, and students who took an AP course in the same subject earned higher grades. It has been noted that students who participate in dual enrollment and/or AP programs are likely to develop study habits necessary to complete college level coursework. Students who participate in dual enrollment and/or AP programs are likely to be exposed to more rigorous academic work; therefore, they are better prepared than traditional students to succeed their first semester in college.

#### Summary of Persistence From First Year to Second Year

The study concluded that students who participated in dual enrollment and/or AP programs had statistically significant higher proportions of first to second year persistence than traditional students. Students who participated in both dual enrollment and AP programs yielded the highest rates of first to second year persistence at 95.2%. Students who participated in either dual enrollment or AP programs had similar first to second year persistence rates of 85.0% and 87.2% respectively. These rates are approximately 10.0% higher than those of traditional students (75.2%). These results are similar to ones reported by other researchers. A study conducted at Arizona State

University indicated that students who participated in dual enrollment programs persist at higher rates than other students (Harrington, 2005). This study included 4,999 first-year students. The first to second year persistence rate for students who participated in dual enrollment programs was 84.0% compared to 71.1% for traditional students (Harrington, 2005). This study mirrors results by Delicath (1999), which determined that students who participated in dual enrollment programs had a first to second year persistence rate of 96.0% compared to the national norm of 79.0%. Participation in dual enrollment programs can greatly impact a student's social and academic integration, which can influence their commitment to the institution and intention to complete a degree (Tinto, 1993). These students are exposed to the academic rigors of college-level coursework, interact with faculty and other college students, experience the campus culture, and learn about student support services. All of which are activities that increase the likelihood that a student be retained by an institution.

Although prior research does not analyze first to second year persistence rates of students who participated in AP programs, this researcher expected dual enrollment students to persist at higher rates than AP students because they completed at least one college level course prior to entering the university. Since dual enrollment students assimilate the behavior of college students through anticipatory socialization, their prior experience would have solidified their desire to attend college and identified any academic and social deficiencies; therefore, they would be more likely to be retained than students who are experiencing college for the first time (Merton, 1968).

## Summary of Degree Attainment Within Four Years and Time-to-Degree Attainment

This study concluded that students who participated in dual enrollment and/or AP programs were more likely than traditional students to complete a degree within four years. Only 20.6% of traditional students graduated in four years compared to 61.9% of students who participated in both dual enrollment and AP programs. Students who participated in either dual enrollment or AP programs graduated within four years at nearly double the rate of traditional students at 39.3% and 44.7% respectively. Participating in dual enrollment and/or AP programs provides students with an increased opportunity to graduate from IUP in four years or less.

Similar to previous studies conducted by The College Board (2006), students who earned at least a three on the AP exam were more likely to complete college than those who scored lower or did not take the test. Furthermore, a California study yielded similar conclusions which indicated that after comparing students with similar academic and economic profiles, students who succeed on an AP exam are better prepared for the rigors of college and more likely to obtain a bachelor's degree (The College Board, 2006). These results were replicated in studies conducted by Harrington (2005) and Shannon (2005), which indicated that students who participate in dual enrollment programs are more likely to graduate than traditional students. Shannon (2005) concluded that 47.5% of students who participated in dual enrollment programs graduated compared to 31.6% of traditional students. Harrington's (2005) study determined that the five-year graduation rate for dual enrollment students was 58.7% compared to 41.4% for traditional

students. In the studies noted it appears as though participation in dual enrollment programs yields graduation rates at least 15% higher than traditional students.

Participating in dual enrollment and/or AP programs had a statistically significant impact on time-to-degree attainment as well. Only 1.6% of traditional students graduated in three and a half years or less compared to 23.8% of students who participated in both dual enrollment and AP programs. There were 7.5% of students with dual enrollment credits who graduated in three and a half years or less and 3.5% of students with AP credits. These results mirror prior research conducted by Delicath in 1999. Delicath's study concluded that students with AP credits take 2.7% less time to graduate than students without those credits. In addition, students with dual enrollment credits take 5.1% less time to graduate than students without those credits. Further research needs to be conducted that compares the number of AP and/or dual enrollment credits transferred to the institution to determine if that impacts time-to-degree attainment.

Tinto (1987) emphasized that pre-college programs need to go beyond providing only information and must encourage students to establish relationships with other new students, faculty and staff. Participation in dual enrollment programs exposes students to admissions' application processes, expectations of college faculty, and allows them to assimilate into the campus culture. These experiences increase a student's level of social and academic integration. According to Tinto (1987), students who have a greater level of social integration are more likely to persist and graduate.

## Summary of Gender and Ethnicity

This study concluded that women are more likely than men to participate in dual enrollment programs. A Chi-square analysis revealed that 66.4% of students who participated in dual enrollment programs were women compared to 54.9% of traditional students. Females were more likely to participate in AP programs as well constituting 60.6% of the population. This study highlights similar findings regarding gender and participation in dual enrollment programs. Buchanan (2006) and Peng (2003) determined that females participated in dual enrollment programs at a statistically significant higher rate than males. These findings may be attributed to research that demonstrated that females are more likely than males to earn a degree after having begun postsecondary education and to do so within four years (Astin, 2001; Tinto, 1993). However, males are more likely to attain a degree over longer periods of time than females because females who drop out are less likely to achieve their educational goals (Astin, 2001; Tinto, 1993).

Additionally, students who identify as White Non-Hispanic are more likely than other ethnic groups to participate in dual enrollment programs. A Chi-square analysis revealed that 93.5% of students who participated in dual enrollment programs identified themselves as being White Non-Hispanic compared to 75.5% of traditional students. These results mirror a study conducted by Peng (2003), which indicated that White students are more likely to enroll in dual enrollment programs in Texas high schools than other ethnic groups.

Only 1.9% of students who participated in dual enrollment programs identified themselves as being Black Non-Hispanic compared to 3.2% of students who participated in AP programs and 13.6% of traditional students. One of the reasons for such great

variance between ethnic groups may be due to high schools not being able to offer participation in dual enrollment and/or AP programs, which creates a severe disadvantage for low income and minority students attending these schools. According to Astin (2001), minority students oftentimes have difficulty persisting because they lack a connection with other members of social and academic communities and their needs and interests do not match those of the institution. Astin (2001) stated that minority students may come from disadvantaged backgrounds and may not have as many opportunities as other students; therefore, they may come to college with academic deficiencies. A study of 229 black high school students indicated that high school rank and student perception of social integration are strong predictors of persistence (Schwartz & Washington, 2002). Participation in dual enrollment programs may help these students to be more proactive in becoming more socially and academically integrated into the institution. These experiences should solidify their interest in earning a bachelor's degree and enable them to determine if the institution is a good fit both academically and socially.

High school guidance counselors need to place more of an emphasis on recruiting minorities and males to participate in dual enrollment and/or AP programs. The data revealed that students who do participate in these programs are more likely to graduate than traditional students. According to Brown-Ingles (2003), students who participated in dual enrollment programs had an increased level of motivation to succeed in high school and post secondary institutions. If more minority students and males participate in dual enrollment programs, their academic success and retention rates will increase as well.

## Recommendations for Constituents

The following recommendations are based on the analysis and conclusions derived from this study:

- Other institutions should conduct similar research to determine whether or not to expand their dual enrollment programs to include additional high schools or to increase the number of students who participate in their dual enrollment program.
- Institutions should more actively recruit students who participated in dual enrollment or AP programs.
- High school guidance counselors should recommend students to participate in dual enrollment and/or AP programs and more actively recruit males and minorities to participate.
- High school guidance counselors should use the data regarding degree completion and time-to-degree attainment to help promote participation in dual enrollment and AP programs.
- AP instructors should use the data regarding degree completion and time-to-degree attainment to encourage more of their students to take the AP exam and transfer the credit to their institution.
- Secondary and postsecondary institutions need to create ways to encourage ethnic minority students to participate in dual enrollment and AP programs.

## Recommendations for Future Research

The following recommendations for further research in student participation in dual enrollment and AP programs and their academic success and retention were derived from the results of this study:

- Continue to compare first semester GPA, first to second year persistence, four-year degree completion rates, and time-to-degree attainment among students who have participated in dual enrollment and/or AP programs and traditional students.
- Compare first semester GPA, first to second year persistence, four-year degree completion rates, and time-to-degree attainment for students who participated in IUP's dual enrollment program versus other programs.
- Determine what type of dual enrollment experiences students had including whether they took the course on a college campus, took it online, or were taught at a high school. Compare these groups and determine if one experience yields a higher first semester GPA, first to second year persistence rate, four-year degree completion rate, and time-to-degree attainment than another group.
- Expand research beyond IUP by analyzing the Pennsylvania State System of Higher Education and possibly nation-wide data. The current study limited its scope to one public four-year university in Pennsylvania. It would be beneficial to know if these same results would occur when the research is expanded to include private, two-year, and for-profit institutions.
- Analyze whether the number of dual enrollment and/or AP credits earned impacts first semester GPA, first to second year persistence, four-year degree completion rates, and time-to-degree attainment.

- A study is needed to examine the perceptions that different constituents have about the effectiveness of dual enrollment programs. The constituents could include high school teachers, guidance counselors, students, parents, college or university administrators, and college or university faculty.
- A study that has a better balance of students from different ethnic and gender backgrounds to examine the impact of participating in dual enrollment and/or AP programs.

### Conclusion

Research demonstrates clear economic benefits for continuing education beyond high school and therefore college aspirations have drastically increased in the last two decades (NCES, 2001). The costs associated with attending post-secondary institutions have escalated as well. Over the past decade, published tuition and fees have risen at an average rate of 2.4% per year after inflation at private four-year colleges compared to an average rate of 4.2% per year after inflation at public four-year institutions (The College Board, 2008). The number of undergraduates students borrowing in an academic year has risen from 20% to 35% between 1992 and 2004 (Choy & Li, 2006). Throughout the past decade the number of students graduating with debt and the amount of debt they incur has increased. Over two-thirds of students graduate from a four-year college or university with student loan debt and the average loan amount, \$19,200, has doubled since 1993 (The Project on Student Debt, 2006). It is also important to acknowledge that not all students who borrow end up obtaining a degree. Although the majority of students who accrue student loan debt in college are able to graduate and begin repayment, borrowing combined with other at-risk factors (such as working, inadequate academic

preparation, and part-time attendance) can leave many at a disadvantage (Gladieux & Perna, 2005). Not only are tuition rates and student borrowing on the rise, students are taking longer to complete a bachelor's degree. According to Wilson (1990), only 15% of students enrolled at four-year colleges were graduating within four years and less than half received a bachelor's degree within six years. In order to hold institutions accountable for students' progress toward degree attainment, the U.S. Congress passed the Student Right to Know and Campus Security Act. However, the U.S. Department of Education is now tracking graduation rates on a six-year rather than four year interval and reported that students are taking nearly five and a half years to graduate (Walker, 2006).

One way to combat the increasing cost of higher education, escalating student loan debt, and completing a degree in six years, is to admit students who are more likely to persist from first year to second, graduate, and graduate in less time. These findings conclude that participating in dual enrollment and/or AP programs impact students' persistence from first year to second year. Students who participated in dual enrollment and/or AP programs also have higher first semester GPAs, which increases the likelihood that they will be retained. These students graduate at higher rates and in less time than traditional students. Few studies test the longitudinal effects of participating in dual enrollment and/or AP programs in relation to persistence, degree completion, and time-to-degree attainment.

It is important for institutions to use dual enrollment and/or AP participation as a pre-college variable in predicting persistence, degree completion, and time-to-degree attainment. As described earlier, these programs are increasing in popularity and more students are coming to college with dual enrollment and/or AP credit(s). Research in this area needs to be continued so that constituents can make informed decisions about participating in or creating dual enrollment and/or AP programs.

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